NavSoft's

2011

Nautical Almanac

Contents	**Page**
Formulae	2
Horizontal Parallaxes and Semi-Diameters	2
Daily Pages	3 - 124
Star Charts by Month incl. Planets	125 - 136

Formulae

Dip = 0.971 x $Ht^{½}$ Ht in feet

or

Dip = 1.758 x $Ht^{½}$ Ht in meters

Refraction = 0.96/ Tan(Alt) Altitude > 11°

Parallax = HP x Cos(Alt)

Cos(Zenith Distance) = Sin(Lat) x Sin(Dec) + Cos(Lat) x Cos(Dec) x Cos(LHA)

Tan(Azimuth) = Sin(LHA) / [Cos(Lat) x Tan(Dec) - Sin(Lat) x Cos(LHA)]

ABC Tables

A = Cos(Lat) x Tan(Dec)

B = Sin(Lat) x Cos(LHA)

C = Sin(LHA) / Tan(Azimuth)

or

Azimuth = Atan[C/ Sin(LHA)]

Increments

Sun = 15°/ hour

Moon = 15°.041666'/ hour

Aries = 14°.316666'/ hour

Horizontal Parallaxes and Semi-Diameters for 2011

	Sun	Venus		Mars		Jupiter	Saturn
	SD	HP	SD	HP	SD	SD	SD
Jan 1	16'.3	0'.24	0'.23	0'.06	0'.03	0'.30	0'.13
Jan	16'.3	0'.20	0'.19	0'.06	0'.03	0'.29	0'.13
Feb	16'.2	0'.15	0'.15	0'.06	0'.03	0'.27	0'.14
Mar	16'.1	0'.13	0'.12	0'.06	0'.03	0'.26	0'.14
Apr	15'.9	0'.11	0'.10	0'.06	0'.03	0'.26	0'.14
May	15'.8	0'.10	0'.09	0'.06	0'.03	0'.27	0'.14
Jun	15'.7	0'.09	0'.09	0'.06	0'.03	0'.28	0'.13
Jul	15'.7	0'.09	0'.08	0'.07	0'.04	0'.30	0'.13
Aug	15'.8	0'.08	0'.08	0'.07	0'.04	0'.33	0'.12
Sep	15'.9	0'.09	0'.08	0'.08	0'.04	0'.37	0'.12
Oct	16'.0	0'.09	0'.09	0'.09	0'.05	0'.39	0'.12
Nov	16'.2	0'.10	0'.09	0'.10	0'.05	0'.39	0'.12
Dec	16'.2	0'.11	0'.10	0'.12	0'.07	0'.36	0'.12
Dec 31	16'.3	0'.11	0'.11	0'.14	0'.07	0'.34	0'.12

15th day of each month unless stated

Sun's HP = 0'.15

HP for Jupiter and Saturn < 0'.05

This Almanac was compiled using AstroNav which will print pages for any dates between 9999BC and 9999AD. It also includes data for all visible bodies at less than the cost of a printed Nautical Almanac. Further details and a demonstration version can be found at navsoft.com/astronav.html

Supplementary tables, which do not change from year to year, are available at navsoft.com/downloads.html

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2011 January 1, 2, 3 (Sat, Sun, Monday)

GMT	ARIES	VENUS -4.5		MARS +1.2		JUPITER -2.3		SATURN +0.9	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
1 Saturday 00	100° 18'.2	228° 13'.2	15° 16'.5 S	170° 15'.5	23° 09'.6 S	102° 57'.9	2° 32'.0 S	264° 01'.4	4° 19'.4 S
01	115° 20'.7	243° 13'.3	17'.1	185° 15'.9	09'.3	118° 00'.0	31'.8	279° 03'.8	19'.4
02	130° 23'.1	258° 13'.3	17'.6	200° 16'.3	09'.0	133° 02'.2	31'.7	294° 06'.1	19'.4
03	145° 25'.6	273° 13'.4	18'.2	215° 16'.6	08'.8	148° 04'.4	31'.6	309° 08'.5	19'.5
04	160° 28'.1	288° 13'.4	18'.7	230° 17'.0	08'.5	163° 06'.5	31'.4	324° 10'.9	19'.5
05	175° 30'.5	303° 13'.5	19'.3	245° 17'.4	08'.3	178° 08'.7	31'.3	339° 13'.2	19'.5
06	190° 33'.0	318° 13'.5	19'.9	260° 17'.8	08'.0	193° 10'.8	31'.1	354° 15'.6	19'.6
07	205° 35'.5	333° 13'.6	20'.4	275° 18'.2	07'.8	208° 13'.0	31'.0	9° 17'.9	19'.6
08	220° 37'.9	348° 13'.6	21'.0	290° 18'.5	07'.5	223° 15'.1	30'.8	24° 20'.3	19'.6
09	235° 40'.4	3° 13'.6	21'.6	305° 18'.9	07'.3	238° 17'.3	30'.7	39° 22'.6	19'.7
10	250° 42'.8	18° 13'.7	22'.1	320° 19'.3	07'.0	253° 19'.5	30'.6	54° 25'.0	19'.7
11	265° 45'.3	33° 13'.7	22'.7	335° 19'.7	06'.7	268° 21'.6	30'.4	69° 27'.4	19'.7
12	280° 47'.8	48° 13'.7	15° 23'.3 S	350° 20'.1	23° 06'.5 S	283° 23'.8	2° 30'.3 S	84° 29'.7	4° 19'.8 S
13	295° 50'.2	63° 13'.8	23'.8	5° 20'.4	06'.2	298° 25'.9	30'.1	99° 32'.1	19'.8
14	310° 52'.7	78° 13'.8	24'.4	20° 20'.8	06'.0	313° 28'.1	30'.0	114° 34'.4	19'.8
15	325° 55'.2	93° 13'.8	24'.9	35° 21'.2	05'.7	328° 30'.2	29'.8	129° 36'.8	19'.9
16	340° 57'.6	108° 13'.9	25'.5	50° 21'.6	05'.4	343° 32'.4	29'.7	144° 39'.2	19'.9
17	356° 00'.1	123° 13'.9	26'.1	65° 21'.9	05'.2	358° 34'.6	29'.6	159° 41'.5	19'.9
18	11° 02'.6	138° 13'.9	26'.6	80° 22'.3	04'.9	13° 36'.7	29'.4	174° 43'.9	19'.9
19	26° 05'.0	153° 14'.0	27'.2	95° 22'.7	04'.7	28° 38'.9	29'.3	189° 46'.2	20'.0
20	41° 07'.5	168° 14'.0	27'.8	110° 23'.1	04'.4	43° 41'.0	29'.1	204° 48'.6	20'.0
21	56° 10'.0	183° 14'.0	28'.3	125° 23'.5	04'.1	58° 43'.2	29'.0	219° 51'.0	20'.0
22	71° 12'.4	198° 14'.1	28'.9	140° 23'.8	03'.9	73° 45'.3	28'.8	234° 53'.3	20'.1
23	86° 14'.9	213° 14'.1	29'.4	155° 24'.2	03'.6	88° 47'.5	28'.7	249° 55'.7	20'.1
2 Sunday 00	101° 17'.3	228° 14'.1	15° 30'.0 S	170° 24'.6	23° 03'.3 S	103° 49'.6	2° 28'.5 S	264° 58'.0	4° 20'.1 S
01	116° 19'.8	243° 14'.1	30'.6	185° 25'.0	03'.1	118° 51'.8	28'.4	280° 00'.4	20'.2
02	131° 22'.3	258° 14'.1	31'.1	200° 25'.4	02'.8	133° 54'.0	28'.3	295° 02'.8	20'.2
03	146° 24'.7	273° 14'.2	31'.7	215° 25'.7	02'.6	148° 56'.1	28'.1	310° 05'.1	20'.2
04	161° 27'.2	288° 14'.2	32'.3	230° 26'.1	02'.3	163° 58'.3	28'.0	325° 07'.5	20'.2
05	176° 29'.7	303° 14'.2	32'.8	245° 26'.5	02'.0	179° 00'.4	27'.8	340° 09'.9	20'.3
06	191° 32'.1	318° 14'.2	33'.4	260° 26'.9	01'.8	194° 02'.6	27'.7	355° 12'.2	20'.3
07	206° 34'.6	333° 14'.2	33'.9	275° 27'.3	01'.5	209° 04'.7	27'.5	10° 14'.6	20'.3
08	221° 37'.1	348° 14'.3	34'.5	290° 27'.6	01'.2	224° 06'.9	27'.4	25° 16'.9	20'.4
09	236° 39'.5	3° 14'.3	35'.1	305° 28'.0	01'.0	239° 09'.0	27'.2	40° 19'.3	20'.4
10	251° 42'.0	18° 14'.3	35'.6	320° 28'.4	00'.7	254° 11'.2	27'.1	55° 21'.7	20'.4
11	266° 44'.4	33° 14'.3	36'.2	335° 28'.8	00'.4	269° 13'.3	27'.0	70° 24'.0	20'.5
12	281° 46'.9	48° 14'.3	15° 36'.8 S	350° 29'.2	23° 00'.1 S	284° 15'.5	2° 26'.8 S	85° 26'.4	4° 20'.5 S
13	296° 49'.4	63° 14'.3	37'.3	5° 29'.6	22° 59'.9 S	299° 17'.6	26'.7	100° 28'.8	20'.5
14	311° 51'.8	78° 14'.3	37'.9	20° 29'.9	59'.6	314° 19'.8	26'.5	115° 31'.1	20'.5
15	326° 54'.3	93° 14'.3	38'.4	35° 30'.3	59'.3	329° 21'.9	26'.4	130° 33'.5	20'.6
16	341° 56'.8	108° 14'.3	39'.0	50° 30'.7	59'.1	344° 24'.1	26'.2	145° 35'.8	20'.6
17	356° 59'.2	123° 14'.3	39'.6	65° 31'.1	58'.8	359° 26'.2	26'.1	160° 38'.2	20'.6
18	12° 01'.7	138° 14'.4	40'.1	80° 31'.5	58'.5	14° 28'.4	25'.9	175° 40'.6	20'.7
19	27° 04'.2	153° 14'.4	40'.7	95° 31'.8	58'.3	29° 30'.5	25'.8	190° 42'.9	20'.7
20	42° 06'.6	168° 14'.4	41'.3	110° 32'.2	58'.0	44° 32'.7	25'.6	205° 45'.3	20'.7
21	57° 09'.1	183° 14'.4	41'.8	125° 32'.6	57'.7	59° 34'.8	25'.5	220° 47'.7	20'.7
22	72° 11'.6	198° 14'.4	42'.4	140° 33'.0	57'.4	74° 37'.0	25'.4	235° 50'.0	20'.8
23	87° 14'.0	213° 14'.4	42'.9	155° 33'.4	57'.2	89° 39'.1	25'.2	250° 52'.4	20'.8
3 Monday 00	102° 16'.5	228° 14'.4	15° 43'.5 S	170° 33'.7	22° 56'.9 S	104° 41'.3	2° 25'.1 S	265° 54'.8	4° 20'.8 S
01	117° 18'.9	243° 14'.4	44'.1	185° 34'.1	56'.6	119° 43'.4	24'.9	280° 57'.1	20'.9
02	132° 21'.4	258° 14'.4	44'.6	200° 34'.5	56'.3	134° 45'.6	24'.8	295° 59'.5	20'.9
03	147° 23'.9	273° 14'.4	45'.2	215° 34'.9	56'.1	149° 47'.7	24'.6	311° 01'.9	20'.9
04	162° 26'.3	288° 14'.3	45'.7	230° 35'.3	55'.8	164° 49'.9	24'.5	326° 04'.2	20'.9
05	177° 28'.8	303° 14'.3	46'.3	245° 35'.7	55'.5	179° 52'.0	24'.3	341° 06'.6	21'.0
06	192° 31'.3	318° 14'.3	46'.9	260° 36'.0	55'.2	194° 54'.2	24'.2	356° 09'.0	21'.0
07	207° 33'.7	333° 14'.3	47'.4	275° 36'.4	54'.9	209° 56'.3	24'.0	11° 11'.3	21'.0
08	222° 36'.2	348° 14'.3	48'.0	290° 36'.8	54'.7	224° 58'.5	23'.9	26° 13'.7	21'.1
09	237° 38'.7	3° 14'.3	48'.6	305° 37'.2	54'.4	240° 00'.6	23'.7	41° 16'.1	21'.1
10	252° 41'.1	18° 14'.3	49'.1	320° 37'.6	54'.1	255° 02'.8	23'.6	56° 18'.4	21'.1
11	267° 43'.6	33° 14'.3	49'.7	335° 37'.9	53'.8	270° 04'.9	23'.4	71° 20'.8	21'.1
12	282° 46'.1	48° 14'.3	15° 50'.2 S	350° 38'.3	22° 53'.6 S	285° 07'.1	2° 23'.3 S	86° 23'.2	4° 21'.2 S
13	297° 48'.5	63° 14'.3	50'.8	5° 38'.7	53'.3	300° 09'.2	23'.1	101° 25'.5	21'.2
14	312° 51'.0	78° 14'.2	51'.4	20° 39'.1	53'.0	315° 11'.3	23'.0	116° 27'.9	21'.2
15	327° 53'.4	93° 14'.2	51'.9	35° 39'.5	52'.7	330° 13'.5	22'.8	131° 30'.3	21'.3
16	342° 55'.9	108° 14'.2	52'.5	50° 39'.9	52'.4	345° 15'.6	22'.7	146° 32'.6	21'.3
17	357° 58'.4	123° 14'.2	53'.0	65° 40'.2	52'.1	0° 17'.8	22'.6	161° 35'.0	21'.3
18	13° 00'.8	138° 14'.2	53'.6	80° 40'.6	51'.9	15° 19'.9	22'.4	176° 37'.4	21'.3
19	28° 03'.3	153° 14'.1	54'.2	95° 41'.0	51'.6	30° 22'.1	22'.3	191° 39'.7	21'.4
20	43° 05'.8	168° 14'.1	54'.7	110° 41'.4	51'.3	45° 24'.2	22'.1	206° 42'.1	21'.4
21	58° 08'.2	183° 14'.1	55'.3	125° 41'.8	51'.0	60° 26'.4	22'.0	221° 44'.5	21'.4
22	73° 10'.7	198° 14'.1	55'.8	140° 42'.2	50'.7	75° 28'.5	21'.8	236° 46'.8	21'.4
23	88° 13'.2	213° 14'.1	56'.4	155° 42'.5	50'.4	90° 30'.6	21'.7	251° 49'.2	21'.5
	M.P. 17:12	v 0'.0	d 0'.6	v 0'.4	d 0'.3	v 2'.2	d 0'.1	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.8 S
Achernar	335° 27'.8	57° 11'.1 S
Acrux	173° 11'.4	63° 09'.4 S
Adhara	255° 13'.5	28° 59'.3 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.1	55° 53'.6 N
Alkaid	153° 00'.3	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.7	26° 40'.5 N
Alpheratz	357° 45'.4	29° 09'.3 N
Altair	62° 10'.3	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.9 S
Antares	112° 28'.7	26° 27'.3 S
Arcturus	145° 57'.4	19° 07'.3 N
Atria	107° 32'.7	69° 02'.7 S
Avior	234° 18'.2	59° 32'.7 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.2 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.4 N
Denebola	182° 35'.3	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.6 S
Dubhe	193° 53'.4	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.5	51° 29'.2 N
Enif	33° 49'.1	9° 55'.7 N
Fomalhaut	15° 26'.0	29° 33'.9 S
Gacrux	172° 02'.9	57° 10'.3 S
Gienah	175° 54'.1	17° 36'.2 S
Hadar	148° 50'.7	60° 25'.4 S
Hamal	328° 02'.6	23° 31'.0 N
Kaus Aust.	83° 46'.5	34° 22'.7 S
Kochab	137° 20'.4	74° 06'.3 N
Markab	13° 40'.2	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.8	36° 25'.3 S
Miaplacidus	221° 39'.4	69° 45'.7 S
Mirfak	308° 42'.6	49° 54'.2 N
Nunki	76° 00'.9	26° 16'.9 S
Peacock	53° 22'.5	56° 42'.0 S
Polaris	318° 23'.4	89° 19'.1 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 08'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.5	60° 52'.6 S
Sabik	102° 14'.9	15° 44'.3 S
Schedar	349° 42'.6	56° 36'.2 N
Shaula	96° 24'.7	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.2	11° 13'.2 S
Suhail	222° 53'.4	43° 28'.6 S
Vega	80° 40'.6	38° 47'.7 N
Zuben'ubi	137° 07'.6	16° 05'.2 S

	SHA	Mer.Pass.
Venus	126° 56'.8	08:47
Mars	69° 07'.3	12:38
Jupiter	2° 32'.3	17:02
Saturn	163° 40'.7	06:19

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 12'.1	23° 02'.7 S	223° 57'.6	7'.2	22° 50'.4 S	4'.8	57'.8
194° 11'.8	02'.5	238° 23'.8	7'.1	55'.2	4'.7	
209° 11'.5	02'.3	252° 49'.9	7'.1	59'.9	4'.6	
224° 11'.2	02'.1	267° 16'.0	7'.0	23° 04'.5 S	4'.4	57'.7
239° 10'.9	01'.9	281° 42'.0	7'.1	08'.9	4'.3	
254° 10'.6	01'.7	296° 08'.1	7'.0	13'.2	4'.1	
269° 10'.3	01'.5	310° 34'.1	7'.0	17'.3	4'.0	
284° 10'.1	01'.3	325° 00'.1	7'.0	21'.3	3'.9	
299° 09'.8	01'.1	339° 26'.1	7'.0	25'.2	3'.7	
314° 09'.5	00'.9	353° 52'.1	7'.0	28'.9	3'.5	57'.6
329° 09'.2	00'.7	8° 18'.1	6'.9	32'.4	3'.5	
344° 08'.9	00'.5	22° 44'.0	7'.0	35'.9	3'.2	
359° 08'.6	23° 00'.3 S	37° 10'.0	6'.9	23° 39'.1 S	3'.2	57'.6
14° 08'.3	00'.1	51° 35'.9	6'.9	42'.3	2'.9	
29° 08'.0	22° 59'.9 S	66° 01'.8	7'.0	45'.2	2'.9	57'.5
44° 07'.7	59'.7	80° 27'.8	6'.9	48'.1	2'.7	
59° 07'.4	59'.5	94° 53'.7	6'.9	50'.8	2'.5	
74° 07'.1	59'.3	109° 19'.6	6'.9	53'.3	2'.4	
89° 06'.8	59'.1	123° 45'.5	6'.9	55'.7	2'.3	
104° 06'.5	58'.9	138° 11'.4	6'.9	58'.0	2'.1	57'.4
119° 06'.2	58'.7	152° 37'.3	7'.0	24° 00'.1 S	2'.0	
134° 05'.9	58'.5	167° 03'.3	6'.9	02'.1	1'.8	
149° 05'.6	58'.2	181° 29'.2	6'.9	03'.9	1'.7	
164° 05'.3	58'.0	195° 55'.1	7'.0	05'.6	1'.5	
179° 05'.0	22° 57'.8 S	210° 21'.1	6'.9	24° 07'.1 S	1'.4	57'.4
194° 04'.7	57'.6	224° 47'.0	7'.0	08'.5	1'.3	57'.3
209° 04'.4	57'.4	239° 13'.0	6'.9	09'.8	1'.1	
224° 04'.1	57'.2	253° 38'.9	7'.0	10'.9	0'.9	
239° 03'.9	57'.0	268° 04'.9	7'.0	11'.8	0'.8	
254° 03'.6	56'.7	282° 30'.9	7'.0	12'.6	0'.7	
269° 03'.3	56'.5	296° 56'.9	7'.0	13'.3	0'.5	57'.2
284° 03'.0	56'.3	311° 22'.9	7'.1	13'.8	0'.4	
299° 02'.7	56'.1	325° 49'.0	7'.0	14'.2	0'.2	
314° 02'.4	55'.9	340° 15'.0	7'.1	14'.4	0'.1	
329° 02'.1	55'.6	354° 41'.1	7'.1	14'.5	0'.1	
344° 01'.8	55'.4	9° 07'.2	7'.2	14'.4	0'.2	57'.1
359° 01'.5	22° 55'.2 S	23° 33'.4	7'.1	24° 14'.2 S	0'.3	57'.1
14° 01'.2	55'.0	37° 59'.5	7'.2	13'.9	0'.5	
29° 00'.9	54'.7	52° 25'.7	7'.3	13'.4	0'.7	
44° 00'.6	54'.5	66° 52'.0	7'.2	12'.7	0'.7	
59° 00'.3	54'.3	81° 18'.2	7'.3	12'.0	1'.0	57'.0
74° 00'.0	54'.1	95° 44'.5	7'.3	11'.0	1'.0	
88° 59'.8	53'.8	110° 10'.8	7'.4	10'.0	1'.2	
103° 59'.5	53'.6	124° 37'.2	7'.3	08'.8	1'.4	
118° 59'.2	53'.4	139° 03'.5	7'.5	07'.4	1'.4	56'.9
133° 58'.9	53'.1	153° 30'.0	7'.4	06'.0	1'.7	
148° 58'.6	52'.9	167° 56'.4	7'.5	04'.3	1'.7	
163° 58'.3	52'.7	182° 22'.9	7'.6	02'.6	1'.9	
178° 58'.0	22° 52'.4 S	196° 49'.5	7'.6	24° 00'.7 S	2'.0	56'.9
193° 57'.7	52'.2	211° 16'.1	7'.6	23° 58'.7 S	2'.2	56'.8
208° 57'.4	52'.0	225° 42'.7	7'.7	56'.5	2'.3	
223° 57'.1	51'.7	240° 09'.4	7'.7	54'.2	2'.5	
238° 56'.8	51'.5	254° 36'.1	7'.8	51'.7	2'.5	
253° 56'.6	51'.3	269° 02'.9	7'.8	49'.2	2'.8	
268° 56'.3	51'.0	283° 29'.7	7'.9	46'.4	2'.8	56'.7
283° 56'.0	50'.8	297° 56'.6	7'.9	43'.6	3'.0	
298° 55'.7	50'.6	312° 23'.5	8'.0	40'.6	3'.1	
313° 55'.4	50'.3	326° 50'.5	8'.0	37'.5	3'.3	
328° 55'.1	50'.1	341° 17'.5	8'.1	34'.2	3'.3	
343° 54'.8	49'.8	355° 44'.6	8'.2	30'.9	3'.5	56'.6
358° 54'.5	22° 49'.6 S	10° 11'.8	8'.2	23° 27'.4 S	3'.7	56'.6
13° 54'.2	49'.3	24° 39'.0	8'.2	23'.7	3'.8	
28° 54'.0	49'.1	39° 06'.2	8'.4	19'.9	3'.8	
43° 53'.7	48'.9	53° 33'.6	8'.3	16'.1	4'.1	56'.5
58° 53'.4	48'.6	68° 00'.9	8'.5	12'.0	4'.1	
73° 53'.1	48'.4	82° 28'.4	8'.5	07'.9	4'.3	
88° 52'.8	48'.1	96° 55'.9	8'.6	03'.6	4'.4	
103° 52'.5	47'.9	111° 23'.5	8'.6	22° 59'.2 S	4'.5	
118° 52'.2	47'.6	125° 51'.1	8'.7	54'.7	4'.7	56'.4
133° 51'.9	47'.4	140° 18'.8	8'.8	50'.0	4'.7	
148° 51'.6	47'.1	154° 46'.6	8'.8	45'.3	4'.9	
163° 51'.4	46'.9	169° 14'.4	8'.9	40'.4	5'.0	
SD 16'.3	d 0'.2	SD	15'.7	15'.6	15'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 1	Moonrise 2	Moonrise 3
N 72°	08:23	10:40	-	-	-	-
N 70°	08:04	09:48	-	-	-	-
68°	07:49	09:16	-	-	-	-
66°	07:37	08:52	10:27	08:39	-	10:35
64°	07:26	08:34	09:49	07:34	08:52	09:31
62°	07:17	08:18	09:22	06:59	08:11	08:56
60°	07:09	08:05	09:02	06:34	07:43	08:31
N 58°	07:02	07:54	08:45	06:14	07:21	08:10
56°	06:55	07:44	08:31	05:58	07:03	07:54
54°	06:50	07:35	08:19	05:43	06:48	07:39
52°	06:44	07:28	08:08	05:31	06:35	07:27
50°	06:39	07:20	07:58	05:20	06:24	07:16
45°	06:28	07:05	07:38	04:58	06:00	06:53
N 40°	06:18	06:52	07:22	04:40	05:41	06:35
35°	06:09	06:40	07:08	04:25	05:25	06:19
30°	06:00	06:30	06:56	04:12	05:11	06:06
20°	05:44	06:11	06:35	03:49	04:48	05:43
N 10°	05:28	05:54	06:17	03:30	04:27	05:23
0°	05:12	05:38	06:00	03:12	04:09	05:05
S 10°	04:53	05:20	05:43	02:54	03:50	04:46
20°	04:31	05:00	05:24	02:35	03:29	04:26
30°	04:02	04:36	05:03	02:13	03:06	04:03
35°	03:44	04:21	04:50	02:00	02:53	03:50
40°	03:22	04:03	04:35	01:46	02:37	03:34
45°	02:52	03:41	04:18	01:28	02:18	03:16
S 50°	02:08	03:12	03:56	01:07	01:55	02:53
52°	01:42	02:57	03:45	00:56	01:43	02:41
54°	01:02	02:40	03:33	00:45	01:31	02:29
56°	-	02:19	03:20	00:32	01:16	02:14
58°	-	01:51	03:04	00:17	00:59	01:57
S 60°	-	01:08	02:44	-	00:38	01:37
S 62°	-	-	02:19	-	00:12	01:10

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 1	Moonset 2	Moonset 3
N 72°	-	13:28	15:45	-	-	-
N 70°	-	14:20	16:04	-	-	-
68°	-	14:52	16:19	-	-	-
66°	13:42	15:16	16:31	10:07	-	12:05
64°	14:19	15:34	16:42	11:12	11:53	13:09
62°	14:46	15:50	16:51	11:47	12:33	13:44
60°	15:06	16:03	16:59	12:13	13:01	14:09
N 58°	15:23	16:14	17:06	12:33	13:23	14:29
56°	15:37	16:24	17:13	12:49	13:41	14:45
54°	15:49	16:33	17:18	13:04	13:56	14:59
52°	16:00	16:40	17:24	13:16	14:09	15:12
50°	16:10	16:48	17:29	13:27	14:20	15:22
45°	16:30	17:03	17:40	13:50	14:44	15:45
N 40°	16:46	17:16	17:50	14:09	15:03	16:03
35°	17:00	17:28	17:59	14:24	15:19	16:18
30°	17:12	17:38	18:08	14:38	15:33	16:31
20°	17:33	17:56	18:24	15:01	15:56	16:54
N 10°	17:51	18:13	18:40	15:20	16:17	17:13
0°	18:08	18:30	18:56	15:39	16:36	17:31
S 10°	18:25	18:48	19:15	15:58	16:54	17:49
20°	18:43	19:08	19:37	16:18	17:15	18:08
30°	19:05	19:32	20:05	16:40	17:38	18:30
35°	19:17	19:47	20:23	16:54	17:52	18:42
40°	19:32	20:05	20:46	17:10	18:07	18:57
45°	19:50	20:27	21:15	17:28	18:26	19:14
S 50°	20:11	20:55	21:59	17:51	18:49	19:36
52°	20:22	21:10	22:24	18:02	19:01	19:46
54°	20:34	21:27	23:03	18:15	19:13	19:58
56°	20:47	21:48	-	18:29	19:28	20:11
58°	21:03	22:15	-	18:47	19:45	20:26
S 60°	21:23	22:57	-	19:07	20:06	20:44
S 62°	21:47	-	-	19:34	20:32	21:07

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
1	3 11	3 25	12:03	09:25	21:54	27d 9%
2	3 39	3 53	12:04	10:22	22:50	28d 4%
3	4 07	4 21	12:04	11:18	23:45	29d 1%

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2011 January 4, 5, 6 (Tue, Wed, Thur)

GMT	ARIES	VENUS -4.5		MARS +1.2		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
4 00	103° 15'.6	228° 14'.0	15° 57'.0 S	170° 42'.9	22° 50'.2 S	105° 32'.8	2° 21'.5 S	266° 51'.6	4° 21'.5 S
01	118° 18'.1	243° 14'.0	57'.5	185° 43'.3	49'.9	120° 34'.9	21'.4	281° 53'.9	21'.5
02	133° 20'.6	258° 14'.0	58'.1	200° 43'.7	49'.6	135° 37'.1	21'.2	296° 56'.3	21'.5
03	148° 23'.0	273° 13'.9	58'.6	215° 44'.1	49'.3	150° 39'.2	21'.1	311° 58'.7	21'.6
04	163° 25'.5	288° 13'.9	59'.2	230° 44'.5	49'.0	165° 41'.4	20'.9	327° 01'.0	21'.6
05	178° 27'.9	303° 13'.9	59'.7	245° 44'.8	48'.7	180° 43'.5	20'.8	342° 03'.4	21'.6
T 06	193° 30'.4	318° 13'.9	16° 00'.3 S	260° 45'.2	48'.4	195° 45'.6	20'.6	357° 05'.8	21'.7
u 07	208° 32'.9	333° 13'.8	00'.9	275° 45'.6	48'.1	210° 47'.8	20'.5	12° 08'.2	21'.7
e 08	223° 35'.3	348° 13'.8	01'.4	290° 46'.0	47'.9	225° 49'.9	20'.3	27° 10'.5	21'.7
s 09	238° 37'.8	3° 13'.8	02'.0	305° 46'.4	47'.6	240° 52'.1	20'.2	42° 12'.9	21'.7
d 10	253° 40'.3	18° 13'.7	02'.5	320° 46'.8	47'.3	255° 54'.2	20'.0	57° 15'.3	21'.8
a 11	268° 42'.7	33° 13'.7	03'.1	335° 47'.1	47'.0	270° 56'.3	19'.9	72° 17'.6	21'.8
y 12	283° 45'.2	48° 13'.6	16° 03'.7 S	350° 47'.5	22° 46'.7 S	285° 58'.5	2° 19'.7 S	87° 20'.0	4° 21'.8 S
13	298° 47'.7	63° 13'.6	04'.2	5° 47'.9	46'.4	301° 00'.6	19'.6	102° 22'.4	21'.8
14	313° 50'.1	78° 13'.6	04'.8	20° 48'.3	46'.1	316° 02'.8	19'.4	117° 24'.7	21'.9
15	328° 52'.6	93° 13'.5	05'.3	35° 48'.7	45'.8	331° 04'.9	19'.3	132° 27'.1	21'.9
16	343° 55'.1	108° 13'.5	05'.9	50° 49'.1	45'.5	346° 07'.0	19'.1	147° 29'.5	21'.9
17	358° 57'.5	123° 13'.4	06'.4	65° 49'.4	45'.2	1° 09'.2	19'.0	162° 31'.9	21'.9
18	14° 00'.0	138° 13'.4	07'.0	80° 49'.8	44'.9	16° 11'.3	18'.8	177° 34'.2	22'.0
19	29° 02'.4	153° 13'.4	07'.6	95° 50'.2	44'.6	31° 13'.5	18'.7	192° 36'.6	22'.0
20	44° 04'.9	168° 13'.3	08'.1	110° 50'.6	44'.3	46° 15'.6	18'.5	207° 39'.0	22'.0
21	59° 07'.4	183° 13'.3	08'.7	125° 51'.0	44'.1	61° 17'.7	18'.4	222° 41'.3	22'.0
22	74° 09'.8	198° 13'.2	09'.2	140° 51'.4	43'.8	76° 19'.9	18'.2	237° 43'.7	22'.1
23	89° 12'.3	213° 13'.2	09'.8	155° 51'.8	43'.5	91° 22'.0	18'.1	252° 46'.1	22'.1
5 00	104° 14'.8	228° 13'.1	16° 10'.3 S	170° 52'.1	22° 43'.2 S	106° 24'.2	2° 17'.9 S	267° 48'.5	4° 22'.1 S
01	119° 17'.2	243° 13'.1	10'.9	185° 52'.5	42'.9	121° 26'.3	17'.8	282° 50'.8	22'.1
02	134° 19'.7	258° 13'.0	11'.5	200° 52'.9	42'.6	136° 28'.4	17'.6	297° 53'.2	22'.2
03	149° 22'.2	273° 13'.0	12'.0	215° 53'.3	42'.3	151° 30'.6	17'.5	312° 55'.6	22'.2
W 04	164° 24'.6	288° 12'.9	12'.6	230° 53'.7	42'.0	166° 32'.7	17'.3	327° 58'.0	22'.2
e 05	179° 27'.1	303° 12'.9	13'.1	245° 54'.1	41'.7	181° 34'.8	17'.2	343° 00'.3	22'.2
d 06	194° 29'.6	318° 12'.8	13'.7	260° 54'.4	41'.4	196° 37'.0	17'.0	358° 02'.7	22'.3
n 07	209° 32'.0	333° 12'.7	14'.2	275° 54'.8	41'.1	211° 39'.1	16'.8	13° 05'.1	22'.3
e 08	224° 34'.5	348° 12'.7	14'.8	290° 55'.2	40'.8	226° 41'.2	16'.7	28° 07'.5	22'.3
s 09	239° 36'.9	3° 12'.6	15'.3	305° 55'.6	40'.5	241° 43'.4	16'.5	43° 09'.8	22'.3
d 10	254° 39'.4	18° 12'.6	15'.9	320° 56'.0	40'.2	256° 45'.5	16'.4	58° 12'.2	22'.4
a 11	269° 41'.9	33° 12'.5	16'.5	335° 56'.4	39'.9	271° 47'.7	16'.2	73° 14'.6	22'.4
y 12	284° 44'.3	48° 12'.4	16° 17'.0 S	350° 56'.8	22° 39'.6 S	286° 49'.8	2° 16'.1 S	88° 17'.0	4° 22'.4 S
13	299° 46'.8	63° 12'.4	17'.6	5° 57'.2	39'.3	301° 51'.9	15'.9	103° 19'.3	22'.4
14	314° 49'.3	78° 12'.3	18'.1	20° 57'.5	39'.0	316° 54'.1	15'.8	118° 21'.7	22'.5
15	329° 51'.7	93° 12'.3	18'.7	35° 57'.9	38'.7	331° 56'.2	15'.6	133° 24'.1	22'.5
16	344° 54'.2	108° 12'.2	19'.2	50° 58'.3	38'.4	346° 58'.3	15'.5	148° 26'.5	22'.5
17	359° 56'.7	123° 12'.1	19'.8	65° 58'.7	38'.1	2° 00'.5	15'.3	163° 28'.8	22'.5
18	14° 59'.1	138° 12'.1	20'.3	80° 59'.1	37'.8	17° 02'.6	15'.2	178° 31'.2	22'.6
19	30° 01'.6	153° 12'.0	20'.9	95° 59'.5	37'.5	32° 04'.7	15'.0	193° 33'.6	22'.6
20	45° 04'.0	168° 11'.9	21'.4	110° 59'.9	37'.1	47° 06'.9	14'.9	208° 36'.0	22'.6
21	60° 06'.5	183° 11'.8	22'.0	126° 00'.2	36'.8	62° 09'.0	14'.7	223° 38'.3	22'.6
22	75° 09'.0	198° 11'.8	22'.5	141° 00'.6	36'.5	77° 11'.1	14'.6	238° 40'.7	22'.7
23	90° 11'.4	213° 11'.7	23'.1	156° 01'.0	36'.2	92° 13'.3	14'.4	253° 43'.1	22'.7
6 00	105° 13'.9	228° 11'.6	16° 23'.7 S	171° 01'.4	22° 35'.9 S	107° 15'.4	2° 14'.3 S	268° 45'.5	4° 22'.7 S
01	120° 16'.4	243° 11'.6	24'.2	186° 01'.8	35'.6	122° 17'.5	14'.1	283° 47'.8	22'.7
02	135° 18'.8	258° 11'.5	24'.8	201° 02'.2	35'.3	137° 19'.6	13'.9	298° 50'.2	22'.8
03	150° 21'.3	273° 11'.4	25'.3	216° 02'.6	35'.0	152° 21'.8	13'.8	313° 52'.6	22'.8
T 04	165° 23'.8	288° 11'.3	25'.9	231° 03'.0	34'.7	167° 23'.9	13'.6	328° 55'.0	22'.8
h 05	180° 26'.2	303° 11'.3	26'.4	246° 03'.3	34'.4	182° 26'.0	13'.5	343° 57'.3	22'.8
u 06	195° 28'.7	318° 11'.2	27'.0	261° 03'.7	34'.1	197° 28'.2	13'.3	358° 59'.7	22'.8
r 07	210° 31'.2	333° 11'.1	27'.5	276° 04'.1	33'.8	212° 30'.3	13'.2	14° 02'.1	22'.9
s 08	225° 33'.6	348° 11'.0	28'.1	291° 04'.5	33'.5	227° 32'.4	13'.0	29° 04'.5	22'.9
d 09	240° 36'.1	3° 10'.9	28'.6	306° 04'.9	33'.1	242° 34'.6	12'.9	44° 06'.9	22'.9
a 10	255° 38'.5	18° 10'.9	29'.2	321° 05'.3	32'.8	257° 36'.7	12'.7	59° 09'.2	22'.9
y 11	270° 41'.0	33° 10'.8	29'.7	336° 05'.7	32'.5	272° 38'.8	12'.6	74° 11'.6	23'.0
12	285° 43'.5	48° 10'.7	16° 30'.3 S	351° 06'.1	22° 32'.2 S	287° 41'.0	2° 12'.4 S	89° 14'.0	4° 23'.0 S
13	300° 45'.9	63° 10'.6	30'.8	6° 06'.5	31'.9	302° 43'.1	12'.2	104° 16'.4	23'.0
14	315° 48'.4	78° 10'.5	31'.4	21° 06'.8	31'.6	317° 45'.2	12'.1	119° 18'.8	23'.0
15	330° 50'.9	93° 10'.4	31'.9	36° 07'.2	31'.3	332° 47'.3	11'.9	134° 21'.1	23'.1
16	345° 53'.3	108° 10'.3	32'.5	51° 07'.6	30'.9	347° 49'.5	11'.8	149° 23'.5	23'.1
17	0° 55'.8	123° 10'.2	33'.0	66° 08'.0	30'.6	2° 51'.6	11'.6	164° 25'.9	23'.1
18	15° 58'.3	138° 10'.2	33'.6	81° 08'.4	30'.3	17° 53'.7	11'.5	179° 28'.3	23'.1
19	31° 00'.7	153° 10'.1	34'.1	96° 08'.8	30'.0	32° 55'.9	11'.3	194° 30'.6	23'.1
20	46° 03'.2	168° 10'.0	34'.7	111° 09'.2	29'.7	47° 58'.0	11'.2	209° 33'.0	23'.2
21	61° 05'.7	183° 09'.9	35'.2	126° 09'.6	29'.4	63° 00'.1	11'.0	224° 35'.4	23'.2
22	76° 08'.1	198° 09'.8	35'.8	141° 10'.0	29'.1	78° 02'.2	10'.9	239° 37'.8	23'.2
23	91° 10'.6	213° 09'.7	36'.3	156° 10'.3	28'.7	93° 04'.4	10'.7	254° 40'.2	23'.2
	M.P. 17:00	v -0'.1	d 0'.6	v 0'.4	d 0'.3	v 2'.1	d 0'.2	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.8 S
Achernar	335° 27'.8	57° 11'.1 S
Acrux	173° 11'.3	63° 09'.4 S
Adhara	255° 13'.5	28° 59'.3 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.1	55° 53'.6 N
Alkaid	153° 00'.3	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.7	26° 40'.5 N
Alpheratz	357° 45'.4	29° 09'.3 N
Altair	62° 10'.3	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.9 S
Antares	112° 28'.7	26° 27'.3 S
Arcturus	145° 57'.4	19° 07'.3 N
Atria	107° 32'.7	69° 02'.7 S
Avior	234° 18'.2	59° 32'.7 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.2 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.4 N
Denebola	182° 35'.3	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.6 S
Dubhe	193° 53'.4	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.5	51° 29'.2 N
Enif	33° 49'.1	9° 55'.7 N
Fomalhaut	15° 26'.0	29° 33'.9 S
Gacrux	172° 02'.9	57° 10'.3 S
Gienah	175° 54'.1	17° 36'.2 S
Hadar	148° 50'.7	60° 25'.4 S
Hamal	328° 02'.6	23° 31'.0 N
Kaus Aust.	83° 46'.5	34° 22'.7 S
Kochab	137° 20'.4	74° 06'.2 N
Markab	13° 40'.2	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.8	36° 25'.4 S
Miaplacidus	221° 39'.4	69° 45'.7 S
Mirfak	308° 42'.6	49° 54'.2 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.5	56° 42'.0 S
Polaris	318° 24'.5	89° 19'.1 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 08'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.5	60° 52'.6 S
Sabik	102° 14'.9	15° 44'.3 S
Schedar	349° 42'.6	56° 36'.2 N
Shaula	96° 24'.7	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.1	11° 13'.2 S
Suhail	222° 53'.4	43° 28'.6 S
Vega	80° 40'.6	38° 47'.6 N
Zuben'ubi	137° 07'.5	16° 05'.3 S

	SHA	Mer.Pass.
Venus	123° 58'.3	08:47
Mars	66° 37'.4	12:36
Jupiter	2° 09'.4	16:52
Saturn	163° 33'.7	06:08

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 51'.1	22° 46'.6 S	183° 42'.3	9'.0	22° 35'.4 S	5'.1	56'.4
193° 50'.8	46'.4	198° 10'.3	9'.0	30'.3	5'.3	56'.3
208° 50'.5	46'.1	212° 38'.3	9'.1	25'.0	5'.4	
223° 50'.2	45'.9	227° 06'.4	9'.2	19'.6	5'.4	
238° 49'.9	45'.6	241° 34'.6	9'.2	14'.2	5'.6	
253° 49'.6	45'.3	256° 02'.8	9'.3	08'.6	5'.7	56'.2
268° 49'.4	45'.1	270° 31'.1	9'.4	02'.9	5'.9	
283° 49'.1	44'.8	284° 59'.5	9'.5	21° 57'.0 S	5'.9	
298° 48'.8	44'.6	299° 28'.0	9'.5	51'.1	6'.0	
313° 48'.5	44'.3	313° 56'.5	9'.7	45'.1	6'.2	
328° 48'.2	44'.1	328° 25'.2	9'.6	38'.9	6'.3	56'.1
343° 47'.9	43'.8	342° 53'.8	9'.8	32'.6	6'.3	
358° 47'.6	22° 43'.5 S	357° 22'.6	9'.8	21° 26'.3 S	6'.5	56'.1
13° 47'.4	43'.3	11° 51'.4	10'.0	19'.8	6'.6	
28° 47'.1	43'.0	26° 20'.4	9'.9	13'.2	6'.7	56'.0
43° 46'.8	42'.7	40° 49'.3	10'.1	06'.5	6'.8	
58° 46'.5	42'.5	55° 18'.4	10'.2	20° 59'.7 S	6'.9	
73° 46'.2	42'.2	69° 47'.6	10'.2	52'.8	7'.0	
88° 45'.9	41'.9	84° 16'.8	10'.3	45'.8	7'.1	
103° 45'.7	41'.7	98° 46'.1	10'.4	38'.7	7'.2	55'.9
118° 45'.4	41'.4	113° 15'.5	10'.4	31'.5	7'.3	
133° 45'.1	41'.1	127° 44'.9	10'.6	24'.2	7'.4	
148° 44'.8	40'.9	142° 14'.5	10'.6	16'.8	7'.5	
163° 44'.5	40'.6	156° 44'.1	10'.7	09'.3	7'.5	
178° 44'.2	22° 40'.3 S	171° 13'.8	10'.7	20° 01'.8 S	7'.7	55'.8
193° 44'.0	40'.1	185° 43'.5	10'.9	19° 54'.1 S	7'.8	
208° 43'.7	39'.8	200° 13'.4	10'.9	46'.3	7'.9	
223° 43'.4	39'.5	214° 43'.3	11'.0	38'.4	7'.9	
238° 43'.1	39'.2	229° 13'.3	11'.1	30'.5	8'.1	55'.7
253° 42'.8	39'.0	243° 43'.4	11'.2	22'.4	8'.1	
268° 42'.5	38'.7	258° 13'.6	11'.2	14'.3	8'.2	
283° 42'.3	38'.4	272° 43'.8	11'.3	06'.1	8'.3	
298° 42'.0	38'.1	287° 14'.1	11'.4	18° 57'.8 S	8'.4	
313° 41'.7	37'.9	301° 44'.5	11'.5	49'.4	8'.5	55'.6
328° 41'.4	37'.6	316° 15'.0	11'.6	40'.9	8'.6	
343° 41'.1	37'.3	330° 45'.6	11'.6	32'.3	8'.6	
358° 40'.9	22° 37'.0 S	345° 16'.2	11'.7	18° 23'.7 S	8'.7	55'.6
13° 40'.6	36'.7	359° 46'.9	11'.8	15'.0	8'.8	
28° 40'.3	36'.5	14° 17'.7	11'.9	06'.2	8'.9	55'.5
43° 40'.0	36'.2	28° 48'.6	12'.0	17° 57'.3 S	9'.0	
58° 39'.7	35'.9	43° 19'.6	12'.0	48'.3	9'.0	
73° 39'.5	35'.6	57° 50'.6	12'.1	39'.3	9'.1	
88° 39'.2	35'.3	72° 21'.7	12'.2	30'.2	9'.2	
103° 38'.9	35'.0	86° 52'.9	12'.2	21'.0	9'.3	55'.4
118° 38'.6	34'.8	101° 24'.1	12'.4	11'.7	9'.3	
133° 38'.3	34'.5	115° 55'.5	12'.4	02'.4	9'.4	
148° 38'.1	34'.2	130° 26'.9	12'.5	16° 53'.0 S	9'.5	
163° 37'.8	33'.9	144° 58'.4	12'.5	43'.5	9'.5	
178° 37'.5	22° 33'.6 S	159° 29'.9	12'.7	16° 34'.0 S	9'.7	55'.3
193° 37'.2	33'.3	174° 01'.6	12'.7	24'.3	9'.6	
208° 37'.0	33'.0	188° 33'.3	12'.8	14'.7	9'.8	
223° 36'.7	32'.7	203° 05'.1	12'.8	04'.9	9'.8	
238° 36'.4	32'.4	217° 36'.9	13'.0	15° 55'.1 S	9'.9	
253° 36'.1	32'.1	232° 08'.9	13'.0	45'.2	9'.9	55'.2
268° 35'.8	31'.8	246° 40'.9	13'.1	35'.3	10'.0	
283° 35'.6	31'.6	261° 13'.0	13'.1	25'.3	10'.1	
298° 35'.3	31'.3	275° 45'.1	13'.3	15'.2	10'.1	
313° 35'.0	31'.0	290° 17'.4	13'.2	05'.1	10'.2	
328° 34'.7	30'.7	304° 49'.6	13'.4	14° 54'.9 S	10'.2	55'.1
343° 34'.5	30'.4	319° 22'.0	13'.4	44'.7	10'.3	
358° 34'.2	22° 30'.1 S	333° 54'.4	13'.6	14° 34'.4 S	10'.4	55'.1
13° 33'.9	29'.8	348° 27'.0	13'.5	24'.0	10'.4	
28° 33'.6	29'.5	2° 59'.5	13'.7	13'.6	10'.4	
43° 33'.4	29'.2	17° 32'.2	13'.7	03'.2	10'.5	55'.0
58° 33'.1	28'.9	32° 04'.9	13'.8	13° 52'.7 S	10'.6	
73° 32'.8	28'.6	46° 37'.7	13'.8	42'.1	10'.6	
88° 32'.5	28'.3	61° 10'.5	13'.9	31'.5	10'.7	
103° 32'.3	28'.0	75° 43'.4	14'.0	20'.8	10'.7	
118° 32'.0	27'.7	90° 16'.4	14'.0	10'.1	10'.8	
133° 31'.7	27'.3	104° 49'.4	14'.1	12° 59'.3 S	10'.8	54'.9
148° 31'.4	27'.0	119° 22'.5	14'.2	48'.5	10'.8	
163° 31'.2	26'.7	133° 55'.7	14'.2	37'.7	10'.9	
SD 16'.3	d 0'.3	SD	15'.3	15'.1	15'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 4	Moonrise 5	Moonrise 6
N 72°	08:20	10:31	-	-	-	11:21
N 70°	08:02	09:43	-	-	11:28	10:50
68°	07:47	09:13	11:32	11:24	10:44	10:27
66°	07:35	08:50	10:20	10:21	10:14	10:09
64°	07:25	08:32	09:45	09:46	09:52	09:54
62°	07:16	08:17	09:20	09:21	09:34	09:42
60°	07:08	08:04	09:00	09:00	09:19	09:31
N 58°	07:01	07:53	08:44	08:44	09:06	09:22
56°	06:55	07:43	08:30	08:30	08:55	09:14
54°	06:49	07:35	08:18	08:18	08:46	09:07
52°	06:44	07:27	08:07	08:07	08:37	09:00
50°	06:39	07:20	07:58	07:57	08:29	08:54
45°	06:28	07:05	07:38	07:37	08:12	08:42
N 40°	06:18	06:52	07:22	07:20	07:59	08:31
35°	06:09	06:41	07:08	07:06	07:47	08:22
30°	06:01	06:30	06:57	06:54	07:37	08:14
20°	05:45	06:12	06:36	06:33	07:19	08:00
N 10°	05:29	05:56	06:18	06:15	07:04	07:48
0°	05:13	05:39	06:02	05:58	06:49	07:37
S 10°	04:55	05:22	05:45	05:41	06:35	07:25
20°	04:33	05:02	05:26	05:23	06:19	07:13
30°	04:05	04:38	05:05	05:02	06:01	06:59
35°	03:47	04:23	04:53	04:50	05:51	06:51
40°	03:25	04:06	04:38	04:36	05:39	06:41
45°	02:55	03:44	04:21	04:19	05:25	06:30
S 50°	02:13	03:16	03:59	03:58	05:07	06:17
52°	01:48	03:01	03:49	03:48	04:59	06:11
54°	01:12	02:45	03:37	03:37	04:50	06:04
56°	-	02:24	03:24	03:24	04:39	05:56
58°	-	01:58	03:08	03:09	04:27	05:47
S 60°	-	01:18	02:49	02:51	04:14	05:37
S 62°	-	-	02:25	02:29	03:57	05:26

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 4	Moonset 5	Moonset 6
N 72°	-	13:40	15:51	-	-	16:35
N 70°	-	14:28	16:09	-	14:49	17:04
68°	12:39	14:58	16:24	13:08	15:32	17:25
66°	13:50	15:21	16:36	14:10	16:00	17:42
64°	14:26	15:39	16:46	14:45	16:22	17:56
62°	14:51	15:54	16:55	15:10	16:39	18:07
60°	15:11	16:07	17:03	15:29	16:53	18:17
N 58°	15:27	16:18	17:10	15:45	17:05	18:25
56°	15:41	16:27	17:16	15:59	17:16	18:33
54°	15:53	16:36	17:22	16:11	17:25	18:39
52°	16:03	16:44	17:27	16:21	17:33	18:45
50°	16:13	16:51	17:32	16:30	17:41	18:50
45°	16:33	17:06	17:43	16:50	17:56	19:02
N 40°	16:49	17:19	17:53	17:06	18:09	19:11
35°	17:02	17:30	18:02	17:19	18:20	19:19
30°	17:14	17:40	18:10	17:31	18:29	19:26
20°	17:34	17:58	18:26	17:50	18:45	19:38
N 10°	17:52	18:15	18:41	18:07	18:59	19:49
0°	18:09	18:31	18:57	18:23	19:12	19:58
S 10°	18:26	18:49	19:16	18:39	19:25	20:08
20°	18:44	19:08	19:37	18:56	19:39	20:18
30°	19:05	19:32	20:05	19:15	19:55	20:30
35°	19:18	19:47	20:23	19:26	20:04	20:37
40°	19:32	20:05	20:45	19:39	20:14	20:45
45°	19:49	20:26	21:14	19:54	20:26	20:53
S 50°	20:11	20:54	21:56	20:12	20:41	21:04
52°	20:21	21:08	22:21	20:21	20:48	21:09
54°	20:33	21:25	22:56	20:31	20:55	21:14
56°	20:46	21:45	-	20:42	21:04	21:20
58°	21:02	22:11	-	20:54	21:13	21:27
S 60°	21:20	22:50	-	21:08	21:24	21:34
S 62°	21:44	-	-	21:25	21:36	21:43

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
4	4 35	4 49	12:05	12:11	24:36	0d 0%
5	5 02	5 16	12:05	13:01	00:36	1d 1%
6	5 29	5 43	12:06	13:48	01:25	2d 5%

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2011 January 7, 8, 9 (Fri, Sat, Sun)

GMT	ARIES	VENUS -4.4		MARS +1.2		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
7 00	106° 13'.0	228° 09'.6	16° 36'.9 S	171° 10'.7	22° 28'.4 S	108° 06'.5	2° 10'.5 S	269° 42'.5	4° 23'.2 S
01	121° 15'.5	243° 09'.5	37'.4	186° 11'.1	28'.1	123° 08'.6	10'.4	284° 44'.9	23'.3
02	136° 18'.0	258° 09'.4	38'.0	201° 11'.5	27'.8	138° 10'.7	10'.2	299° 47'.3	23'.3
03	151° 20'.4	273° 09'.3	38'.5	216° 11'.9	27'.5	153° 12'.9	10'.1	314° 49'.7	23'.3
F 04	166° 22'.9	288° 09'.2	39'.0	231° 12'.3	27'.1	168° 15'.0	09'.9	329° 52'.1	23'.3
r 05	181° 25'.4	303° 09'.1	39'.6	246° 12'.7	26'.8	183° 17'.1	09'.8	344° 54'.5	23'.4
i 06	196° 27'.8	318° 09'.0	40'.1	261° 13'.1	26'.5	198° 19'.2	09'.6	359° 56'.8	23'.4
d 07	211° 30'.3	333° 08'.9	40'.7	276° 13'.5	26'.2	213° 21'.4	09'.4	14° 59'.2	23'.4
a 08	226° 32'.8	348° 08'.8	41'.2	291° 13'.9	25'.9	228° 23'.5	09'.3	30° 01'.6	23'.4
y 09	241° 35'.2	3° 08'.7	41'.8	306° 14'.2	25'.5	243° 25'.6	09'.1	45° 04'.0	23'.4
10	256° 37'.7	18° 08'.6	42'.3	321° 14'.6	25'.2	258° 27'.7	09'.0	60° 06'.4	23'.5
11	271° 40'.2	33° 08'.5	42'.9	336° 15'.0	24'.9	273° 29'.9	08'.8	75° 08'.7	23'.5
12	286° 42'.6	48° 08'.4	16° 43'.4 S	351° 15'.4	22° 24'.6 S	288° 32'.0	2° 08'.7 S	90° 11'.1	4° 23'.5 S
13	301° 45'.1	63° 08'.3	44'.0	6° 15'.8	24'.3	303° 34'.1	08'.5	105° 13'.5	23'.5
14	316° 47'.5	78° 08'.2	44'.5	21° 16'.2	23'.9	318° 36'.2	08'.3	120° 15'.9	23'.5
15	331° 50'.0	93° 08'.0	45'.1	36° 16'.6	23'.6	333° 38'.4	08'.2	135° 18'.3	23'.6
16	346° 52'.5	108° 07'.9	45'.6	51° 17'.0	23'.3	348° 40'.5	08'.0	150° 20'.7	23'.6
17	1° 54'.9	123° 07'.8	46'.1	66° 17'.4	23'.0	3° 42'.6	07'.9	165° 23'.0	23'.6
18	16° 57'.4	138° 07'.7	46'.7	81° 17'.8	22'.6	18° 44'.7	07'.7	180° 25'.4	23'.6
19	31° 59'.9	153° 07'.6	47'.2	96° 18'.1	22'.3	33° 46'.9	07'.6	195° 27'.8	23'.7
20	47° 02'.3	168° 07'.5	47'.8	111° 18'.5	22'.0	48° 49'.0	07'.4	210° 30'.2	23'.7
21	62° 04'.8	183° 07'.4	48'.3	126° 18'.9	21'.6	63° 51'.1	07'.2	225° 32'.6	23'.7
22	77° 07'.3	198° 07'.2	48'.9	141° 19'.3	21'.3	78° 53'.2	07'.1	240° 35'.0	23'.7
23	92° 09'.7	213° 07'.1	49'.4	156° 19'.7	21'.0	93° 55'.3	06'.9	255° 37'.3	23'.7
8 00	107° 12'.2	228° 07'.0	16° 49'.9 S	171° 20'.1	22° 20'.7 S	108° 57'.5	2° 06'.8 S	270° 39'.7	4° 23'.8 S
01	122° 14'.6	243° 06'.9	50'.5	186° 20'.5	20'.3	123° 59'.6	06'.6	285° 42'.1	23'.8
02	137° 17'.1	258° 06'.8	51'.0	201° 20'.9	20'.0	139° 01'.7	06'.5	300° 44'.5	23'.8
03	152° 19'.6	273° 06'.7	51'.6	216° 21'.3	19'.7	154° 03'.8	06'.3	315° 46'.9	23'.8
S 04	167° 22'.0	288° 06'.5	52'.1	231° 21'.7	19'.3	169° 06'.0	06'.1	330° 49'.3	23'.8
a 05	182° 24'.5	303° 06'.4	52'.7	246° 22'.1	19'.0	184° 08'.1	06'.0	345° 51'.7	23'.9
t 06	197° 27'.0	318° 06'.3	53'.2	261° 22'.5	18'.7	199° 10'.2	05'.8	0° 54'.0	23'.9
u 07	212° 29'.4	333° 06'.2	53'.7	276° 22'.9	18'.4	214° 12'.3	05'.7	15° 56'.4	23'.9
r 08	227° 31'.9	348° 06'.0	54'.3	291° 23'.2	18'.0	229° 14'.4	05'.5	30° 58'.8	23'.9
d 09	242° 34'.4	3° 05'.9	54'.8	306° 23'.6	17'.7	244° 16'.5	05'.3	46° 01'.2	23'.9
a 10	257° 36'.8	18° 05'.8	55'.4	321° 24'.0	17'.4	259° 18'.7	05'.2	61° 03'.6	24'.0
y 11	272° 39'.3	33° 05'.6	55'.9	336° 24'.4	17'.0	274° 20'.8	05'.0	76° 06'.0	24'.0
12	287° 41'.8	48° 05'.5	16° 56'.4 S	351° 24'.8	22° 16'.7 S	289° 22'.9	2° 04'.9 S	91° 08'.4	4° 24'.0 S
13	302° 44'.2	63° 05'.4	57'.0	6° 25'.2	16'.4	304° 25'.0	04'.7	106° 10'.7	24'.0
14	317° 46'.7	78° 05'.3	57'.5	21° 25'.6	16'.0	319° 27'.1	04'.6	121° 13'.1	24'.0
15	332° 49'.1	93° 05'.1	58'.1	36° 26'.0	15'.7	334° 29'.3	04'.4	136° 15'.5	24'.0
16	347° 51'.6	108° 05'.0	58'.6	51° 26'.4	15'.4	349° 31'.4	04'.2	151° 17'.9	24'.1
17	2° 54'.1	123° 04'.9	59'.1	66° 26'.8	15'.0	4° 33'.5	04'.1	166° 20'.3	24'.1
18	17° 56'.5	138° 04'.7	59'.7	81° 27'.2	14'.7	19° 35'.6	03'.9	181° 22'.7	24'.1
19	32° 59'.0	153° 04'.6	17° 00'.2 S	96° 27'.6	14'.3	34° 37'.7	03'.8	196° 25'.1	24'.1
20	48° 01'.5	168° 04'.5	00'.7	111° 28'.0	14'.0	49° 39'.8	03'.6	211° 27'.5	24'.1
21	63° 03'.9	183° 04'.3	01'.3	126° 28'.4	13'.7	64° 42'.0	03'.4	226° 29'.8	24'.2
22	78° 06'.4	198° 04'.2	01'.8	141° 28'.8	13'.3	79° 44'.1	03'.3	241° 32'.2	24'.2
23	93° 08'.9	213° 04'.0	02'.4	156° 29'.2	13'.0	94° 46'.2	03'.1	256° 34'.6	24'.2
9 00	108° 11'.3	228° 03'.9	17° 02'.9 S	171° 29'.5	22° 12'.7 S	109° 48'.3	2° 03'.0 S	271° 37'.0	4° 24'.2 S
01	123° 13'.8	243° 03'.8	03'.4	186° 29'.9	12'.3	124° 50'.4	02'.8	286° 39'.4	24'.2
02	138° 16'.3	258° 03'.6	04'.0	201° 30'.3	12'.0	139° 52'.5	02'.6	301° 41'.8	24'.3
03	153° 18'.7	273° 03'.5	04'.5	216° 30'.7	11'.6	154° 54'.7	02'.5	316° 44'.2	24'.3
S 04	168° 21'.2	288° 03'.3	05'.0	231° 31'.1	11'.3	169° 56'.8	02'.3	331° 46'.6	24'.3
u 05	183° 23'.6	303° 03'.2	05'.6	246° 31'.5	11'.0	184° 58'.9	02'.2	346° 49'.0	24'.3
n 06	198° 26'.1	318° 03'.0	06'.1	261° 31'.9	10'.6	200° 01'.0	02'.0	1° 51'.4	24'.3
d 07	213° 28'.6	333° 02'.9	06'.6	276° 32'.3	10'.3	215° 03'.1	01'.8	16° 53'.7	24'.3
a 08	228° 31'.0	348° 02'.7	07'.2	291° 32'.7	09'.9	230° 05'.2	01'.7	31° 56'.1	24'.4
y 09	243° 33'.5	3° 02'.6	07'.7	306° 33'.1	09'.6	245° 07'.4	01'.5	46° 58'.5	24'.4
10	258° 36'.0	18° 02'.4	08'.2	321° 33'.5	09'.2	260° 09'.5	01'.3	62° 00'.9	24'.4
11	273° 38'.4	33° 02'.3	08'.8	336° 33'.9	08'.9	275° 11'.6	01'.2	77° 03'.3	24'.4
12	288° 40'.9	48° 02'.1	17° 09'.3 S	351° 34'.3	22° 08'.6 S	290° 13'.7	2° 01'.0 S	92° 05'.7	4° 24'.4 S
13	303° 43'.4	63° 02'.0	09'.8	6° 34'.7	08'.2	305° 15'.8	00'.9	107° 08'.1	24'.4
14	318° 45'.8	78° 01'.8	10'.4	21° 35'.1	07'.9	320° 17'.9	00'.7	122° 10'.5	24'.5
15	333° 48'.3	93° 01'.7	10'.9	36° 35'.5	07'.5	335° 20'.0	00'.5	137° 12'.9	24'.5
16	348° 50'.7	108° 01'.5	11'.4	51° 35'.9	07'.2	350° 22'.1	00'.4	152° 15'.3	24'.5
17	3° 53'.2	123° 01'.4	12'.0	66° 36'.3	06'.8	5° 24'.3	00'.2	167° 17'.6	24'.5
18	18° 55'.7	138° 01'.2	12'.5	81° 36'.7	06'.5	20° 26'.4	00'.1	182° 20'.0	24'.5
19	33° 58'.1	153° 01'.1	13'.0	96° 37'.1	06'.1	35° 28'.5	1° 59'.9 S	197° 22'.4	24'.6
20	49° 00'.6	168° 00'.9	13'.6	111° 37'.5	05'.8	50° 30'.6	59'.7	212° 24'.8	24'.6
21	64° 03'.1	183° 00'.7	14'.1	126° 37'.9	05'.4	65° 32'.7	59'.6	227° 27'.2	24'.6
22	79° 05'.5	198° 00'.6	14'.6	141° 38'.2	05'.1	80° 34'.8	59'.4	242° 29'.6	24'.6
23	94° 08'.0	213° 00'.4	15'.1	156° 38'.6	04'.7	95° 36'.9	59'.2	257° 32'.0	24'.6
	M.P. 16:48	v -0'.1	d 0'.5	v 0'.4	d 0'.3	v 2'.1	d 0'.2	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.8 S
Achernar	335° 27'.9	57° 11'.1 S
Acrux	173° 11'.3	63° 09'.4 S
Adhara	255° 13'.5	28° 59'.3 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.1	55° 53'.6 N
Alkaid	153° 00'.3	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.7	26° 40'.5 N
Alpheratz	357° 45'.4	29° 09'.3 N
Altair	62° 10'.3	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.9 S
Antares	112° 28'.7	26° 27'.3 S
Arcturus	145° 57'.4	19° 07'.3 N
Atria	107° 32'.6	69° 02'.7 S
Avior	234° 18'.2	59° 32'.7 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.2 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.4 N
Denebola	182° 35'.3	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.6 S
Dubhe	193° 53'.3	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.5	51° 29'.2 N
Enif	33° 49'.1	9° 55'.7 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.9	57° 10'.3 S
Gienah	175° 54'.0	17° 36'.2 S
Hadar	148° 50'.6	60° 25'.4 S
Hamal	328° 02'.6	23° 31'.0 N
Kaus Aust.	83° 46'.5	34° 22'.7 S
Kochab	137° 20'.3	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.8	36° 25'.4 S
Miaplacidus	221° 39'.3	69° 45'.7 S
Mirfak	308° 42'.6	49° 54'.2 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.5	56° 42'.0 S
Polaris	318° 25'.7	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 08'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.4	60° 52'.6 S
Sabik	102° 14'.8	15° 44'.3 S
Schedar	349° 42'.7	56° 36'.2 N
Shaula	96° 24'.7	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.1	11° 13'.2 S
Suhail	222° 53'.4	43° 28'.6 S
Vega	80° 40'.6	38° 47'.6 N
Zuben'ubi	137° 07'.5	16° 05'.3 S

	SHA	Mer.Pass.
Venus	120° 54'.8	08:48
Mars	64° 07'.9	12:34
Jupiter	1° 45'.3	16:42
Saturn	163° 27'.6	05:56

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 30'.9	22° 26'.4 S	148° 28'.9	14'.3	12° 26'.8 S	11'.0	54'.9
193° 30'.6	26'.1	163° 02'.2	14'.4	15'.8	11'.0	
208° 30'.3	25'.8	177° 35'.6	14'.4	04'.8	11'.0	
223° 30'.1	25'.5	192° 09'.0	14'.4	11° 53'.8 S	11'.1	54'.8
238° 29'.8	25'.2	206° 42'.4	14'.6	42'.7	11'.1	
253° 29'.5	24'.9	221° 16'.0	14'.5	31'.6	11'.2	
268° 29'.3	24'.6	235° 49'.5	14'.7	20'.4	11'.1	
283° 29'.0	24'.2	250° 23'.2	14'.7	09'.3	11'.3	
298° 28'.7	23'.9	264° 56'.9	14'.7	10° 58'.0 S	11'.2	
313° 28'.4	23'.6	279° 30'.6	14'.8	46'.8	11'.4	54'.7
328° 28'.2	23'.3	294° 04'.4	14'.9	35'.4	11'.3	
343° 27'.9	23'.0	308° 38'.3	14'.9	24'.1	11'.4	
358° 27'.6	22° 22'.7 S	323° 12'.2	15'.0	10° 12'.7 S	11'.4	54'.7
13° 27'.4	22'.4	337° 46'.2	15'.0	01'.3	11'.4	
28° 27'.1	22'.0	352° 20'.2	15'.1	9° 49'.9 S	11'.5	
43° 26'.8	21'.7	6° 54'.3	15'.1	38'.4	11'.5	54'.6
58° 26'.6	21'.4	21° 28'.4	15'.2	26'.9	11'.5	
73° 26'.3	21'.1	36° 02'.6	15'.2	15'.4	11'.6	
88° 26'.0	20'.8	50° 36'.8	15'.3	03'.8	11'.6	
103° 25'.7	20'.4	65° 11'.1	15'.3	8° 52'.2 S	11'.6	
118° 25'.5	20'.1	79° 45'.4	15'.3	40'.6	11'.7	
133° 25'.2	19'.8	94° 19'.7	15'.4	28'.9	11'.6	
148° 24'.9	19'.5	108° 54'.1	15'.5	17'.3	11'.7	54'.5
163° 24'.7	19'.1	123° 28'.6	15'.5	05'.6	11'.8	
178° 24'.4	22° 18'.8 S	138° 03'.1	15'.5	7° 53'.8 S	11'.7	54'.5
193° 24'.1	18'.5	152° 37'.6	15'.6	42'.1	11'.8	
208° 23'.9	18'.2	167° 12'.2	15'.6	30'.3	11'.8	
223° 23'.6	17'.8	181° 46'.8	15'.7	18'.5	11'.8	
238° 23'.3	17'.5	196° 21'.5	15'.7	06'.7	11'.9	
253° 23'.1	17'.2	210° 56'.2	15'.7	6° 54'.8 S	11'.8	
268° 22'.8	16'.8	225° 30'.9	15'.8	43'.0	11'.9	54'.4
283° 22'.5	16'.5	240° 05'.7	15'.8	31'.1	11'.9	
298° 22'.3	16'.2	254° 40'.5	15'.8	19'.2	11'.9	
313° 22'.0	15'.8	269° 15'.3	15'.9	07'.3	11'.9	
328° 21'.7	15'.5	283° 50'.2	15'.9	5° 55'.4 S	12'.0	
343° 21'.5	15'.2	298° 25'.1	16'.0	43'.4	12'.0	
358° 21'.2	22° 14'.8 S	313° 00'.1	15'.9	5° 31'.4 S	11'.9	54'.4
13° 20'.9	14'.5	327° 35'.0	16'.0	19'.5	12'.0	
28° 20'.7	14'.2	342° 10'.0	16'.1	07'.5	12'.1	
43° 20'.4	13'.8	356° 45'.1	16'.0	4° 55'.4 S	12'.0	54'.3
58° 20'.1	13'.5	11° 20'.1	16'.1	43'.4	12'.0	
73° 19'.9	13'.1	25° 55'.2	16'.2	31'.4	12'.1	
88° 19'.6	12'.8	40° 30'.4	16'.1	19'.3	12'.0	
103° 19'.4	12'.5	55° 05'.5	16'.2	07'.3	12'.1	
118° 19'.1	12'.1	69° 40'.7	16'.2	3° 55'.2 S	12'.1	
133° 18'.8	11'.8	84° 15'.9	16'.2	43'.1	12'.1	
148° 18'.6	11'.4	98° 51'.1	16'.2	31'.0	12'.0	
163° 18'.3	11'.1	113° 26'.3	16'.3	19'.0	12'.2	
178° 18'.0	22° 10'.7 S	128° 01'.6	16'.3	3° 06'.8 S	12'.1	54'.3
193° 17'.8	10'.4	142° 36'.9	16'.3	2° 54'.7 S	12'.1	
208° 17'.5	10'.1	157° 12'.2	16'.3	42'.6	12'.1	54'.2
223° 17'.2	09'.7	171° 47'.5	16'.4	30'.5	12'.1	
238° 17'.0	09'.4	186° 22'.9	16'.3	18'.4	12'.2	
253° 16'.7	09'.0	200° 58'.2	16'.4	06'.2	12'.1	
268° 16'.5	08'.7	215° 33'.6	16'.4	1° 54'.1 S	12'.1	
283° 16'.2	08'.3	230° 09'.0	16'.4	42'.0	12'.2	
298° 15'.9	08'.0	244° 44'.4	16'.4	29'.8	12'.1	
313° 15'.7	07'.6	259° 19'.8	16'.4	17'.7	12'.2	
328° 15'.4	07'.3	273° 55'.2	16'.5	05'.5	12'.1	
343° 15'.2	06'.9	288° 30'.7	16'.4	0° 53'.4 S	12'.2	
358° 14'.9	22° 06'.6 S	303° 06'.1	16'.5	0° 41'.2 S	12'.1	54'.2
13° 14'.6	06'.2	317° 41'.6	16'.5	29'.1	12'.1	
28° 14'.4	05'.8	332° 17'.1	16'.4	17'.0	12'.2	
43° 14'.1	05'.5	346° 52'.5	16'.5	04'.8	12'.1	
58° 13'.9	05'.1	1° 28'.0	16'.5	0° 07'.3 N	12'.2	
73° 13'.6	04'.8	16° 03'.5	16'.5	19'.5	12'.1	
88° 13'.4	04'.4	30° 39'.0	16'.5	31'.6	12'.1	
103° 13'.1	04'.1	45° 14'.5	16'.5	43'.7	12'.1	
118° 12'.8	03'.7	59° 50'.0	16'.5	55'.8	12'.1	
133° 12'.6	03'.3	74° 25'.5	16'.5	1° 07'.9 N	12'.2	
148° 12'.3	03'.0	89° 01'.0	16'.5	20'.1	12'.1	
163° 12'.1	02'.6	103° 36'.5	16'.5	32'.2	12'.1	
SD 16'.3	d 0'.3	SD	14'.9	14'.8	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 7	Moonrise 8	Moonrise 9
N 72°	08:15	10:20	-	10:45	10:20	09:59
N 70°	07:58	09:37	-	10:28	10:12	09:57
68°	07:44	09:08	11:11	10:15	10:05	09:56
66°	07:33	08:46	10:13	10:04	09:59	09:55
64°	07:23	08:29	09:40	09:55	09:55	09:54
62°	07:14	08:14	09:16	09:47	09:50	09:53
60°	07:07	08:02	08:57	09:40	09:47	09:53
N 58°	07:00	07:51	08:41	09:34	09:43	09:52
56°	06:54	07:42	08:28	09:29	09:41	09:51
54°	06:48	07:34	08:16	09:24	09:38	09:51
52°	06:43	07:26	08:06	09:19	09:36	09:50
50°	06:38	07:19	07:57	09:15	09:33	09:50
45°	06:28	07:04	07:38	09:07	09:29	09:49
N 40°	06:18	06:52	07:22	08:59	09:25	09:48
35°	06:09	06:41	07:09	08:53	09:21	09:48
30°	06:01	06:31	06:57	08:47	09:18	09:47
20°	05:46	06:13	06:37	08:38	09:13	09:46
N 10°	05:31	05:57	06:19	08:29	09:08	09:45
0°	05:15	05:41	06:03	08:21	09:03	09:44
S 10°	04:57	05:23	05:46	08:13	08:59	09:43
20°	04:35	05:04	05:28	08:05	08:54	09:43
30°	04:07	04:40	05:07	07:55	08:49	09:42
35°	03:50	04:26	04:55	07:49	08:46	09:41
40°	03:28	04:09	04:41	07:43	08:42	09:40
45°	03:00	03:48	04:24	07:35	08:38	09:40
S 50°	02:19	03:20	04:03	07:26	08:33	09:39
52°	01:55	03:06	03:53	07:22	08:31	09:38
54°	01:21	02:50	03:42	07:17	08:28	09:38
56°	-	02:30	03:28	07:12	08:25	09:37
58°	-	02:05	03:13	07:06	08:22	09:37
S 60°	-	01:28	02:55	06:59	08:19	09:36
S 62°	-	-	02:32	06:52	08:15	09:36

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 7	Moonset 8	Moonset 9
N 72°	-	13:54	15:58	18:42	20:34	22:21
N 70°	-	14:37	16:16	18:56	20:39	22:19
68°	13:03	15:06	16:29	19:08	20:44	22:17
66°	14:00	15:27	16:41	19:17	20:48	22:16
64°	14:33	15:45	16:51	19:25	20:51	22:15
62°	14:57	15:59	16:59	19:32	20:54	22:14
60°	15:16	16:11	17:07	19:38	20:56	22:13
N 58°	15:32	16:22	17:14	19:43	20:58	22:12
56°	15:45	16:31	17:20	19:47	21:00	22:12
54°	15:57	16:40	17:25	19:51	21:02	22:11
52°	16:07	16:47	17:30	19:55	21:03	22:11
50°	16:16	16:54	17:35	19:58	21:05	22:10
45°	16:36	17:09	17:46	20:06	21:08	22:09
N 40°	16:51	17:22	17:55	20:11	21:10	22:08
35°	17:05	17:33	18:04	20:17	21:13	22:08
30°	17:16	17:42	18:12	20:21	21:14	22:07
20°	17:36	18:00	18:27	20:29	21:18	22:06
N 10°	17:54	18:16	18:43	20:36	21:21	22:05
0°	18:10	18:33	18:59	20:42	21:23	22:04
S 10°	18:27	18:50	19:17	20:48	21:26	22:03
20°	18:45	19:09	19:38	20:55	21:29	22:02
30°	19:06	19:33	20:05	21:02	21:32	22:00
35°	19:18	19:47	20:23	21:06	21:34	22:00
40°	19:32	20:04	20:45	21:11	21:36	21:59
45°	19:49	20:25	21:13	21:17	21:38	21:58
S 50°	20:10	20:53	21:53	21:23	21:41	21:57
52°	20:20	21:06	22:17	21:26	21:42	21:56
54°	20:31	21:22	22:49	21:30	21:43	21:56
56°	20:44	21:42	-	21:33	21:45	21:55
58°	20:59	22:07	-	21:37	21:46	21:55
S 60°	21:17	22:42	-	21:42	21:48	21:54
S 62°	21:40	-	-	21:47	21:50	21:53

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
7	5 56	6 09	12:06	14:32	02:10	3d 10%
8	6 22	6 35	12:07	15:13	02:53	4d 16%
9	6 47	7 00	12:07	15:54	03:34	5d 23%

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2011 January 10, 11, 12 (Mon, Tue, Wed)

GMT	ARIES	VENUS -4.4		MARS +1.2		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
10 00	109° 10'.5	228° 00'.3	17° 15'.7 S	171° 39'.0	22° 04'.4 S	110° 39'.0	1° 59'.1 S	272° 34'.4	4° 24'.6 S
01	124° 12'.9	243° 00'.1	16'.2	186° 39'.4	04'.0	125° 41'.2	58'.9	287° 36'.8	24'.7
02	139° 15'.4	257° 59'.9	16'.7	201° 39'.8	03'.7	140° 43'.3	58'.8	302° 39'.2	24'.7
03	154° 17'.9	272° 59'.8	17'.3	216° 40'.2	03'.3	155° 45'.4	58'.6	317° 41'.6	24'.7
04	169° 20'.3	287° 59'.6	17'.8	231° 40'.6	03'.0	170° 47'.5	58'.4	332° 44'.0	24'.7
05	184° 22'.8	302° 59'.4	18'.3	246° 41'.0	02'.6	185° 49'.6	58'.3	347° 46'.4	24'.7
06	199° 25'.2	317° 59'.3	18'.8	261° 41'.4	02'.3	200° 51'.7	58'.1	2° 48'.8	24'.7
07	214° 27'.7	332° 59'.1	19'.4	276° 41'.8	01'.9	215° 53'.8	57'.9	17° 51'.1	24'.8
08	229° 30'.2	347° 58'.9	19'.9	291° 42'.2	01'.6	230° 55'.9	57'.8	32° 53'.5	24'.8
09	244° 32'.6	2° 58'.8	20'.4	306° 42'.6	01'.2	245° 58'.0	57'.6	47° 55'.9	24'.8
10	259° 35'.1	17° 58'.6	21'.0	321° 43'.0	00'.9	261° 00'.1	57'.5	62° 58'.3	24'.8
11	274° 37'.6	32° 58'.4	21'.5	336° 43'.4	00'.5	276° 02'.2	57'.3	78° 00'.7	24'.8
12	289° 40'.0	47° 58'.2	17° 22'.0 S	351° 43'.8	22° 00'.2 S	291° 04'.4	1° 57'.1 S	93° 03'.1	4° 24'.8 S
13	304° 42'.5	62° 58'.1	22'.5	6° 44'.2	21° 59'.8 S	306° 06'.5	57'.0	108° 05'.5	24'.8
14	319° 45'.0	77° 57'.9	23'.1	21° 44'.6	59'.5	321° 08'.6	56'.8	123° 07'.9	24'.9
15	334° 47'.4	92° 57'.7	23'.6	36° 45'.0	59'.1	336° 10'.7	56'.6	138° 10'.3	24'.9
16	349° 49'.9	107° 57'.5	24'.1	51° 45'.4	58'.7	351° 12'.8	56'.5	153° 12'.7	24'.9
17	4° 52'.3	122° 57'.4	24'.6	66° 45'.8	58'.4	6° 14'.9	56'.3	168° 15'.1	24'.9
18	19° 54'.8	137° 57'.2	25'.2	81° 46'.2	58'.0	21° 17'.0	56'.1	183° 17'.5	24'.9
19	34° 57'.3	152° 57'.0	25'.7	96° 46'.6	57'.7	36° 19'.1	56'.0	198° 19'.9	24'.9
20	49° 59'.7	167° 56'.8	26'.2	111° 47'.0	57'.3	51° 21'.2	55'.8	213° 22'.3	25'.0
21	65° 02'.2	182° 56'.6	26'.7	126° 47'.4	57'.0	66° 23'.3	55'.7	228° 24'.7	25'.0
22	80° 04'.7	197° 56'.5	27'.2	141° 47'.8	56'.6	81° 25'.4	55'.5	243° 27'.1	25'.0
23	95° 07'.1	212° 56'.3	27'.8	156° 48'.2	56'.2	96° 27'.5	55'.3	258° 29'.5	25'.0
11 00	110° 09'.6	227° 56'.1	17° 28'.3 S	171° 48'.6	21° 55'.9 S	111° 29'.6	1° 55'.2 S	273° 31'.9	4° 25'.0 S
01	125° 12'.1	242° 55'.9	28'.8	186° 49'.0	55'.5	126° 31'.7	55'.0	288° 34'.3	25'.0
02	140° 14'.5	257° 55'.7	29'.3	201° 49'.4	55'.2	141° 33'.9	54'.8	303° 36'.7	25'.0
03	155° 17'.0	272° 55'.5	29'.9	216° 49'.8	54'.8	156° 36'.0	54'.7	318° 39'.1	25'.1
04	170° 19'.5	287° 55'.3	30'.4	231° 50'.2	54'.4	171° 38'.1	54'.5	333° 41'.5	25'.1
05	185° 21'.9	302° 55'.2	30'.9	246° 50'.6	54'.1	186° 40'.2	54'.3	348° 43'.9	25'.1
06	200° 24'.4	317° 55'.0	31'.4	261° 51'.0	53'.7	201° 42'.3	54'.2	3° 46'.2	25'.1
07	215° 26'.8	332° 54'.8	31'.9	276° 51'.4	53'.4	216° 44'.4	54'.0	18° 48'.6	25'.1
08	230° 29'.3	347° 54'.6	32'.4	291° 51'.8	53'.0	231° 46'.5	53'.8	33° 51'.0	25'.1
09	245° 31'.8	2° 54'.4	33'.0	306° 52'.2	52'.6	246° 48'.6	53'.7	48° 53'.4	25'.1
10	260° 34'.2	17° 54'.2	33'.5	321° 52'.6	52'.3	261° 50'.7	53'.5	63° 55'.8	25'.2
11	275° 36'.7	32° 54'.0	34'.0	336° 53'.0	51'.9	276° 52'.8	53'.4	78° 58'.2	25'.2
12	290° 39'.2	47° 53'.8	17° 34'.5 S	351° 53'.4	21° 51'.5 S	291° 54'.9	1° 53'.2 S	94° 00'.6	4° 25'.2 S
13	305° 41'.6	62° 53'.6	35'.0	6° 53'.8	51'.2	306° 57'.0	53'.0	109° 03'.0	25'.2
14	320° 44'.1	77° 53'.4	35'.6	21° 54'.2	50'.8	321° 59'.1	52'.9	124° 05'.4	25'.2
15	335° 46'.6	92° 53'.2	36'.1	36° 54'.6	50'.4	337° 01'.2	52'.7	139° 07'.8	25'.2
16	350° 49'.0	107° 53'.0	36'.6	51° 55'.0	50'.1	352° 03'.3	52'.5	154° 10'.2	25'.2
17	5° 51'.5	122° 52'.8	37'.1	66° 55'.4	49'.7	7° 05'.4	52'.4	169° 12'.6	25'.3
18	20° 54'.0	137° 52'.6	37'.6	81° 55'.8	49'.3	22° 07'.5	52'.2	184° 15'.0	25'.3
19	35° 56'.4	152° 52'.4	38'.1	96° 56'.2	49'.0	37° 09'.6	52'.0	199° 17'.4	25'.3
20	50° 58'.9	167° 52'.2	38'.6	111° 56'.6	48'.6	52° 11'.7	51'.9	214° 19'.8	25'.3
21	66° 01'.3	182° 52'.0	39'.2	126° 57'.0	48'.2	67° 13'.8	51'.7	229° 22'.2	25'.3
22	81° 03'.8	197° 51'.8	39'.7	141° 57'.4	47'.9	82° 15'.9	51'.5	244° 24'.6	25'.3
23	96° 06'.3	212° 51'.6	40'.2	156° 57'.8	47'.5	97° 18'.0	51'.4	259° 27'.0	25'.3
12 00	111° 08'.7	227° 51'.4	17° 40'.7 S	171° 58'.2	21° 47'.1 S	112° 20'.1	1° 51'.2 S	274° 29'.4	4° 25'.4 S
01	126° 11'.2	242° 51'.2	41'.2	186° 58'.6	46'.8	127° 22'.2	51'.0	289° 31'.8	25'.4
02	141° 13'.7	257° 51'.0	41'.7	201° 59'.0	46'.4	142° 24'.3	50'.9	304° 34'.2	25'.4
03	156° 16'.1	272° 50'.8	42'.2	216° 59'.5	46'.0	157° 26'.4	50'.7	319° 36'.6	25'.4
04	171° 18'.6	287° 50'.6	42'.8	231° 59'.9	45'.6	172° 28'.5	50'.5	334° 39'.0	25'.4
05	186° 21'.1	302° 50'.4	43'.3	247° 00'.3	45'.3	187° 30'.6	50'.4	349° 41'.4	25'.4
06	201° 23'.5	317° 50'.2	43'.8	262° 00'.7	44'.9	202° 32'.7	50'.2	4° 43'.8	25'.4
07	216° 26'.0	332° 50'.0	44'.3	277° 01'.1	44'.5	217° 34'.8	50'.0	19° 46'.2	25'.4
08	231° 28'.4	347° 49'.8	44'.8	292° 01'.5	44'.1	232° 36'.9	49'.9	34° 48'.6	25'.5
09	246° 30'.9	2° 49'.6	45'.3	307° 01'.9	43'.8	247° 39'.0	49'.7	49° 51'.1	25'.5
10	261° 33'.4	17° 49'.3	45'.8	322° 02'.3	43'.4	262° 41'.1	49'.5	64° 53'.5	25'.5
11	276° 35'.8	32° 49'.1	46'.3	337° 02'.7	43'.0	277° 43'.2	49'.4	79° 55'.9	25'.5
12	291° 38'.3	47° 48'.9	17° 46'.8 S	352° 03'.1	21° 42'.7 S	292° 45'.3	1° 49'.2 S	94° 58'.3	4° 25'.5 S
13	306° 40'.8	62° 48'.7	47'.3	7° 03'.5	42'.3	307° 47'.4	49'.0	110° 00'.7	25'.5
14	321° 43'.2	77° 48'.5	47'.8	22° 03'.9	41'.9	322° 49'.5	48'.9	125° 03'.1	25'.5
15	336° 45'.7	92° 48'.3	48'.4	37° 04'.3	41'.5	337° 51'.6	48'.7	140° 05'.5	25'.5
16	351° 48'.2	107° 48'.0	48'.9	52° 04'.7	41'.1	352° 53'.7	48'.5	155° 07'.9	25'.6
17	6° 50'.6	122° 47'.8	49'.4	67° 05'.1	40'.8	7° 55'.8	48'.4	170° 10'.3	25'.6
18	21° 53'.1	137° 47'.6	49'.9	82° 05'.5	40'.4	22° 57'.9	48'.2	185° 12'.7	25'.6
19	36° 55'.6	152° 47'.4	50'.4	97° 05'.9	40'.0	38° 00'.0	48'.0	200° 15'.1	25'.6
20	51° 58'.0	167° 47'.2	50'.9	112° 06'.3	39'.6	53° 02'.1	47'.8	215° 17'.5	25'.6
21	67° 00'.5	182° 46'.9	51'.4	127° 06'.7	39'.3	68° 04'.2	47'.7	230° 19'.9	25'.6
22	82° 02'.9	197° 46'.7	51'.9	142° 07'.1	38'.9	83° 06'.3	47'.5	245° 22'.3	25'.6
23	97° 05'.4	212° 46'.5	52'.4	157° 07'.5	38'.5	98° 08'.4	47'.3	260° 24'.7	25'.6
	M.P. 16:37	v -0'.2	d 0'.5	v 0'.4	d 0'.4	v 2'.1	d 0'.2	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.8 S
Achernar	335° 27'.9	57° 11'.1 S
Acrux	173° 11'.2	63° 09'.4 S
Adhara	255° 13'.5	28° 59'.3 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.0	55° 53'.6 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.7	26° 40'.4 N
Alpheratz	357° 45'.4	29° 09'.3 N
Altair	62° 10'.3	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.9 S
Antares	112° 28'.7	26° 27'.3 S
Arcturus	145° 57'.4	19° 07'.3 N
Atria	107° 32'.6	69° 02'.6 S
Avior	234° 18'.1	59° 32'.7 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.2 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.2	45° 19'.3 N
Denebola	182° 35'.3	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.6 S
Dubhe	193° 53'.3	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.5	51° 29'.2 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.8	57° 10'.4 S
Gienah	175° 54'.0	17° 36'.3 S
Hadar	148° 50'.6	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.5	34° 22'.7 S
Kochab	137° 20'.3	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.7	36° 25'.4 S
Miaplacidus	221° 39'.3	69° 45'.7 S
Mirfak	308° 42'.6	49° 54'.2 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.5	56° 42'.0 S
Polaris	318° 27'.0	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 08'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.4	60° 52'.6 S
Sabik	102° 14'.8	15° 44'.3 S
Schedar	349° 42'.7	56° 36'.2 N
Shaula	96° 24'.6	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.1	11° 13'.2 S
Suhail	222° 53'.4	43° 28'.7 S
Vega	80° 40'.6	38° 47'.6 N
Zuben'ubi	137° 07'.5	16° 05'.3 S

	SHA	Mer.Pass.
Venus	117° 46'.5	08:48
Mars	61° 39'.0	12:32
Jupiter	1° 20'.0	16:32
Saturn	163° 22'.3	05:45

SUN				
GHA	Dec	GHA	v	Dec	d	HP
178° 11'.8	22° 02'.3 S	118° 12'.0	16'.5	1° 44'.3 N	12'.0	54'.1
193° 11'.5	01'.9	132° 47'.5	16'.5	56'.3	12'.1	
208° 11'.3	01'.5	147° 23'.0	16'.5	2° 08'.4 N	12'.1	
223° 11'.0	01'.2	161° 58'.5	16'.5	20'.5	12'.0	
238° 10'.8	00'.8	176° 34'.0	16'.4	32'.5	12'.1	
253° 10'.5	00'.4	191° 09'.4	16'.5	44'.6	12'.0	
268° 10'.3	00'.1	205° 44'.9	16'.5	56'.6	12'.1	
283° 10'.0	21° 59'.7 S	220° 20'.4	16'.4	3° 08'.7 N	12'.0	
298° 09'.8	59'.3	234° 55'.8	16'.5	20'.7	12'.0	
313° 09'.5	59'.0	249° 31'.3	16'.4	32'.7	12'.0	
328° 09'.3	58'.6	264° 06'.7	16'.4	44'.7	11'.9	
343° 09'.0	58'.2	278° 42'.1	16'.4	56'.6	12'.0	
358° 08'.7	21° 57'.8 S	293° 17'.5	16'.4	4° 08'.6 N	11'.9	54'.2
13° 08'.5	57'.5	307° 52'.9	16'.4	20'.5	12'.0	
28° 08'.2	57'.1	322° 28'.3	16'.4	32'.5	11'.9	
43° 08'.0	56'.7	337° 03'.7	16'.3	44'.4	11'.9	
58° 07'.7	56'.4	351° 39'.0	16'.4	56'.3	11'.8	
73° 07'.5	56'.0	6° 14'.4	16'.3	5° 08'.1 N	11'.9	
88° 07'.2	55'.6	20° 49'.7	16'.3	20'.0	11'.8	
103° 07'.0	55'.2	35° 25'.0	16'.3	31'.8	11'.8	
118° 06'.7	54'.9	50° 00'.3	16'.2	43'.6	11'.8	
133° 06'.5	54'.5	64° 35'.5	16'.2	55'.4	11'.8	
148° 06'.2	54'.1	79° 10'.7	16'.2	6° 07'.2 N	11'.8	
163° 06'.0	53'.7	93° 45'.9	16'.2	19'.0	11'.7	
178° 05'.7	21° 53'.3 S	108° 21'.1	16'.2	6° 30'.7 N	11'.7	54'.2
193° 05'.5	53'.0	122° 56'.3	16'.1	42'.4	11'.7	
208° 05'.2	52'.6	137° 31'.4	16'.1	54'.1	11'.7	
223° 05'.0	52'.2	152° 06'.5	16'.1	7° 05'.8 N	11'.6	
238° 04'.7	51'.8	166° 41'.6	16'.0	17'.4	11'.6	
253° 04'.5	51'.4	181° 16'.6	16'.1	29'.0	11'.6	
268° 04'.2	51'.0	195° 51'.7	15'.9	40'.6	11'.6	
283° 04'.0	50'.7	210° 26'.6	16'.0	52'.2	11'.5	
298° 03'.7	50'.3	225° 01'.6	15'.9	8° 03'.7 N	11'.5	
313° 03'.5	49'.9	239° 36'.5	15'.9	15'.2	11'.5	54'.3
328° 03'.2	49'.5	254° 11'.4	15'.8	26'.7	11'.4	
343° 03'.0	49'.1	268° 46'.2	15'.9	38'.1	11'.5	
358° 02'.7	21° 48'.7 S	283° 21'.1	15'.7	8° 49'.6 N	11'.3	54'.3
13° 02'.5	48'.3	297° 55'.8	15'.8	9° 00'.9 N	11'.4	
28° 02'.2	47'.9	312° 30'.6	15'.7	12'.3	11'.3	
43° 02'.0	47'.5	327° 05'.3	15'.6	23'.6	11'.3	
58° 01'.7	47'.2	341° 39'.9	15'.7	34'.9	11'.3	
73° 01'.5	46'.8	356° 14'.6	15'.5	46'.2	11'.2	
88° 01'.3	46'.4	10° 49'.1	15'.6	57'.4	11'.2	
103° 01'.0	46'.0	25° 23'.7	15'.5	10° 08'.6 N	11'.2	54'.4
118° 00'.8	45'.6	39° 58'.2	15'.4	19'.8	11'.1	
133° 00'.5	45'.2	54° 32'.6	15'.4	30'.9	11'.1	
148° 00'.3	44'.8	69° 07'.0	15'.4	42'.0	11'.0	
163° 00'.0	44'.4	83° 41'.4	15'.3	53'.0	11'.0	
177° 59'.8	21° 44'.0 S	98° 15'.7	15'.3	11° 04'.0 N	11'.0	54'.4
192° 59'.5	43'.6	112° 50'.0	15'.2	15'.0	10'.9	
207° 59'.3	43'.2	127° 24'.2	15'.2	25'.9	10'.9	
222° 59'.0	42'.8	141° 58'.4	15'.1	36'.8	10'.9	
237° 58'.8	42'.4	156° 32'.5	15'.0	47'.7	10'.8	54'.5
252° 58'.6	42'.0	171° 06'.5	15'.0	58'.5	10'.8	
267° 58'.3	41'.6	185° 40'.5	15'.0	12° 09'.3 N	10'.7	
282° 58'.1	41'.2	200° 14'.5	14'.9	20'.0	10'.7	
297° 57'.8	40'.8	214° 48'.4	14'.9	30'.7	10'.6	
312° 57'.6	40'.4	229° 22'.3	14'.7	41'.3	10'.6	
327° 57'.4	40'.0	243° 56'.0	14'.8	51'.9	10'.5	54'.6
342° 57'.1	39'.6	258° 29'.8	14'.7	13° 02'.4 N	10'.5	
357° 56'.9	21° 39'.2 S	273° 03'.5	14'.6	13° 12'.9 N	10'.5	54'.6
12° 56'.6	38'.7	287° 37'.1	14'.5	23'.4	10'.4	
27° 56'.4	38'.3	302° 10'.6	14'.5	33'.8	10'.3	
42° 56'.1	37'.9	316° 44'.1	14'.5	44'.1	10'.3	
57° 55'.9	37'.5	331° 17'.6	14'.4	54'.4	10'.3	54'.7
72° 55'.7	37'.1	345° 51'.0	14'.3	14° 04'.7 N	10'.2	
87° 55'.4	36'.7	0° 24'.3	14'.2	14'.9	10'.1	
102° 55'.2	36'.3	14° 57'.5	14'.2	25'.0	10'.1	
117° 54'.9	35'.9	29° 30'.7	14'.1	35'.1	10'.1	
132° 54'.7	35'.5	44° 03'.8	14'.1	45'.2	10'.0	
147° 54'.5	35'.0	58° 36'.9	14'.0	55'.2	9'.9	54'.8
162° 54'.2	34'.6	73° 09'.9	13'.9	15° 05'.1 N	9'.9	
SD 16'.3	d 0'.4	SD	14'.8	14'.8	14'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 10	Moonrise 11	Moonrise 12
N 72°	08:10	10:09	-	09:39	09:17	08:49
N 70°	07:54	09:30	-	09:43	09:28	09:11
68°	07:41	09:03	10:54	09:47	09:38	09:28
66°	07:30	08:42	10:05	09:51	09:46	09:42
64°	07:20	08:25	09:35	09:54	09:53	09:54
62°	07:12	08:11	09:12	09:56	09:59	10:03
60°	07:05	08:00	08:54	09:58	10:04	10:12
N 58°	06:58	07:49	08:39	10:00	10:09	10:19
56°	06:52	07:40	08:26	10:02	10:13	10:26
54°	06:47	07:32	08:14	10:04	10:17	10:32
52°	06:42	07:25	08:04	10:05	10:20	10:37
50°	06:37	07:18	07:56	10:06	10:23	10:42
45°	06:27	07:04	07:37	10:09	10:30	10:53
N 40°	06:18	06:51	07:21	10:12	10:36	11:02
35°	06:09	06:41	07:08	10:14	10:41	11:09
30°	06:01	06:31	06:57	10:16	10:45	11:16
20°	05:46	06:14	06:37	10:19	10:52	11:28
N 10°	05:32	05:58	06:20	10:22	10:59	11:38
0°	05:16	05:42	06:04	10:25	11:05	11:48
S 10°	04:58	05:25	05:48	10:27	11:12	11:58
20°	04:37	05:06	05:30	10:30	11:19	12:08
30°	04:10	04:43	05:10	10:34	11:26	12:20
35°	03:53	04:29	04:58	10:36	11:31	12:27
40°	03:32	04:12	04:44	10:38	11:36	12:35
45°	03:04	03:51	04:27	10:41	11:42	12:45
S 50°	02:24	03:24	04:07	10:44	11:49	12:56
52°	02:02	03:11	03:57	10:45	11:53	13:01
54°	01:31	02:55	03:46	10:47	11:56	13:07
56°	00:27	02:36	03:34	10:49	12:01	13:14
58°	-	02:13	03:19	10:51	12:05	13:21
S 60°	-	01:39	03:01	10:53	12:10	13:29
S 62°	-	00:29	02:40	10:56	12:16	13:39

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 10	Moonset 11	Moonset 12
N 72°	-	14:08	16:06	-	00:08	02:03
N 70°	-	14:47	16:23	23:58	-	01:43
68°	13:22	15:14	16:36	23:51	-	01:27
66°	14:11	15:34	16:47	23:44	-	01:15
64°	14:41	15:51	16:56	23:39	-	01:04
62°	15:04	16:05	17:04	23:34	-	00:55
60°	15:22	16:17	17:11	23:30	-	00:48
N 58°	15:37	16:27	17:18	23:26	-	00:41
56°	15:50	16:36	17:24	23:23	-	00:35
54°	16:02	16:44	17:29	23:20	-	00:30
52°	16:12	16:51	17:34	23:18	-	00:25
50°	16:20	16:58	17:39	23:15	-	00:21
45°	16:39	17:12	17:49	23:10	-	00:12
N 40°	16:54	17:24	17:58	23:06	-	00:04
35°	17:07	17:35	18:06	23:02	23:58	24:55
30°	17:19	17:45	18:14	22:59	23:52	24:47
20°	17:38	18:02	18:29	22:54	23:42	24:33
N 10°	17:55	18:18	18:44	22:49	23:34	24:20
0°	18:12	18:34	19:00	22:44	23:26	24:09
S 10°	18:28	18:50	19:17	22:40	23:18	23:58
20°	18:45	19:09	19:38	22:35	23:09	23:46
30°	19:06	19:32	20:05	22:29	22:59	23:32
35°	19:17	19:46	20:22	22:26	22:54	23:24
40°	19:31	20:03	20:43	22:23	22:47	23:15
45°	19:48	20:24	21:11	22:18	22:40	23:04
S 50°	20:08	20:50	21:50	22:14	22:31	22:52
52°	20:18	21:04	22:12	22:11	22:27	22:46
54°	20:29	21:19	22:42	22:09	22:23	22:39
56°	20:41	21:38	23:38	22:06	22:18	22:32
58°	20:56	22:01	-	22:03	22:12	22:24
S 60°	21:13	22:33	-	22:00	22:06	22:15
S 62°	21:34	23:35	-	21:56	21:59	22:04

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
10	7 12	7 25	12:07	16:34	04:14	6d 32%
11	7 37	7 49	12:08	17:15	04:55	7d 41%
12	8 00	8 12	12:08	17:58	05:37	8d 50%

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2011 January 13, 14, 15 (Thur, Fri, Sat)

GMT	ARIES	VENUS -4.4		MARS +1.2		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
13 Thursday 00	112° 07'.9	227° 46'.3	17° 52'.9 S	172° 07'.9	21° 38'.1 S	113° 10'.5	1° 47'.2 S	275° 27'.1	4° 25'.7 S
01	127° 10'.3	242° 46'.0	53'.4	187° 08'.4	37'.7	128° 12'.6	47'.0	290° 29'.5	25'.7
02	142° 12'.8	257° 45'.8	53'.9	202° 08'.8	37'.4	143° 14'.7	46'.8	305° 31'.9	25'.7
03	157° 15'.3	272° 45'.6	54'.4	217° 09'.2	37'.0	158° 16'.8	46'.7	320° 34'.3	25'.7
04	172° 17'.7	287° 45'.4	54'.9	232° 09'.6	36'.6	173° 18'.9	46'.5	335° 36'.7	25'.7
05	187° 20'.2	302° 45'.1	55'.4	247° 10'.0	36'.2	188° 21'.0	46'.3	350° 39'.1	25'.7
06	202° 22'.7	317° 44'.9	55'.9	262° 10'.4	35'.8	203° 23'.1	46'.2	5° 41'.5	25'.7
07	217° 25'.1	332° 44'.7	56'.4	277° 10'.8	35'.4	218° 25'.2	46'.0	20° 43'.9	25'.7
08	232° 27'.6	347° 44'.4	56'.9	292° 11'.2	35'.1	233° 27'.2	45'.8	35° 46'.3	25'.7
09	247° 30'.1	2° 44'.2	57'.4	307° 11'.6	34'.7	248° 29'.3	45'.7	50° 48'.8	25'.8
10	262° 32'.5	17° 44'.0	57'.9	322° 12'.0	34'.3	263° 31'.4	45'.5	65° 51'.2	25'.8
11	277° 35'.0	32° 43'.7	58'.4	337° 12'.4	33'.9	278° 33'.5	45'.3	80° 53'.6	25'.8
12	292° 37'.4	47° 43'.5	17° 58'.9 S	352° 12'.8	21° 33'.5 S	293° 35'.6	1° 45'.1 S	95° 56'.0	4° 25'.8 S
13	307° 39'.9	62° 43'.3	59'.4	7° 13'.2	33'.1	308° 37'.7	45'.0	110° 58'.4	25'.8
14	322° 42'.4	77° 43'.0	59'.9	22° 13'.6	32'.8	323° 39'.8	44'.8	126° 00'.8	25'.8
15	337° 44'.8	92° 42'.8	18° 00'.4 S	37° 14'.1	32'.4	338° 41'.9	44'.6	141° 03'.2	25'.8
16	352° 47'.3	107° 42'.6	00'.9	52° 14'.5	32'.0	353° 44'.0	44'.5	156° 05'.6	25'.8
17	7° 49'.8	122° 42'.3	01'.4	67° 14'.9	31'.6	8° 46'.1	44'.3	171° 08'.0	25'.8
18	22° 52'.2	137° 42'.1	01'.9	82° 15'.3	31'.2	23° 48'.2	44'.1	186° 10'.4	25'.9
19	37° 54'.7	152° 41'.8	02'.4	97° 15'.7	30'.8	38° 50'.3	44'.0	201° 12'.8	25'.9
20	52° 57'.2	167° 41'.6	02'.9	112° 16'.1	30'.4	53° 52'.4	43'.8	216° 15'.2	25'.9
21	67° 59'.6	182° 41'.4	03'.4	127° 16'.5	30'.0	68° 54'.5	43'.6	231° 17'.6	25'.9
22	83° 02'.1	197° 41'.1	03'.9	142° 16'.9	29'.7	83° 56'.5	43'.4	246° 20'.1	25'.9
23	98° 04'.5	212° 40'.9	04'.4	157° 17'.3	29'.3	98° 58'.6	43'.3	261° 22'.5	25'.9
14 Friday 00	113° 07'.0	227° 40'.6	18° 04'.9 S	172° 17'.7	21° 28'.9 S	114° 00'.7	1° 43'.1 S	276° 24'.9	4° 25'.9 S
01	128° 09'.5	242° 40'.4	05'.4	187° 18'.1	28'.5	129° 02'.8	42'.9	291° 27'.3	25'.9
02	143° 11'.9	257° 40'.1	05'.9	202° 18'.5	28'.1	144° 04'.9	42'.8	306° 29'.7	25'.9
03	158° 14'.4	272° 39'.9	06'.4	217° 19'.0	27'.7	159° 07'.0	42'.6	321° 32'.1	25'.9
04	173° 16'.9	287° 39'.6	06'.9	232° 19'.4	27'.3	174° 09'.1	42'.4	336° 34'.5	26'.0
05	188° 19'.3	302° 39'.4	07'.3	247° 19'.8	26'.9	189° 11'.2	42'.2	351° 36'.9	26'.0
06	203° 21'.8	317° 39'.1	07'.8	262° 20'.2	26'.5	204° 13'.3	42'.1	6° 39'.3	26'.0
07	218° 24'.3	332° 38'.9	08'.3	277° 20'.6	26'.1	219° 15'.4	41'.9	21° 41'.7	26'.0
08	233° 26'.7	347° 38'.6	08'.8	292° 21'.0	25'.7	234° 17'.5	41'.7	36° 44'.1	26'.0
09	248° 29'.2	2° 38'.4	09'.3	307° 21'.4	25'.3	249° 19'.5	41'.6	51° 46'.6	26'.0
10	263° 31'.7	17° 38'.1	09'.8	322° 21'.8	24'.9	264° 21'.6	41'.4	66° 49'.0	26'.0
11	278° 34'.1	32° 37'.9	10'.3	337° 22'.2	24'.6	279° 23'.7	41'.2	81° 51'.4	26'.0
12	293° 36'.6	47° 37'.6	18° 10'.8 S	352° 22'.6	21° 24'.2 S	294° 25'.8	1° 41'.0 S	96° 53'.8	4° 26'.0 S
13	308° 39'.0	62° 37'.4	11'.3	7° 23'.1	23'.8	309° 27'.9	40'.9	111° 56'.2	26'.0
14	323° 41'.5	77° 37'.1	11'.8	22° 23'.5	23'.4	324° 30'.0	40'.7	126° 58'.6	26'.0
15	338° 44'.0	92° 36'.9	12'.2	37° 23'.9	23'.0	339° 32'.1	40'.5	142° 01'.0	26'.1
16	353° 46'.4	107° 36'.6	12'.7	52° 24'.3	22'.6	354° 34'.2	40'.4	157° 03'.4	26'.1
17	8° 48'.9	122° 36'.3	13'.2	67° 24'.7	22'.2	9° 36'.3	40'.2	172° 05'.8	26'.1
18	23° 51'.4	137° 36'.1	13'.7	82° 25'.1	21'.8	24° 38'.3	40'.0	187° 08'.3	26'.1
19	38° 53'.8	152° 35'.8	14'.2	97° 25'.5	21'.4	39° 40'.4	39'.8	202° 10'.7	26'.1
20	53° 56'.3	167° 35'.6	14'.7	112° 25'.9	21'.0	54° 42'.5	39'.7	217° 13'.1	26'.1
21	68° 58'.8	182° 35'.3	15'.2	127° 26'.3	20'.6	69° 44'.6	39'.5	232° 15'.5	26'.1
22	84° 01'.2	197° 35'.0	15'.6	142° 26'.8	20'.2	84° 46'.7	39'.3	247° 17'.9	26'.1
23	99° 03'.7	212° 34'.8	16'.1	157° 27'.2	19'.8	99° 48'.8	39'.2	262° 20'.3	26'.1
15 Saturday 00	114° 06'.2	227° 34'.5	18° 16'.6 S	172° 27'.6	21° 19'.4 S	114° 50'.9	1° 39'.0 S	277° 22'.7	4° 26'.1 S
01	129° 08'.6	242° 34'.2	17'.1	187° 28'.0	19'.0	129° 52'.9	38'.8	292° 25'.1	26'.1
02	144° 11'.1	257° 34'.0	17'.6	202° 28'.4	18'.6	144° 55'.0	38'.6	307° 27'.6	26'.1
03	159° 13'.5	272° 33'.7	18'.1	217° 28'.8	18'.2	159° 57'.1	38'.5	322° 30'.0	26'.2
04	174° 16'.0	287° 33'.4	18'.5	232° 29'.2	17'.8	174° 59'.2	38'.3	337° 32'.4	26'.2
05	189° 18'.5	302° 33'.2	19'.0	247° 29'.6	17'.4	190° 01'.3	38'.1	352° 34'.8	26'.2
06	204° 20'.9	317° 32'.9	19'.5	262° 30'.1	17'.0	205° 03'.4	37'.9	7° 37'.2	26'.2
07	219° 23'.4	332° 32'.6	20'.0	277° 30'.5	16'.6	220° 05'.5	37'.8	22° 39'.6	26'.2
08	234° 25'.9	347° 32'.4	20'.5	292° 30'.9	16'.2	235° 07'.5	37'.6	37° 42'.0	26'.2
09	249° 28'.3	2° 32'.1	20'.9	307° 31'.3	15'.8	250° 09'.6	37'.4	52° 44'.5	26'.2
10	264° 30'.8	17° 31'.8	21'.4	322° 31'.7	15'.4	265° 11'.7	37'.3	67° 46'.9	26'.2
11	279° 33'.3	32° 31'.5	21'.9	337° 32'.1	15'.0	280° 13'.8	37'.1	82° 49'.3	26'.2
12	294° 35'.7	47° 31'.3	18° 22'.4 S	352° 32'.5	21° 14'.5 S	295° 15'.9	1° 36'.9 S	97° 51'.7	4° 26'.2 S
13	309° 38'.2	62° 31'.0	22'.9	7° 33'.0	14'.1	310° 18'.0	36'.7	112° 54'.1	26'.2
14	324° 40'.7	77° 30'.7	23'.3	22° 33'.4	13'.7	325° 20'.1	36'.6	127° 56'.5	26'.2
15	339° 43'.1	92° 30'.4	23'.8	37° 33'.8	13'.3	340° 22'.1	36'.4	142° 59'.0	26'.2
16	354° 45'.6	107° 30'.2	24'.3	52° 34'.2	12'.9	355° 24'.2	36'.2	158° 01'.4	26'.3
17	9° 48'.0	122° 29'.9	24'.8	67° 34'.6	12'.5	10° 26'.3	36'.0	173° 03'.8	26'.3
18	24° 50'.5	137° 29'.6	25'.2	82° 35'.0	12'.1	25° 28'.4	35'.9	188° 06'.2	26'.3
19	39° 53'.0	152° 29'.3	25'.7	97° 35'.4	11'.7	40° 30'.5	35'.7	203° 08'.6	26'.3
20	54° 55'.4	167° 29'.0	26'.2	112° 35'.9	11'.3	55° 32'.5	35'.5	218° 11'.0	26'.3
21	69° 57'.9	182° 28'.8	26'.7	127° 36'.3	10'.9	70° 34'.6	35'.3	233° 13'.4	26'.3
22	85° 00'.4	197° 28'.5	27'.1	142° 36'.7	10'.5	85° 36'.7	35'.2	248° 15'.9	26'.3
23	100° 02'.8	212° 28'.2	27'.6	157° 37'.1	10'.1	100° 38'.8	35'.0	263° 18'.3	26'.3
	M.P. 16:25	v -0'.3	d 0'.5	v 0'.4	d 0'.4	v 2'.1	d 0'.2	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.8 S
Achernar	335° 27'.9	57° 11'.1 S
Acrux	173° 11'.2	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.0	55° 53'.6 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.6	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.3	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.7	26° 27'.3 S
Arcturus	145° 57'.4	19° 07'.3 N
Atria	107° 32'.5	69° 02'.6 S
Avior	234° 18'.1	59° 32'.7 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.2 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.2	45° 19'.3 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.2	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.4	51° 29'.1 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.8	57° 10'.4 S
Gienah	175° 54'.0	17° 36'.3 S
Hadar	148° 50'.6	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.5	34° 22'.7 S
Kochab	137° 20'.2	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.7	36° 25'.4 S
Miaplacidus	221° 39'.3	69° 45'.7 S
Mirfak	308° 42'.6	49° 54'.2 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.5	56° 42'.0 S
Polaris	318° 28'.1	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.3	60° 52'.6 S
Sabik	102° 14'.8	15° 44'.3 S
Schedar	349° 42'.7	56° 36'.2 N
Shaula	96° 24'.6	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.1	11° 13'.2 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.6	38° 47'.6 N
Zuben'ubi	137° 07'.5	16° 05'.3 S

	SHA	Mer.Pass.
Venus	114° 33'.6	08:49
Mars	59° 10'.7	12:30
Jupiter	0° 53'.7	16:22
Saturn	163° 17'.9	05:33

SUN						
GHA	Dec	GHA	v	Dec	d	HP
177° 54'.0	21° 34'.2 S	87° 42'.8	13'.9	15° 15'.0 N	9'.8	54'.8
192° 53'.8	33'.8	102° 15'.7	13'.7	24'.8	9'.8	
207° 53'.5	33'.4	116° 48'.4	13'.8	34'.6	9'.7	
222° 53'.3	33'.0	131° 21'.2	13'.6	44'.3	9'.6	54'.9
237° 53'.0	32'.6	145° 53'.8	13'.6	53'.9	9'.6	
252° 52'.8	32'.1	160° 26'.4	13'.5	16° 03'.5 N	9'.5	
267° 52'.6	31'.7	174° 58'.9	13'.4	13'.0	9'.5	
282° 52'.3	31'.3	189° 31'.3	13'.4	22'.5	9'.4	
297° 52'.1	30'.9	204° 03'.7	13'.2	31'.9	9'.3	55'.0
312° 51'.9	30'.4	218° 35'.9	13'.3	41'.2	9'.3	
327° 51'.6	30'.0	233° 08'.2	13'.1	50'.5	9'.2	
342° 51'.4	29'.6	247° 40'.3	13'.0	59'.7	9'.1	
357° 51'.2	21° 29'.2 S	262° 12'.3	13'.0	17° 08'.8 N	9'.0	55'.1
12° 50'.9	28'.8	276° 44'.3	12'.9	17'.8	9'.0	
27° 50'.7	28'.3	291° 16'.2	12'.8	26'.8	9'.0	
42° 50'.5	27'.9	305° 48'.0	12'.8	35'.8	8'.8	
57° 50'.2	27'.5	320° 19'.8	12'.7	44'.6	8'.8	55'.2
72° 50'.0	27'.0	334° 51'.5	12'.5	53'.4	8'.7	
87° 49'.8	26'.6	349° 23'.0	12'.6	18° 02'.1 N	8'.7	
102° 49'.5	26'.2	3° 54'.6	12'.4	10'.8	8'.5	
117° 49'.3	25'.8	18° 26'.0	12'.3	19'.3	8'.5	55'.3
132° 49'.1	25'.3	32° 57'.3	12'.3	27'.8	8'.4	
147° 48'.8	24'.9	47° 28'.6	12'.2	36'.2	8'.3	
162° 48'.6	24'.5	61° 59'.8	12'.1	44'.5	8'.3	
177° 48'.4	21° 24'.0 S	76° 30'.9	12'.0	18° 52'.8 N	8'.2	55'.4
192° 48'.1	23'.6	91° 01'.9	11'.9	19° 01'.0 N	8'.1	
207° 47'.9	23'.2	105° 32'.8	11'.9	09'.1	8'.0	
222° 47'.7	22'.7	120° 03'.7	11'.7	17'.1	7'.9	
237° 47'.4	22'.3	134° 34'.4	11'.7	25'.0	7'.9	55'.5
252° 47'.2	21'.9	149° 05'.1	11'.6	32'.9	7'.7	
267° 47'.0	21'.4	163° 35'.7	11'.5	40'.6	7'.7	
282° 46'.8	21'.0	178° 06'.2	11'.5	48'.3	7'.6	55'.6
297° 46'.5	20'.5	192° 36'.7	11'.3	55'.9	7'.5	
312° 46'.3	20'.1	207° 07'.0	11'.3	20° 03'.4 N	7'.4	
327° 46'.1	19'.7	221° 37'.3	11'.1	10'.8	7'.3	
342° 45'.8	19'.2	236° 07'.4	11'.1	18'.1	7'.2	55'.7
357° 45'.6	21° 18'.8 S	250° 37'.5	11'.0	20° 25'.3 N	7'.2	55'.7
12° 45'.4	18'.3	265° 07'.5	10'.9	32'.5	7'.0	
27° 45'.2	17'.9	279° 37'.4	10'.8	39'.5	7'.0	55'.8
42° 44'.9	17'.5	294° 07'.2	10'.8	46'.5	6'.8	
57° 44'.7	17'.0	308° 37'.0	10'.6	53'.3	6'.8	
72° 44'.5	16'.6	323° 06'.6	10'.6	21° 00'.1 N	6'.7	
87° 44'.3	16'.1	337° 36'.2	10'.4	06'.8	6'.5	55'.9
102° 44'.0	15'.7	352° 05'.6	10'.4	13'.3	6'.5	
117° 43'.8	15'.2	6° 35'.0	10'.3	19'.8	6'.4	
132° 43'.6	14'.8	21° 04'.3	10'.2	26'.2	6'.2	56'.0
147° 43'.4	14'.3	35° 33'.5	10'.2	32'.4	6'.2	
162° 43'.1	13'.9	50° 02'.7	10'.0	38'.6	6'.1	
177° 42'.9	21° 13'.4 S	64° 31'.7	9'.9	21° 44'.7 N	5'.9	56'.1
192° 42'.7	13'.0	79° 00'.6	9'.9	50'.6	5'.9	
207° 42'.5	12'.5	93° 29'.5	9'.8	56'.5	5'.7	
222° 42'.2	12'.1	107° 58'.3	9'.7	22° 02'.2 N	5'.6	56'.2
237° 42'.0	11'.6	122° 27'.0	9'.6	07'.8	5'.6	
252° 41'.8	11'.2	136° 55'.6	9'.5	13'.4	5'.4	
267° 41'.6	10'.7	151° 24'.1	9'.4	18'.8	5'.3	56'.3
282° 41'.3	10'.3	165° 52'.5	9'.4	24'.1	5'.2	
297° 41'.1	09'.8	180° 20'.9	9'.2	29'.3	5'.0	
312° 40'.9	09'.4	194° 49'.1	9'.2	34'.3	5'.0	56'.4
327° 40'.7	08'.9	209° 17'.3	9'.1	39'.3	4'.8	
342° 40'.5	08'.4	223° 45'.4	9'.0	44'.1	4'.8	
357° 40'.2	21° 08'.0 S	238° 13'.4	8'.9	22° 48'.9 N	4'.6	56'.5
12° 40'.0	07'.5	252° 41'.3	8'.8	53'.5	4'.5	
27° 39'.8	07'.1	267° 09'.1	8'.8	58'.0	4'.4	
42° 39'.6	06'.6	281° 36'.9	8'.7	23° 02'.4 N	4'.2	56'.6
57° 39'.4	06'.1	296° 04'.6	8'.6	06'.6	4'.1	
72° 39'.1	05'.7	310° 32'.2	8'.5	10'.7	4'.0	
87° 38'.9	05'.2	324° 59'.7	8'.4	14'.7	3'.9	56'.7
102° 38'.7	04'.8	339° 27'.1	8'.4	18'.6	3'.8	
117° 38'.5	04'.3	353° 54'.5	8'.2	22'.4	3'.6	
132° 38'.3	03'.8	8° 21'.7	8'.2	26'.0	3'.5	56'.8
147° 38'.1	03'.4	22° 48'.9	8'.1	29'.5	3'.4	
162° 37'.8	02'.9	37° 16'.0	8'.1	32'.9	3'.3	
SD 16'.3	d 0'.4	SD	15'.0	15'.2	15'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 13	Moonrise 14	Moonrise 15
N 72°	08:04	09:57	-	08:03	-	-
N 70°	07:48	09:22	-	08:46	07:44	-
68°	07:36	08:56	10:39	09:16	08:56	-
66°	07:26	08:37	09:57	09:38	09:33	09:28
64°	07:17	08:21	09:29	09:55	10:00	10:10
62°	07:09	08:08	09:07	10:10	10:20	10:38
60°	07:02	07:56	08:50	10:22	10:37	11:00
N 58°	06:56	07:47	08:35	10:33	10:51	11:18
56°	06:50	07:38	08:23	10:42	11:04	11:33
54°	06:45	07:30	08:12	10:50	11:14	11:46
52°	06:41	07:23	08:02	10:58	11:24	11:58
50°	06:36	07:17	07:54	11:05	11:32	12:08
45°	06:26	07:03	07:35	11:19	11:51	12:29
N 40°	06:17	06:51	07:21	11:31	12:05	12:47
35°	06:09	06:40	07:08	11:41	12:18	13:01
30°	06:02	06:31	06:57	11:50	12:29	13:14
20°	05:47	06:14	06:38	12:06	12:48	13:36
N 10°	05:33	05:59	06:21	12:20	13:05	13:55
0°	05:17	05:43	06:05	12:33	13:21	14:12
S 10°	05:00	05:27	05:49	12:46	13:36	14:30
20°	04:40	05:08	05:32	13:00	13:53	14:49
30°	04:13	04:46	05:12	13:16	14:13	15:11
35°	03:56	04:32	05:01	13:25	14:24	15:24
40°	03:36	04:15	04:47	13:36	14:37	15:40
45°	03:09	03:55	04:31	13:48	14:53	15:57
S 50°	02:31	03:29	04:11	14:04	15:12	16:20
52°	02:10	03:16	04:02	14:11	15:22	16:30
54°	01:42	03:01	03:51	14:19	15:32	16:43
56°	00:55	02:43	03:39	14:28	15:44	16:57
58°	-	02:21	03:25	14:39	15:57	17:13
S 60°	-	01:51	03:08	14:51	16:13	17:33
S 62°	-	00:59	02:48	15:05	16:32	17:57

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 13	Moonset 14	Moonset 15
N 72°	-	14:22	16:15	04:21	-	-
N 70°	-	14:57	16:30	03:39	06:19	-
68°	13:39	15:22	16:43	03:11	05:08	-
66°	14:22	15:42	16:53	02:50	04:31	06:22
64°	14:50	15:58	17:02	02:33	04:06	05:40
62°	15:11	16:11	17:09	02:19	03:46	05:12
60°	15:29	16:22	17:16	02:08	03:29	04:51
N 58°	15:43	16:32	17:22	01:58	03:16	04:33
56°	15:56	16:40	17:28	01:49	03:04	04:18
54°	16:06	16:48	17:33	01:41	02:54	04:06
52°	16:16	16:55	17:38	01:34	02:45	03:54
50°	16:25	17:02	17:42	01:28	02:37	03:45
45°	16:43	17:16	17:52	01:15	02:19	03:24
N 40°	16:58	17:27	18:01	01:04	02:05	03:07
35°	17:10	17:38	18:09	00:55	01:53	02:53
30°	17:21	17:47	18:17	00:47	01:43	02:41
20°	17:40	18:04	18:31	00:33	01:25	02:20
N 10°	17:57	18:19	18:45	00:20	01:10	02:02
0°	18:13	18:35	19:01	00:09	00:55	01:45
S 10°	18:28	18:51	19:18	-	00:41	01:28
20°	18:45	19:10	19:38	-	00:26	01:10
30°	19:05	19:32	20:04	-	00:08	00:50
35°	19:17	19:46	20:21	23:58	-	00:37
40°	19:30	20:02	20:42	23:46	-	00:24
45°	19:46	20:22	21:08	23:33	-	00:07
S 50°	20:06	20:48	21:46	23:16	23:47	24:27
52°	20:15	21:00	22:06	23:08	23:38	24:17
54°	20:26	21:15	22:34	23:00	23:27	24:04
56°	20:38	21:33	23:18	22:50	23:15	23:50
58°	20:52	21:55	-	22:39	23:01	23:34
S 60°	21:08	22:24	-	22:27	22:45	23:14
S 62°	21:28	23:12	-	22:12	22:25	22:48

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
13	8 24	8 35	12:09	18:44	06:21	9d 60%
14	8 46	8 57	12:09	19:33	07:08	10d 69%
15	9 08	9 19	12:09	20:25	07:59	11d 78%

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2011 January 16, 17, 18 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -4.4		MARS +1.1		JUPITER -2.2		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
16 Sunday 00	115° 05'.3	227° 27'.9	18° 28'.1 S	172° 37'.5	21° 09'.7 S	115° 40'.9	1° 34'.8 S	278° 20'.7	4° 26'.3 S
01	130° 07'.8	242° 27'.6	28'.5	187° 37'.9	09'.2	130° 43'.0	34'.6	293° 23'.1	26'.3
02	145° 10'.2	257° 27'.3	29'.0	202° 38'.3	08'.8	145° 45'.0	34'.5	308° 25'.5	26'.3
03	160° 12'.7	272° 27'.1	29'.5	217° 38'.8	08'.4	160° 47'.1	34'.3	323° 28'.0	26'.3
04	175° 15'.2	287° 26'.8	30'.0	232° 39'.2	08'.0	175° 49'.2	34'.1	338° 30'.4	26'.3
05	190° 17'.6	302° 26'.5	30'.4	247° 39'.6	07'.6	190° 51'.3	33'.9	353° 32'.8	26'.3
06	205° 20'.1	317° 26'.2	30'.9	262° 40'.0	07'.2	205° 53'.4	33'.8	8° 35'.2	26'.3
07	220° 22'.5	332° 25'.9	31'.4	277° 40'.4	06'.8	220° 55'.4	33'.6	23° 37'.6	26'.4
08	235° 25'.0	347° 25'.6	31'.8	292° 40'.8	06'.4	235° 57'.5	33'.4	38° 40'.0	26'.4
09	250° 27'.5	2° 25'.3	32'.3	307° 41'.3	05'.9	250° 59'.6	33'.2	53° 42'.5	26'.4
10	265° 29'.9	17° 25'.0	32'.8	322° 41'.7	05'.5	266° 01'.7	33'.1	68° 44'.9	26'.4
11	280° 32'.4	32° 24'.7	33'.2	337° 42'.1	05'.1	281° 03'.8	32'.9	83° 47'.3	26'.4
12	295° 34'.9	47° 24'.4	18° 33'.7 S	352° 42'.5	21° 04'.7 S	296° 05'.8	1° 32'.7 S	98° 49'.7	4° 26'.4 S
13	310° 37'.3	62° 24'.1	34'.2	7° 42'.9	04'.3	311° 07'.9	32'.5	113° 52'.1	26'.4
14	325° 39'.8	77° 23'.8	34'.6	22° 43'.3	03'.9	326° 10'.0	32'.4	128° 54'.6	26'.4
15	340° 42'.3	92° 23'.6	35'.1	37° 43'.8	03'.5	341° 12'.1	32'.2	143° 57'.0	26'.4
16	355° 44'.7	107° 23'.3	35'.6	52° 44'.2	03'.0	356° 14'.2	32'.0	158° 59'.4	26'.4
17	10° 47'.2	122° 23'.0	36'.0	67° 44'.6	02'.6	11° 16'.2	31'.8	174° 01'.8	26'.4
18	25° 49'.6	137° 22'.7	36'.5	82° 45'.0	02'.2	26° 18'.3	31'.7	189° 04'.2	26'.4
19	40° 52'.1	152° 22'.4	37'.0	97° 45'.4	01'.8	41° 20'.4	31'.5	204° 06'.7	26'.4
20	55° 54'.6	167° 22'.1	37'.4	112° 45'.9	01'.4	56° 22'.5	31'.3	219° 09'.1	26'.4
21	70° 57'.0	182° 21'.8	37'.9	127° 46'.3	00'.9	71° 24'.5	31'.1	234° 11'.5	26'.4
22	85° 59'.5	197° 21'.5	38'.3	142° 46'.7	00'.5	86° 26'.6	31'.0	249° 13'.9	26'.4
23	101° 02'.0	212° 21'.2	38'.8	157° 47'.1	00'.1	101° 28'.7	30'.8	264° 16'.3	26'.4
17 Monday 00	116° 04'.4	227° 20'.9	18° 39'.3 S	172° 47'.5	20° 59'.7 S	116° 30'.8	1° 30'.6 S	279° 18'.8	4° 26'.4 S
01	131° 06'.9	242° 20'.6	39'.7	187° 47'.9	59'.3	131° 32'.9	30'.4	294° 21'.2	26'.5
02	146° 09'.4	257° 20'.2	40'.2	202° 48'.4	58'.8	146° 34'.9	30'.3	309° 23'.6	26'.5
03	161° 11'.8	272° 19'.9	40'.6	217° 48'.8	58'.4	161° 37'.0	30'.1	324° 26'.0	26'.5
04	176° 14'.3	287° 19'.6	41'.1	232° 49'.2	58'.0	176° 39'.1	29'.9	339° 28'.4	26'.5
05	191° 16'.8	302° 19'.3	41'.6	247° 49'.6	57'.6	191° 41'.2	29'.7	354° 30'.9	26'.5
06	206° 19'.2	317° 19'.0	42'.0	262° 50'.0	57'.2	206° 43'.2	29'.5	9° 33'.3	26'.5
07	221° 21'.7	332° 18'.7	42'.5	277° 50'.5	56'.7	221° 45'.3	29'.4	24° 35'.7	26'.5
08	236° 24'.1	347° 18'.4	42'.9	292° 50'.9	56'.3	236° 47'.4	29'.2	39° 38'.1	26'.5
09	251° 26'.6	2° 18'.1	43'.4	307° 51'.3	55'.9	251° 49'.5	29'.0	54° 40'.6	26'.5
10	266° 29'.1	17° 17'.8	43'.8	322° 51'.7	55'.5	266° 51'.5	28'.8	69° 43'.0	26'.5
11	281° 31'.5	32° 17'.5	44'.3	337° 52'.1	55'.0	281° 53'.6	28'.7	84° 45'.4	26'.5
12	296° 34'.0	47° 17'.2	18° 44'.7 S	352° 52'.6	20° 54'.6 S	296° 55'.7	1° 28'.5 S	99° 47'.8	4° 26'.5 S
13	311° 36'.5	62° 16'.8	45'.2	7° 53'.0	54'.2	311° 57'.8	28'.3	114° 50'.3	26'.5
14	326° 38'.9	77° 16'.5	45'.7	22° 53'.4	53'.8	326° 59'.8	28'.1	129° 52'.7	26'.5
15	341° 41'.4	92° 16'.2	46'.1	37° 53'.8	53'.3	342° 01'.9	28'.0	144° 55'.1	26'.5
16	356° 43'.9	107° 15'.9	46'.6	52° 54'.3	52'.9	357° 04'.0	27'.8	159° 57'.5	26'.5
17	11° 46'.3	122° 15'.6	47'.0	67° 54'.7	52'.5	12° 06'.1	27'.6	174° 59'.9	26'.5
18	26° 48'.8	137° 15'.3	47'.5	82° 55'.1	52'.1	27° 08'.1	27'.4	190° 02'.4	26'.5
19	41° 51'.3	152° 15'.0	47'.9	97° 55'.5	51'.6	42° 10'.2	27'.2	205° 04'.8	26'.5
20	56° 53'.7	167° 14'.6	48'.4	112° 55'.9	51'.2	57° 12'.3	27'.1	220° 07'.2	26'.5
21	71° 56'.2	182° 14'.3	48'.8	127° 56'.4	50'.8	72° 14'.4	26'.9	235° 09'.6	26'.5
22	86° 58'.6	197° 14'.0	49'.3	142° 56'.8	50'.3	87° 16'.4	26'.7	250° 12'.1	26'.5
23	102° 01'.1	212° 13'.7	49'.7	157° 57'.2	49'.9	102° 18'.5	26'.5	265° 14'.5	26'.5
18 Tuesday 00	117° 03'.6	227° 13'.4	18° 50'.2 S	172° 57'.6	20° 49'.5 S	117° 20'.6	1° 26'.4 S	280° 16'.9	4° 26'.5 S
01	132° 06'.0	242° 13'.0	50'.6	187° 58'.1	49'.1	132° 22'.7	26'.2	295° 19'.3	26'.5
02	147° 08'.5	257° 12'.7	51'.0	202° 58'.5	48'.6	147° 24'.7	26'.0	310° 21'.8	26'.6
03	162° 11'.0	272° 12'.4	51'.5	217° 58'.9	48'.2	162° 26'.8	25'.8	325° 24'.2	26'.6
04	177° 13'.4	287° 12'.1	51'.9	232° 59'.3	47'.8	177° 28'.9	25'.6	340° 26'.6	26'.6
05	192° 15'.9	302° 11'.7	52'.4	247° 59'.7	47'.3	192° 30'.9	25'.5	355° 29'.0	26'.6
06	207° 18'.4	317° 11'.4	52'.8	263° 00'.2	46'.9	207° 33'.0	25'.3	10° 31'.5	26'.6
07	222° 20'.8	332° 11'.1	53'.3	278° 00'.6	46'.5	222° 35'.1	25'.1	25° 33'.9	26'.6
08	237° 23'.3	347° 10'.8	53'.7	293° 01'.0	46'.0	237° 37'.2	24'.9	40° 36'.3	26'.6
09	252° 25'.8	2° 10'.4	54'.2	308° 01'.4	45'.6	252° 39'.2	24'.7	55° 38'.8	26'.6
10	267° 28'.2	17° 10'.1	54'.6	323° 01'.9	45'.2	267° 41'.3	24'.6	70° 41'.2	26'.6
11	282° 30'.7	32° 09'.8	55'.0	338° 02'.3	44'.7	282° 43'.4	24'.4	85° 43'.6	26'.6
12	297° 33'.1	47° 09'.4	18° 55'.5 S	353° 02'.7	20° 44'.3 S	297° 45'.4	1° 24'.2 S	100° 46'.0	4° 26'.6 S
13	312° 35'.6	62° 09'.1	55'.9	8° 03'.1	43'.9	312° 47'.5	24'.0	115° 48'.5	26'.6
14	327° 38'.1	77° 08'.8	56'.4	23° 03'.6	43'.4	327° 49'.6	23'.8	130° 50'.9	26'.6
15	342° 40'.5	92° 08'.4	56'.8	38° 04'.0	43'.0	342° 51'.6	23'.7	145° 53'.3	26'.6
16	357° 43'.0	107° 08'.1	57'.2	53° 04'.4	42'.6	357° 53'.7	23'.5	160° 55'.7	26'.6
17	12° 45'.5	122° 07'.8	57'.7	68° 04'.8	42'.1	12° 55'.8	23'.3	175° 58'.2	26'.6
18	27° 47'.9	137° 07'.4	58'.1	83° 05'.3	41'.7	27° 57'.9	23'.1	191° 00'.6	26'.6
19	42° 50'.4	152° 07'.1	58'.6	98° 05'.7	41'.2	42° 59'.9	23'.0	206° 03'.0	26'.6
20	57° 52'.9	167° 06'.8	59'.0	113° 06'.1	40'.8	58° 02'.0	22'.8	221° 05'.5	26'.6
21	72° 55'.3	182° 06'.4	59'.4	128° 06'.5	40'.4	73° 04'.1	22'.6	236° 07'.9	26'.6
22	87° 57'.8	197° 06'.1	59'.9	143° 07'.0	39'.9	88° 06'.1	22'.4	251° 10'.3	26'.6
23	103° 00'.3	212° 05'.7	19° 00'.3 S	158° 07'.4	39'.5	103° 08'.2	22'.2	266° 12'.7	26'.6
	M.P. 16:13	v -0'.3	d 0'.5	v 0'.4	d 0'.4	v 2'.1	d 0'.2	v 2'.4	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.8 S
Achernar	335° 27'.9	57° 11'.1 S
Acrux	173° 11'.2	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.0	55° 53'.6 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.6 S
Alphecca	126° 12'.6	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.3	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.6	26° 27'.3 S
Arcturus	145° 57'.3	19° 07'.2 N
Atria	107° 32'.5	69° 02'.6 S
Avior	234° 18'.1	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.3 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.2	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.4	51° 29'.1 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.7	57° 10'.4 S
Gienah	175° 54'.0	17° 36'.3 S
Hadar	148° 50'.5	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.5	34° 22'.7 S
Kochab	137° 20'.1	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.7	36° 25'.4 S
Miaplacidus	221° 39'.3	69° 45'.8 S
Mirfak	308° 42'.6	49° 54'.2 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.5	56° 41'.9 S
Polaris	318° 29'.1	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.3	12° 33'.1 N
Regulus	207° 45'.0	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.3	60° 52'.6 S
Sabik	102° 14'.8	15° 44'.3 S
Schedar	349° 42'.7	56° 36'.2 N
Shaula	96° 24'.6	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.0	11° 13'.2 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.5	38° 47'.6 N
Zuben'ubi	137° 07'.4	16° 05'.3 S

	SHA	Mer.Pass.
Venus	111° 16'.4	08:51
Mars	56° 43'.1	12:28
Jupiter	0° 26'.3	16:12
Saturn	163° 14'.3	05:22

SUN

GHA	Dec
177° 37'.6	21° 02'.4 S
192° 37'.4	02'.0
207° 37'.2	01'.5
222° 37'.0	01'.0
237° 36'.8	00'.6
252° 36'.5	00'.1
267° 36'.3	20° 59'.6 S
282° 36'.1	59'.2
297° 35'.9	58'.7
312° 35'.7	58'.2
327° 35'.5	57'.7
342° 35'.3	57'.3
357° 35'.0	20° 56'.8 S
12° 34'.8	56'.3
27° 34'.6	55'.8
42° 34'.4	55'.4
57° 34'.2	54'.9
72° 34'.0	54'.4
87° 33'.8	53'.9
102° 33'.6	53'.4
117° 33'.3	53'.0
132° 33'.1	52'.5
147° 32'.9	52'.0
162° 32'.7	51'.5
177° 32'.5	20° 51'.0 S
192° 32'.3	50'.5
207° 32'.1	50'.1
222° 31'.9	49'.6
237° 31'.7	49'.1
252° 31'.5	48'.6
267° 31'.2	48'.1
282° 31'.0	47'.6
297° 30'.8	47'.1
312° 30'.6	46'.7
327° 30'.4	46'.2
342° 30'.2	45'.7
357° 30'.0	20° 45'.2 S
12° 29'.8	44'.7
27° 29'.6	44'.2
42° 29'.4	43'.7
57° 29'.2	43'.2
72° 29'.0	42'.7
87° 28'.8	42'.2
102° 28'.6	41'.7
117° 28'.4	41'.2
132° 28'.2	40'.7
147° 28'.0	40'.2
162° 27'.8	39'.7
177° 27'.6	20° 39'.2 S
192° 27'.4	38'.7
207° 27'.2	38'.2
222° 27'.0	37'.7
237° 26'.8	37'.2
252° 26'.6	36'.7
267° 26'.4	36'.2
282° 26'.2	35'.7
297° 26'.0	35'.2
312° 25'.8	34'.7
327° 25'.6	34'.2
342° 25'.4	33'.7
357° 25'.2	20° 33'.2 S
12° 25'.0	32'.7
27° 24'.8	32'.2
42° 24'.6	31'.7
57° 24'.4	31'.1
72° 24'.2	30'.6
87° 24'.0	30'.1
102° 23'.8	29'.6
117° 23'.6	29'.1
132° 23'.4	28'.6
147° 23'.2	28'.1
162° 23'.0	27'.6

SD 16'.3 d 0'.5

MOON

GHA	v	Dec	d	HP
51° 43'.1	8'.0	23° 36'.2 N	3'.1	56'.9
66° 10'.1	7'.8	39'.3	3'.0	
80° 36'.9	7'.9	42'.3	2'.8	
95° 03'.8	7'.7	45'.1	2'.8	57'.0
109° 30'.5	7'.7	47'.9	2'.5	
123° 57'.2	7'.6	50'.4	2'.5	57'.1
138° 23'.8	7'.5	52'.9	2'.3	
152° 50'.3	7'.5	55'.2	2'.2	
167° 16'.8	7'.4	57'.4	2'.1	57'.2
181° 43'.2	7'.3	59'.5	1'.9	
196° 09'.5	7'.2	24° 01'.4 N	1'.7	
210° 35'.7	7'.2	03'.1	1'.7	57'.3
225° 01'.9	7'.2	24° 04'.8 N	1'.5	57'.3
239° 28'.1	7'.0	06'.3	1'.3	
253° 54'.1	7'.1	07'.6	1'.2	57'.4
268° 20'.2	6'.9	08'.8	1'.1	
282° 46'.1	6'.9	09'.9	0'.9	
297° 12'.0	6'.8	10'.8	0'.8	57'.5
311° 37'.8	6'.8	11'.6	0'.6	
326° 03'.6	6'.7	12'.2	0'.5	57'.6
340° 29'.3	6'.7	12'.7	0'.3	
354° 55'.0	6'.6	13'.0	0'.2	
9° 20'.6	6'.6	13'.2	0'.1	57'.7
23° 46'.2	6'.5	13'.3	0'.1	
38° 11'.7	6'.5	24° 13'.2 N	0'.3	57'.7
52° 37'.2	6'.4	12'.9	0'.4	57'.8
67° 02'.6	6'.4	12'.5	0'.6	
81° 28'.0	6'.3	11'.9	0'.7	
95° 53'.3	6'.3	11'.2	0'.8	57'.9
110° 18'.6	6'.2	10'.4	1'.0	
124° 43'.8	6'.3	09'.4	1'.2	58'.0
139° 09'.1	6'.1	08'.2	1'.3	
153° 34'.2	6'.2	06'.9	1'.4	
167° 59'.4	6'.1	05'.5	1'.7	58'.1
182° 24'.5	6'.1	03'.8	1'.7	
196° 49'.6	6'.0	02'.1	1'.9	
211° 14'.6	6'.0	24° 00'.2 N	2'.1	58'.2
225° 39'.6	6'.0	23° 58'.1 N	2'.2	
240° 04'.6	6'.0	55'.9	2'.4	
254° 29'.6	5'.9	53'.5	2'.6	58'.3
268° 54'.5	5'.9	50'.9	2'.7	
283° 19'.4	5'.9	48'.2	2'.8	
297° 44'.3	5'.9	45'.4	3'.0	58'.4
312° 09'.2	5'.9	42'.4	3'.2	
326° 34'.1	5'.8	39'.2	3'.3	
340° 58'.9	5'.9	35'.9	3'.4	58'.5
355° 23'.8	5'.8	32'.5	3'.7	
9° 48'.6	5'.8	28'.8	3'.7	58'.6
24° 13'.4	5'.8	23° 25'.1 N	4'.0	58'.6
38° 38'.2	5'.8	21'.1	4'.1	
53° 03'.0	5'.7	17'.0	4'.2	58'.7
67° 27'.7	5'.8	12'.8	4'.4	
81° 52'.5	5'.8	08'.4	4'.6	
96° 17'.3	5'.8	03'.8	4'.7	58'.8
110° 42'.1	5'.7	22° 59'.1 N	4'.8	
125° 06'.8	5'.8	54'.3	5'.0	
139° 31'.6	5'.8	49'.3	5'.2	58'.9
153° 56'.4	5'.8	44'.1	5'.3	
168° 21'.2	5'.8	38'.8	5'.5	
182° 46'.0	5'.8	33'.3	5'.6	59'.0
197° 10'.8	5'.8	22° 27'.7 N	5'.8	59'.0
211° 35'.6	5'.8	21'.9	5'.9	
226° 00'.4	5'.8	16'.0	6'.1	
240° 25'.2	5'.9	09'.9	6'.2	59'.1
254° 50'.1	5'.8	03'.7	6'.4	
269° 14'.9	5'.9	21° 57'.3 N	6'.6	
283° 39'.8	5'.9	50'.7	6'.6	59'.2
298° 04'.7	5'.9	44'.1	6'.9	
312° 29'.6	5'.9	37'.2	6'.9	
326° 54'.5	6'.0	30'.3	7'.1	59'.3
341° 19'.5	5'.9	23'.2	7'.3	
355° 44'.4	6'.0	15'.9	7'.4	

SD 15'.6 15'.8 16'.1

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 16	Moonrise 17	Moonrise 18
N 72°	07:57	09:45	-	-	-	-
N 70°	07:42	09:13	11:49	-	-	-
68°	07:31	08:49	10:25	-	-	-
66°	07:21	08:31	09:48	09:19	10:11	12:25
64°	07:13	08:16	09:22	10:35	11:33	13:07
62°	07:06	08:04	09:01	11:12	12:10	13:35
60°	06:59	07:53	08:45	11:38	12:37	13:57
N 58°	06:53	07:43	08:31	11:59	12:57	14:15
56°	06:48	07:35	08:19	12:16	13:15	14:30
54°	06:43	07:28	08:09	12:30	13:29	14:42
52°	06:39	07:21	08:00	12:43	13:42	14:54
50°	06:34	07:15	07:51	12:54	13:53	15:03
45°	06:25	07:01	07:34	13:17	14:16	15:24
N 40°	06:16	06:50	07:19	13:36	14:35	15:41
35°	06:09	06:40	07:07	13:52	14:50	15:55
30°	06:01	06:31	06:56	14:05	15:04	16:08
20°	05:47	06:14	06:38	14:29	15:27	16:29
N 10°	05:33	05:59	06:22	14:49	15:47	16:47
0°	05:18	05:44	06:06	15:08	16:05	17:04
S 10°	05:02	05:28	05:51	15:26	16:24	17:21
20°	04:42	05:10	05:34	15:47	16:44	17:39
30°	04:16	04:48	05:15	16:10	17:07	18:00
35°	04:00	04:35	05:04	16:24	17:20	18:12
40°	03:40	04:19	04:51	16:40	17:36	18:26
45°	03:14	04:00	04:35	16:59	17:54	18:42
S 50°	02:38	03:35	04:16	17:23	18:17	19:02
52°	02:18	03:22	04:07	17:34	18:28	19:12
54°	01:52	03:08	03:56	17:47	18:41	19:23
56°	01:13	02:51	03:45	18:02	18:55	19:35
58°	-	02:30	03:31	18:20	19:12	19:49
S 60°	-	02:02	03:15	18:41	19:32	20:05
S 62°	-	01:20	02:56	19:09	19:58	20:25

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 16	Moonset 17	Moonset 18
N 72°	-	14:36	16:24	-	-	-
N 70°	12:32	15:08	16:38	-	-	-
68°	13:56	15:31	16:50	-	-	-
66°	14:33	15:50	17:00	08:24	09:32	09:21
64°	14:59	16:05	17:08	07:08	08:09	08:38
62°	15:19	16:17	17:15	06:31	07:32	08:09
60°	15:36	16:28	17:22	06:05	07:05	07:47
N 58°	15:49	16:37	17:27	05:45	06:45	07:29
56°	16:01	16:45	17:33	05:28	06:27	07:14
54°	16:12	16:53	17:37	05:13	06:13	07:00
52°	16:21	17:00	17:42	05:01	06:00	06:49
50°	16:29	17:06	17:46	04:50	05:49	06:39
45°	16:47	17:19	17:55	04:27	05:25	06:17
N 40°	17:01	17:31	18:04	04:08	05:07	06:00
35°	17:13	17:41	18:12	03:53	04:51	05:45
30°	17:24	17:50	18:19	03:40	04:37	05:32
20°	17:42	18:06	18:33	03:17	04:14	05:10
N 10°	17:58	18:21	18:47	02:57	03:54	04:51
0°	18:14	18:36	19:01	02:38	03:35	04:33
S 10°	18:29	18:52	19:18	02:20	03:16	04:15
20°	18:46	19:10	19:38	02:00	02:56	03:56
30°	19:05	19:31	20:03	01:37	02:32	03:33
35°	19:16	19:45	20:20	01:24	02:18	03:20
40°	19:29	20:00	20:40	01:09	02:02	03:05
45°	19:44	20:20	21:05	00:50	01:43	02:47
S 50°	20:03	20:44	21:41	00:27	01:20	02:24
52°	20:12	20:57	22:00	00:17	01:08	02:14
54°	20:23	21:11	22:25	00:04	00:55	02:01
56°	20:34	21:28	23:02	-	00:40	01:47
58°	20:47	21:48	-	-	00:22	01:31
S 60°	21:03	22:15	-	-	00:01	01:11
S 62°	21:22	22:55	-	23:33	-	00:45

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
16	9 29	9 39	12:10	21:21	08:53	12d 86%
17	9 50	10 00	12:10	22:19	09:50	13d 93%
18	10 09	10 19	12:10	23:18	10:48	14d 97%

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2011 January 19, 20, 21 (Wed, Thur, Fri)

GMT	ARIES	VENUS -4.3		MARS +1.1		JUPITER -2.2		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
19 Wednesday 00	118° 02'.7	227° 05'.4	19° 00'.7 S	173° 07'.8	20° 39'.1 S	118° 10'.3	1° 22'.1 S	281° 15'.2	4° 26'.6 S
01	133° 05'.2	242° 05'.1	01'.2	188° 08'.2	38'.6	133° 12'.3	21'.9	296° 17'.6	26'.6
02	148° 07'.6	257° 04'.7	01'.6	203° 08'.7	38'.2	148° 14'.4	21'.7	311° 20'.0	26'.6
03	163° 10'.1	272° 04'.4	02'.0	218° 09'.1	37'.7	163° 16'.5	21'.5	326° 22'.5	26'.6
04	178° 12'.6	287° 04'.0	02'.5	233° 09'.5	37'.3	178° 18'.5	21'.3	341° 24'.9	26'.6
05	193° 15'.0	302° 03'.7	02'.9	248° 09'.9	36'.9	193° 20'.6	21'.2	356° 27'.3	26'.6
06	208° 17'.5	317° 03'.4	03'.3	263° 10'.4	36'.4	208° 22'.7	21'.0	11° 29'.8	26'.6
07	223° 20'.0	332° 03'.0	03'.8	278° 10'.8	36'.0	223° 24'.7	20'.8	26° 32'.2	26'.6
08	238° 22'.4	347° 02'.7	04'.2	293° 11'.2	35'.5	238° 26'.8	20'.6	41° 34'.6	26'.6
09	253° 24'.9	2° 02'.3	04'.6	308° 11'.7	35'.1	253° 28'.9	20'.4	56° 37'.0	26'.6
10	268° 27'.4	17° 02'.0	05'.0	323° 12'.1	34'.6	268° 30'.9	20'.2	71° 39'.5	26'.6
11	283° 29'.8	32° 01'.6	05'.5	338° 12'.5	34'.2	283° 33'.0	20'.1	86° 41'.9	26'.6
12	298° 32'.3	47° 01'.3	19° 05'.9 S	353° 12'.9	20° 33'.8 S	298° 35'.1	1° 19'.9 S	101° 44'.3	4° 26'.6 S
13	313° 34'.8	62° 00'.9	06'.3	8° 13'.4	33'.3	313° 37'.1	19'.7	116° 46'.8	26'.6
14	328° 37'.2	77° 00'.6	06'.8	23° 13'.8	32'.9	328° 39'.2	19'.5	131° 49'.2	26'.6
15	343° 39'.7	92° 00'.2	07'.2	38° 14'.2	32'.4	343° 41'.3	19'.3	146° 51'.6	26'.6
16	358° 42'.1	106° 59'.9	07'.6	53° 14'.6	32'.0	358° 43'.3	19'.2	161° 54'.1	26'.6
17	13° 44'.6	121° 59'.5	08'.0	68° 15'.1	31'.5	13° 45'.4	19'.0	176° 56'.5	26'.6
18	28° 47'.1	136° 59'.2	08'.5	83° 15'.5	31'.1	28° 47'.5	18'.8	191° 58'.9	26'.6
19	43° 49'.5	151° 58'.8	08'.9	98° 15'.9	30'.6	43° 49'.5	18'.6	207° 01'.4	26'.6
20	58° 52'.0	166° 58'.5	09'.3	113° 16'.4	30'.2	58° 51'.6	18'.4	222° 03'.8	26'.6
21	73° 54'.5	181° 58'.1	09'.7	128° 16'.8	29'.7	73° 53'.7	18'.3	237° 06'.2	26'.6
22	88° 56'.9	196° 57'.7	10'.1	143° 17'.2	29'.3	88° 55'.7	18'.1	252° 08'.7	26'.6
23	103° 59'.4	211° 57'.4	10'.6	158° 17'.6	28'.8	103° 57'.8	17'.9	267° 11'.1	26'.6
20 Thursday 00	119° 01'.9	226° 57'.0	19° 11'.0 S	173° 18'.1	20° 28'.4 S	118° 59'.8	1° 17'.7 S	282° 13'.5	4° 26'.6 S
01	134° 04'.3	241° 56'.7	11'.4	188° 18'.5	27'.9	134° 01'.9	17'.5	297° 16'.0	26'.6
02	149° 06'.8	256° 56'.3	11'.8	203° 18'.9	27'.5	149° 04'.0	17'.3	312° 18'.4	26'.6
03	164° 09'.2	271° 56'.0	12'.2	218° 19'.4	27'.0	164° 06'.0	17'.2	327° 20'.8	26'.6
04	179° 11'.7	286° 55'.6	12'.7	233° 19'.8	26'.6	179° 08'.1	17'.0	342° 23'.3	26'.6
05	194° 14'.2	301° 55'.2	13'.1	248° 20'.2	26'.1	194° 10'.2	16'.8	357° 25'.7	26'.6
06	209° 16'.6	316° 54'.9	13'.5	263° 20'.7	25'.7	209° 12'.2	16'.6	12° 28'.1	26'.6
07	224° 19'.1	331° 54'.5	13'.9	278° 21'.1	25'.2	224° 14'.3	16'.4	27° 30'.6	26'.6
08	239° 21'.6	346° 54'.1	14'.3	293° 21'.5	24'.8	239° 16'.4	16'.3	42° 33'.0	26'.6
09	254° 24'.0	1° 53'.8	14'.8	308° 22'.0	24'.3	254° 18'.4	16'.1	57° 35'.4	26'.6
10	269° 26'.5	16° 53'.4	15'.2	323° 22'.4	23'.9	269° 20'.5	15'.9	72° 37'.9	26'.6
11	284° 29'.0	31° 53'.0	15'.6	338° 22'.8	23'.4	284° 22'.5	15'.7	87° 40'.3	26'.6
12	299° 31'.4	46° 52'.7	19° 16'.0 S	353° 23'.2	20° 23'.0 S	299° 24'.6	1° 15'.5 S	102° 42'.8	4° 26'.6 S
13	314° 33'.9	61° 52'.3	16'.4	8° 23'.7	22'.5	314° 26'.7	15'.3	117° 45'.2	26'.6
14	329° 36'.4	76° 51'.9	16'.8	23° 24'.1	22'.1	329° 28'.7	15'.2	132° 47'.6	26'.6
15	344° 38'.8	91° 51'.6	17'.2	38° 24'.5	21'.6	344° 30'.8	15'.0	147° 50'.1	26'.6
16	359° 41'.3	106° 51'.2	17'.6	53° 25'.0	21'.2	359° 32'.8	14'.8	162° 52'.5	26'.6
17	14° 43'.7	121° 50'.8	18'.1	68° 25'.4	20'.7	14° 34'.9	14'.6	177° 54'.9	26'.6
18	29° 46'.2	136° 50'.5	18'.5	83° 25'.8	20'.2	29° 37'.0	14'.4	192° 57'.4	26'.6
19	44° 48'.7	151° 50'.1	18'.9	98° 26'.3	19'.8	44° 39'.0	14'.2	207° 59'.8	26'.6
20	59° 51'.1	166° 49'.7	19'.3	113° 26'.7	19'.3	59° 41'.1	14'.1	223° 02'.2	26'.6
21	74° 53'.6	181° 49'.4	19'.7	128° 27'.1	18'.9	74° 43'.1	13'.9	238° 04'.7	26'.6
22	89° 56'.1	196° 49'.0	20'.1	143° 27'.6	18'.4	89° 45'.2	13'.7	253° 07'.1	26'.6
23	104° 58'.5	211° 48'.6	20'.5	158° 28'.0	18'.0	104° 47'.3	13'.5	268° 09'.6	26'.6
21 Friday 00	120° 01'.0	226° 48'.2	19° 20'.9 S	173° 28'.4	20° 17'.5 S	119° 49'.3	1° 13'.3 S	283° 12'.0	4° 26'.6 S
01	135° 03'.5	241° 47'.9	21'.3	188° 28'.9	17'.0	134° 51'.4	13'.1	298° 14'.4	26'.6
02	150° 05'.9	256° 47'.5	21'.7	203° 29'.3	16'.6	149° 53'.4	13'.0	313° 16'.9	26'.6
03	165° 08'.4	271° 47'.1	22'.1	218° 29'.7	16'.1	164° 55'.5	12'.8	328° 19'.3	26'.6
04	180° 10'.9	286° 46'.7	22'.5	233° 30'.2	15'.7	179° 57'.6	12'.6	343° 21'.7	26'.6
05	195° 13'.3	301° 46'.3	22'.9	248° 30'.6	15'.2	194° 59'.6	12'.4	358° 24'.2	26'.6
06	210° 15'.8	316° 46'.0	23'.3	263° 31'.0	14'.7	210° 01'.7	12'.2	13° 26'.6	26'.6
07	225° 18'.2	331° 45'.6	23'.7	278° 31'.5	14'.3	225° 03'.7	12'.0	28° 29'.1	26'.6
08	240° 20'.7	346° 45'.2	24'.1	293° 31'.9	13'.8	240° 05'.8	11'.9	43° 31'.5	26'.6
09	255° 23'.2	1° 44'.8	24'.5	308° 32'.3	13'.4	255° 07'.9	11'.7	58° 33'.9	26'.6
10	270° 25'.6	16° 44'.4	24'.9	323° 32'.8	12'.9	270° 09'.9	11'.5	73° 36'.4	26'.6
11	285° 28'.1	31° 44'.1	25'.3	338° 33'.2	12'.4	285° 12'.0	11'.3	88° 38'.8	26'.6
12	300° 30'.6	46° 43'.7	19° 25'.7 S	353° 33'.7	20° 12'.0 S	300° 14'.0	1° 11'.1 S	103° 41'.3	4° 26'.6 S
13	315° 33'.0	61° 43'.3	26'.1	8° 34'.1	11'.5	315° 16'.1	10'.9	118° 43'.7	26'.6
14	330° 35'.5	76° 42'.9	26'.5	23° 34'.5	11'.0	330° 18'.1	10'.7	133° 46'.1	26'.6
15	345° 38'.0	91° 42'.5	26'.9	38° 35'.0	10'.6	345° 20'.2	10'.6	148° 48'.6	26'.6
16	0° 40'.4	106° 42'.1	27'.3	53° 35'.4	10'.1	0° 22'.3	10'.4	163° 51'.0	26'.5
17	15° 42'.9	121° 41'.7	27'.7	68° 35'.8	09'.7	15° 24'.3	10'.2	178° 53'.5	26'.5
18	30° 45'.4	136° 41'.4	28'.1	83° 36'.3	09'.2	30° 26'.4	10'.0	193° 55'.9	26'.5
19	45° 47'.8	151° 41'.0	28'.5	98° 36'.7	08'.7	45° 28'.4	09'.8	208° 58'.3	26'.5
20	60° 50'.3	166° 40'.6	28'.9	113° 37'.1	08'.3	60° 30'.5	09'.6	224° 00'.8	26'.5
21	75° 52'.7	181° 40'.2	29'.3	128° 37'.6	07'.8	75° 32'.5	09'.4	239° 03'.2	26'.5
22	90° 55'.2	196° 39'.8	29'.7	143° 38'.0	07'.3	90° 34'.6	09'.3	254° 05'.7	26'.5
23	105° 57'.7	211° 39'.4	30'.1	158° 38'.4	06'.9	105° 36'.6	09'.1	269° 08'.1	26'.5
	M.P. 16:01	v -0'.4	d 0'.4	v 0'.4	d 0'.5	v 2'.1	d 0'.2	v 2'.4	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.8 S
Achernar	335° 28'.0	57° 11'.1 S
Acrux	173° 11'.1	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.9	55° 53'.6 N
Alkaid	153° 00'.1	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.6 S
Alphecca	126° 12'.6	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.6	26° 27'.3 S
Arcturus	145° 57'.3	19° 07'.2 N
Atria	107° 32'.4	69° 02'.6 S
Avior	234° 18'.1	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.3 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.2	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.4	51° 29'.1 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.7	57° 10'.4 S
Gienah	175° 53'.9	17° 36'.3 S
Hadar	148° 50'.5	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.4	34° 22'.7 S
Kochab	137° 20'.1	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.7	36° 25'.4 S
Miaplacidus	221° 39'.3	69° 45'.8 S
Mirfak	308° 42'.6	49° 54'.3 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 30'.4	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.3	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.4 S
Rigil Kent	139° 54'.2	60° 52'.6 S
Sabik	102° 14'.8	15° 44'.3 S
Schedar	349° 42'.8	56° 36'.2 N
Shaula	96° 24'.6	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.0	11° 13'.2 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.5	38° 47'.6 N
Zuben'ubi	137° 07'.4	16° 05'.3 S

	SHA	Mer.Pass.
Venus	107° 55'.2	08:52
Mars	54° 16'.2	12:26
Jupiter	359° 58'.0	16:02
Saturn	163° 11'.7	05:10

SUN

GHA	Dec
177° 22'.8	20° 27'.0 S
192° 22'.6	26'.5
207° 22'.4	26'.0
222° 22'.2	25'.5
237° 22'.0	25'.0
252° 21'.8	24'.5
267° 21'.6	23'.9
282° 21'.4	23'.4
297° 21'.3	22'.9
312° 21'.1	22'.4
327° 20'.9	21'.9
342° 20'.7	21'.3
357° 20'.5	20° 20'.8 S
12° 20'.3	20'.3
27° 20'.1	19'.8
42° 19'.9	19'.2
57° 19'.7	18'.7
72° 19'.5	18'.2
87° 19'.3	17'.6
102° 19'.2	17'.1
117° 19'.0	16'.6
132° 18'.8	16'.1
147° 18'.6	15'.5
162° 18'.4	15'.0
177° 18'.2	20° 14'.5 S
192° 18'.0	13'.9
207° 17'.8	13'.4
222° 17'.7	12'.9
237° 17'.5	12'.3
252° 17'.3	11'.8
267° 17'.1	11'.3
282° 16'.9	10'.7
297° 16'.7	10'.2
312° 16'.5	09'.7
327° 16'.4	09'.1
342° 16'.2	08'.6
357° 16'.0	20° 08'.0 S
12° 15'.8	07'.5
27° 15'.6	07'.0
42° 15'.5	06'.4
57° 15'.3	05'.9
72° 15'.1	05'.3
87° 14'.9	04'.8
102° 14'.7	04'.2
117° 14'.5	03'.7
132° 14'.4	03'.2
147° 14'.2	02'.6
162° 14'.0	02'.1
177° 13'.8	20° 01'.5 S
192° 13'.6	01'.0
207° 13'.5	00'.4
222° 13'.3	19° 59'.9 S
237° 13'.1	59'.3
252° 12'.9	58'.8
267° 12'.8	58'.2
282° 12'.6	57'.7
297° 12'.4	57'.1
312° 12'.2	56'.6
327° 12'.0	56'.0
342° 11'.9	55'.4
357° 11'.7	19° 54'.9 S
12° 11'.5	54'.3
27° 11'.3	53'.8
42° 11'.2	53'.2
57° 11'.0	52'.7
72° 10'.8	52'.1
87° 10'.7	51'.5
102° 10'.5	51'.0
117° 10'.3	50'.4
132° 10'.1	49'.9
147° 10'.0	49'.3
162° 09'.8	48'.7
SD 16'.3	d 0'.5

MOON

GHA	v	Dec	d	HP
10° 09'.4	6'.1	21° 08'.5 N	7'.6	59'.3
24° 34'.5	6'.0	00'.9	7'.7	59'.4
38° 59'.5	6'.1	20° 53'.2 N	7'.8	
53° 24'.6	6'.1	45'.4	8'.0	
67° 49'.7	6'.2	37'.4	8'.1	59'.5
82° 14'.9	6'.1	29'.3	8'.3	
96° 40'.0	6'.2	21'.0	8'.4	
111° 05'.2	6'.3	12'.6	8'.5	
125° 30'.5	6'.3	04'.1	8'.7	59'.6
139° 55'.8	6'.3	19° 55'.4 N	8'.8	
154° 21'.1	6'.3	46'.6	9'.0	
168° 46'.4	6'.4	37'.6	9'.1	
183° 11'.8	6'.4	19° 28'.5 N	9'.2	59'.7
197° 37'.2	6'.5	19'.3	9'.4	
212° 02'.7	6'.5	09'.9	9'.4	
226° 28'.2	6'.5	00'.5	9'.7	
240° 53'.7	6'.6	18° 50'.8 N	9'.7	59'.8
255° 19'.3	6'.6	41'.1	9'.9	
269° 44'.9	6'.7	31'.2	10'.0	
284° 10'.6	6'.7	21'.2	10'.1	
298° 36'.3	6'.8	11'.1	10'.2	59'.9
313° 02'.1	6'.8	00'.9	10'.4	
327° 27'.9	6'.8	17° 50'.5 N	10'.5	
341° 53'.7	6'.9	40'.0	10'.6	
356° 19'.6	6'.9	17° 29'.4 N	10'.7	59'.9
10° 45'.5	7'.0	18'.7	10'.8	60'.0
25° 11'.5	7'.1	07'.9	11'.0	
39° 37'.6	7'.0	16° 56'.9 N	11'.1	
54° 03'.6	7'.2	45'.8	11'.2	
68° 29'.8	7'.1	34'.6	11'.2	
82° 55'.9	7'.3	23'.4	11'.5	60'.1
97° 22'.2	7'.3	11'.9	11'.5	
111° 48'.5	7'.3	00'.4	11'.6	
126° 14'.8	7'.4	15° 48'.8 N	11'.7	
140° 41'.2	7'.4	37'.1	11'.8	
155° 07'.6	7'.5	25'.3	12'.0	
169° 34'.1	7'.5	15° 13'.3 N	12'.0	60'.2
184° 00'.6	7'.6	01'.3	12'.2	
198° 27'.2	7'.6	14° 49'.1 N	12'.2	
212° 53'.8	7'.7	36'.9	12'.3	
227° 20'.5	7'.7	24'.6	12'.4	
241° 47'.2	7'.8	12'.2	12'.6	
256° 14'.0	7'.8	13° 59'.6 N	12'.6	
270° 40'.8	7'.9	47'.0	12'.7	60'.3
285° 07'.7	7'.9	34'.3	12'.7	
299° 34'.6	8'.0	21'.6	12'.9	
314° 01'.6	8'.0	08'.7	13'.0	
328° 28'.6	8'.1	12° 55'.7 N	13'.0	
342° 55'.7	8'.1	12° 42'.7 N	13'.1	60'.3
357° 22'.8	8'.2	29'.6	13'.3	
11° 50'.0	8'.2	16'.3	13'.2	
26° 17'.2	8'.3	03'.1	13'.4	
40° 44'.5	8'.3	11° 49'.7 N	13'.4	60'.4
55° 11'.8	8'.4	36'.3	13'.5	
69° 39'.2	8'.4	22'.8	13'.6	
84° 06'.6	8'.5	09'.2	13'.7	
98° 34'.1	8'.5	10° 55'.5 N	13'.7	
113° 01'.6	8'.6	41'.8	13'.8	
127° 29'.2	8'.6	28'.0	13'.8	
141° 56'.8	8'.7	14'.2	13'.9	
156° 24'.5	8'.7	10° 00'.3 N	14'.0	60'.4
170° 52'.2	8'.7	9° 46'.3 N	14'.1	
185° 19'.9	8'.8	32'.2	14'.1	
199° 47'.7	8'.8	18'.1	14'.1	
214° 15'.5	8'.9	04'.0	14'.2	
228° 43'.4	8'.9	8° 49'.8 N	14'.3	
243° 11'.3	9'.0	35'.5	14'.3	
257° 39'.3	9'.0	21'.2	14'.3	
272° 07'.3	9'.0	06'.9	14'.5	
286° 35'.3	9'.1	7° 52'.4 N	14'.4	
301° 03'.4	9'.2	38'.0	14'.5	
315° 31'.6	9'.1	23'.5	14'.5	
SD 16'.3	d 0'.5	SD 16'.3	16'.4	16'.5

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 19	Moonrise 20	Moonrise 21
N 72°	07:49	09:32	-	-	15:21	17:59
N 70°	07:36	09:03	11:08	12:58	15:53	18:12
68°	07:25	08:42	10:11	13:58	16:16	18:23
66°	07:16	08:25	09:38	14:32	16:34	18:32
64°	07:08	08:11	09:14	14:56	16:49	18:39
62°	07:02	07:59	08:55	15:16	17:01	18:46
60°	06:56	07:49	08:40	15:31	17:11	18:51
N 58°	06:50	07:40	08:27	15:45	17:20	18:56
56°	06:45	07:32	08:15	15:56	17:28	19:00
54°	06:41	07:25	08:05	16:06	17:35	19:04
52°	06:36	07:18	07:57	16:15	17:41	19:08
50°	06:32	07:12	07:49	16:23	17:46	19:11
45°	06:23	06:59	07:32	16:40	17:58	19:17
N 40°	06:15	06:48	07:18	16:53	18:08	19:23
35°	06:08	06:39	07:06	17:05	18:16	19:28
30°	06:01	06:30	06:56	17:15	18:24	19:32
20°	05:47	06:14	06:38	17:33	18:37	19:39
N 10°	05:34	06:00	06:22	17:48	18:48	19:46
0°	05:20	05:45	06:07	18:02	18:58	19:52
S 10°	05:03	05:30	05:52	18:16	19:08	19:58
20°	04:44	05:12	05:36	18:31	19:19	20:04
30°	04:19	04:51	05:18	18:48	19:32	20:11
35°	04:03	04:38	05:07	18:58	19:39	20:16
40°	03:44	04:23	04:54	19:09	19:47	20:20
45°	03:19	04:04	04:39	19:22	19:56	20:26
S 50°	02:44	03:40	04:21	19:38	20:08	20:32
52°	02:26	03:28	04:12	19:46	20:13	20:35
54°	02:02	03:14	04:02	19:54	20:19	20:38
56°	01:29	02:58	03:51	20:04	20:25	20:42
58°	-	02:38	03:38	20:14	20:32	20:46
S 60°	-	02:13	03:23	20:26	20:40	20:50
S 62°	-	01:37	03:05	20:40	20:49	20:55

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 19	Moonset 20	Moonset 21
N 72°	-	14:51	16:34	-	10:29	09:46
N 70°	13:15	15:20	16:47	10:51	09:55	09:30
68°	14:11	15:41	16:58	09:50	09:30	09:17
66°	14:44	15:58	17:07	09:15	09:11	09:06
64°	15:08	16:12	17:14	08:50	08:55	08:57
62°	15:27	16:24	17:21	08:30	08:42	08:50
60°	15:43	16:34	17:27	08:13	08:31	08:43
N 58°	15:56	16:43	17:32	08:00	08:21	08:37
56°	16:07	16:51	17:37	07:47	08:12	08:31
54°	16:17	16:58	17:42	07:37	08:05	08:27
52°	16:26	17:04	17:46	07:28	07:58	08:22
50°	16:34	17:10	17:50	07:19	07:51	08:18
45°	16:51	17:23	17:59	07:01	07:38	08:09
N 40°	17:04	17:34	18:07	06:46	07:27	08:02
35°	17:16	17:43	18:14	06:34	07:17	07:56
30°	17:26	17:52	18:21	06:23	07:09	07:50
20°	17:44	18:08	18:35	06:04	06:54	07:41
N 10°	18:00	18:22	18:48	05:47	06:41	07:32
0°	18:15	18:37	19:02	05:32	06:29	07:24
S 10°	18:29	18:52	19:18	05:16	06:16	07:16
20°	18:45	19:09	19:38	04:59	06:03	07:07
30°	19:04	19:30	20:02	04:39	05:48	06:56
35°	19:15	19:43	20:18	04:28	05:39	06:51
40°	19:27	19:58	20:37	04:15	05:29	06:44
45°	19:42	20:17	21:02	03:59	05:17	06:36
S 50°	20:00	20:41	21:36	03:40	05:02	06:26
52°	20:09	20:53	21:54	03:31	04:55	06:22
54°	20:19	21:06	22:17	03:20	04:47	06:17
56°	20:30	21:22	22:49	03:09	04:39	06:11
58°	20:42	21:41	-	02:55	04:29	06:05
S 60°	20:57	22:06	-	02:39	04:18	05:58
S 62°	21:15	22:40	-	02:20	04:04	05:50

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
19	10 28	10 38	12:11	24:15	11:47	15d Full
20	10 47	10 56	12:11	00:15	12:43	16d 99%
21	11 04	11 13	12:11	01:11	13:38	17d 96%

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2011 January 22, 23, 24 (Sat, Sun, Monday)

GMT	ARIES	VENUS -4.3		MARS +1.1		JUPITER -2.2		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
22 00	121° 00'.1	226° 39'.0	19° 30'.5 S	173° 38'.9	20° 06'.4 S	120° 38'.7	1° 08'.9 S	284° 10'.5	4° 26'.5 S
01	136° 02'.6	241° 38'.6	30'.9	188° 39'.3	05'.9	135° 40'.8	08'.7	299° 13'.0	26'.5
02	151° 05'.1	256° 38'.2	31'.2	203° 39'.8	05'.5	150° 42'.8	08'.5	314° 15'.4	26'.5
03	166° 07'.5	271° 37'.8	31'.6	218° 40'.2	05'.0	165° 44'.9	08'.3	329° 17'.9	26'.5
S 04	181° 10'.0	286° 37'.4	32'.0	233° 40'.6	04'.5	180° 46'.9	08'.2	344° 20'.3	26'.5
a 05	196° 12'.5	301° 37'.0	32'.4	248° 41'.1	04'.0	195° 49'.0	08'.0	359° 22'.8	26'.5
t 06	211° 14'.9	316° 36'.6	32'.8	263° 41'.5	03'.6	210° 51'.0	07'.8	14° 25'.2	26'.5
u 07	226° 17'.4	331° 36'.2	33'.2	278° 41'.9	03'.1	225° 53'.1	07'.6	29° 27'.6	26'.5
r 08	241° 19'.8	346° 35'.9	33'.6	293° 42'.4	02'.6	240° 55'.1	07'.4	44° 30'.1	26'.5
d 09	256° 22'.3	1° 35'.5	34'.0	308° 42'.8	02'.2	255° 57'.2	07'.2	59° 32'.5	26'.5
a 10	271° 24'.8	16° 35'.1	34'.3	323° 43'.3	01'.7	270° 59'.2	07'.0	74° 35'.0	26'.5
y 11	286° 27'.2	31° 34'.7	34'.7	338° 43'.7	01'.2	286° 01'.3	06'.9	89° 37'.4	26'.5
12	301° 29'.7	46° 34'.3	19° 35'.1 S	353° 44'.1	20° 00'.7 S	301° 03'.4	1° 06'.7 S	104° 39'.9	4° 26'.5 S
13	316° 32'.2	61° 33'.9	35'.5	8° 44'.6	00'.3	316° 05'.4	06'.5	119° 42'.3	26'.5
14	331° 34'.6	76° 33'.5	35'.9	23° 45'.0	19° 59'.8 S	331° 07'.5	06'.3	134° 44'.8	26'.5
15	346° 37'.1	91° 33'.0	36'.3	38° 45'.5	59'.3	346° 09'.5	06'.1	149° 47'.2	26'.5
16	1° 39'.6	106° 32'.6	36'.6	53° 45'.9	58'.9	1° 11'.6	05'.9	164° 49'.6	26'.5
17	16° 42'.0	121° 32'.2	37'.0	68° 46'.3	58'.4	16° 13'.6	05'.7	179° 52'.1	26'.4
18	31° 44'.5	136° 31'.8	37'.4	83° 46'.8	57'.9	31° 15'.7	05'.5	194° 54'.5	26'.4
19	46° 47'.0	151° 31'.4	37'.8	98° 47'.2	57'.4	46° 17'.7	05'.4	209° 57'.0	26'.4
20	61° 49'.4	166° 31'.0	38'.2	113° 47'.7	57'.0	61° 19'.8	05'.2	224° 59'.4	26'.4
21	76° 51'.9	181° 30'.6	38'.5	128° 48'.1	56'.5	76° 21'.8	05'.0	240° 01'.9	26'.4
22	91° 54'.3	196° 30'.2	38'.9	143° 48'.5	56'.0	91° 23'.9	04'.8	255° 04'.3	26'.4
23	106° 56'.8	211° 29'.8	39'.3	158° 49'.0	55'.5	106° 25'.9	04'.6	270° 06'.8	26'.4
23 00	121° 59'.3	226° 29'.4	19° 39'.7 S	173° 49'.4	19° 55'.1 S	121° 28'.0	1° 04'.4 S	285° 09'.2	4° 26'.4 S
01	137° 01'.7	241° 29'.0	40'.0	188° 49'.9	54'.6	136° 30'.0	04'.2	300° 11'.6	26'.4
02	152° 04'.2	256° 28'.6	40'.4	203° 50'.3	54'.1	151° 32'.1	04'.1	315° 14'.1	26'.4
03	167° 06'.7	271° 28'.2	40'.8	218° 50'.7	53'.6	166° 34'.1	03'.9	330° 16'.5	26'.4
S 04	182° 09'.1	286° 27'.8	41'.2	233° 51'.2	53'.1	181° 36'.2	03'.7	345° 19'.0	26'.4
u 05	197° 11'.6	301° 27'.3	41'.5	248° 51'.6	52'.7	196° 38'.2	03'.5	0° 21'.4	26'.4
n 06	212° 14'.1	316° 26'.9	41'.9	263° 52'.1	52'.2	211° 40'.3	03'.3	15° 23'.9	26'.4
d 07	227° 16'.5	331° 26'.5	42'.3	278° 52'.5	51'.7	226° 42'.3	03'.1	30° 26'.3	26'.4
a 08	242° 19'.0	346° 26'.1	42'.6	293° 53'.0	51'.2	241° 44'.4	02'.9	45° 28'.8	26'.4
y 09	257° 21'.4	1° 25'.7	43'.0	308° 53'.4	50'.7	256° 46'.4	02'.7	60° 31'.2	26'.4
10	272° 23'.9	16° 25'.3	43'.4	323° 53'.8	50'.3	271° 48'.5	02'.6	75° 33'.7	26'.4
11	287° 26'.4	31° 24'.9	43'.7	338° 54'.3	49'.8	286° 50'.5	02'.4	90° 36'.1	26'.4
12	302° 28'.8	46° 24'.4	19° 44'.1 S	353° 54'.7	19° 49'.3 S	301° 52'.6	1° 02'.2 S	105° 38'.6	4° 26'.3 S
13	317° 31'.3	61° 24'.0	44'.5	8° 55'.2	48'.8	316° 54'.6	02'.0	120° 41'.0	26'.3
14	332° 33'.8	76° 23'.6	44'.8	23° 55'.6	48'.3	331° 56'.7	01'.8	135° 43'.5	26'.3
15	347° 36'.2	91° 23'.2	45'.2	38° 56'.1	47'.9	346° 58'.7	01'.6	150° 45'.9	26'.3
16	2° 38'.7	106° 22'.8	45'.6	53° 56'.5	47'.4	2° 00'.8	01'.4	165° 48'.4	26'.3
17	17° 41'.2	121° 22'.3	45'.9	68° 56'.9	46'.9	17° 02'.8	01'.2	180° 50'.8	26'.3
18	32° 43'.6	136° 21'.9	46'.3	83° 57'.4	46'.4	32° 04'.9	01'.0	195° 53'.3	26'.3
19	47° 46'.1	151° 21'.5	46'.7	98° 57'.8	45'.9	47° 06'.9	00'.9	210° 55'.7	26'.3
20	62° 48'.6	166° 21'.1	47'.0	113° 58'.3	45'.4	62° 09'.0	00'.7	225° 58'.2	26'.3
21	77° 51'.0	181° 20'.7	47'.4	128° 58'.7	44'.9	77° 11'.0	00'.5	241° 00'.6	26'.3
22	92° 53'.5	196° 20'.2	47'.7	143° 59'.2	44'.5	92° 13'.1	00'.3	256° 03'.1	26'.3
23	107° 55'.9	211° 19'.8	48'.1	158° 59'.6	44'.0	107° 15'.1	00'.1	271° 05'.5	26'.3
24 00	122° 58'.4	226° 19'.4	19° 48'.5 S	174° 00'.1	19° 43'.5 S	122° 17'.2	0° 59'.9 S	286° 08'.0	4° 26'.3 S
01	138° 00'.9	241° 19'.0	48'.8	189° 00'.5	43'.0	137° 19'.2	59'.7	301° 10'.4	26'.3
02	153° 03'.3	256° 18'.5	49'.2	204° 00'.9	42'.5	152° 21'.2	59'.5	316° 12'.9	26'.3
03	168° 05'.8	271° 18'.1	49'.5	219° 01'.4	42'.0	167° 23'.3	59'.3	331° 15'.3	26'.2
M 04	183° 08'.3	286° 17'.7	49'.9	234° 01'.8	41'.5	182° 25'.3	59'.2	346° 17'.8	26'.2
o 05	198° 10'.7	301° 17'.3	50'.2	249° 02'.3	41'.1	197° 27'.4	59'.0	1° 20'.2	26'.2
n 06	213° 13'.2	316° 16'.8	50'.6	264° 02'.7	40'.6	212° 29'.4	58'.8	16° 22'.7	26'.2
d 07	228° 15'.7	331° 16'.4	51'.0	279° 03'.2	40'.1	227° 31'.5	58'.6	31° 25'.1	26'.2
a 08	243° 18'.1	346° 16'.0	51'.3	294° 03'.6	39'.6	242° 33'.5	58'.4	46° 27'.6	26'.2
y 09	258° 20'.6	1° 15'.5	51'.7	309° 04'.1	39'.1	257° 35'.6	58'.2	61° 30'.0	26'.2
10	273° 23'.1	16° 15'.1	52'.0	324° 04'.5	38'.6	272° 37'.6	58'.0	76° 32'.5	26'.2
11	288° 25'.5	31° 14'.7	52'.4	339° 05'.0	38'.1	287° 39'.7	57'.8	91° 34'.9	26'.2
12	303° 28'.0	46° 14'.2	19° 52'.7 S	354° 05'.4	19° 37'.6 S	302° 41'.7	0° 57'.6 S	106° 37'.4	4° 26'.2 S
13	318° 30'.4	61° 13'.8	53'.1	9° 05'.8	37'.1	317° 43'.7	57'.5	121° 39'.8	26'.2
14	333° 32'.9	76° 13'.4	53'.4	24° 06'.3	36'.6	332° 45'.8	57'.3	136° 42'.3	26'.2
15	348° 35'.4	91° 12'.9	53'.8	39° 06'.7	36'.2	347° 47'.8	57'.1	151° 44'.7	26'.2
16	3° 37'.8	106° 12'.5	54'.1	54° 07'.2	35'.7	2° 49'.9	56'.9	166° 47'.2	26'.1
17	18° 40'.3	121° 12'.1	54'.5	69° 07'.6	35'.2	17° 51'.9	56'.7	181° 49'.6	26'.1
18	33° 42'.8	136° 11'.6	54'.8	84° 08'.1	34'.7	32° 54'.0	56'.5	196° 52'.1	26'.1
19	48° 45'.2	151° 11'.2	55'.2	99° 08'.5	34'.2	47° 56'.0	56'.3	211° 54'.5	26'.1
20	63° 47'.7	166° 10'.8	55'.5	114° 09'.0	33'.7	62° 58'.1	56'.1	226° 57'.0	26'.1
21	78° 50'.2	181° 10'.3	55'.8	129° 09'.4	33'.2	78° 00'.1	55'.9	241° 59'.5	26'.1
22	93° 52'.6	196° 09'.9	56'.2	144° 09'.9	32'.7	93° 02'.1	55'.7	257° 01'.9	26'.1
23	108° 55'.1	211° 09'.4	56'.5	159° 10'.3	32'.2	108° 04'.2	55'.6	272° 04'.4	26'.1
	M.P. 15:49	v -0'.4	d 0'.4	v 0'.4	d 0'.5	v 2'.0	d 0'.2	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.8 S
Achernar	335° 28'.0	57° 11'.1 S
Acrux	173° 11'.1	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.9	55° 53'.6 N
Alkaid	153° 00'.1	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.6	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.6	26° 27'.3 S
Arcturus	145° 57'.3	19° 07'.2 N
Atria	107° 32'.4	69° 02'.6 S
Avior	234° 18'.1	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.8	7° 24'.5 N
Canopus	263° 56'.4	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.3 N
Denebola	182° 35'.2	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.1	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.4	51° 29'.1 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.7	57° 10'.4 S
Gienah	175° 53'.9	17° 36'.3 S
Hadar	148° 50'.4	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.4	34° 22'.7 S
Kochab	137° 20'.0	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.7	4° 08'.0 N
Menkent	148° 09'.6	36° 25'.4 S
Miaplacidus	221° 39'.3	69° 45'.8 S
Mirfak	308° 42'.6	49° 54'.3 N
Nunki	76° 00'.8	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 31'.8	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.3	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.4	8° 11'.5 S
Rigil Kent	139° 54'.2	60° 52'.6 S
Sabik	102° 14'.7	15° 44'.3 S
Schedar	349° 42'.8	56° 36'.2 N
Shaula	96° 24'.6	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.0 S
Spica	158° 33'.0	11° 13'.2 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.5	38° 47'.6 N
Zuben'ubi	137° 07'.4	16° 05'.3 S

	SHA	Mer.Pass.
Venus	104° 30'.1	08:54
Mars	51° 50'.1	12:24
Jupiter	359° 28'.7	15:52
Saturn	163° 09'.9	04:59

SUN						
GHA	Dec	GHA	v	Dec	d	HP
177° 09'.6	19° 48'.2 S	329° 59'.7	9'.2	7° 09'.0 N	14'.6	60'.4
192° 09'.4	47'.6	344° 27'.9	9'.3	6° 54'.4 N	14'.7	
207° 09'.3	47'.1	358° 56'.2	9'.2	39'.7	14'.6	
222° 09'.1	46'.5	13° 24'.4	9'.4	25'.1	14'.7	
237° 08'.9	45'.9	27° 52'.8	9'.3	10'.4	14'.7	
252° 08'.8	45'.4	42° 21'.1	9'.4	5° 55'.7 N	14'.8	
267° 08'.6	44'.8	56° 49'.5	9'.4	40'.9	14'.8	
282° 08'.4	44'.2	71° 17'.9	9'.5	26'.1	14'.8	
297° 08'.3	43'.7	85° 46'.4	9'.5	11'.3	14'.9	
312° 08'.1	43'.1	100° 14'.9	9'.5	4° 56'.4 N	14'.9	
327° 07'.9	42'.5	114° 43'.4	9'.5	41'.5	14'.9	
342° 07'.8	41'.9	129° 11'.9	9'.6	26'.6	14'.9	
357° 07'.6	19° 41'.4 S	143° 40'.5	9'.6	4° 11'.7 N	14'.9	60'.4
12° 07'.4	40'.8	158° 09'.1	9'.6	3° 56'.8 N	15'.0	
27° 07'.2	40'.2	172° 37'.7	9'.7	41'.8	15'.0	
42° 07'.1	39'.7	187° 06'.4	9'.7	26'.8	15'.0	
57° 06'.9	39'.1	201° 35'.1	9'.7	11'.8	15'.0	
72° 06'.8	38'.5	216° 03'.8	9'.8	2° 56'.8 N	15'.0	
87° 06'.6	37'.9	230° 32'.6	9'.7	41'.8	15'.0	
102° 06'.4	37'.4	245° 01'.3	9'.8	26'.8	15'.1	
117° 06'.3	36'.8	259° 30'.1	9'.8	11'.7	15'.0	
132° 06'.1	36'.2	273° 58'.9	9'.9	1° 56'.7 N	15'.1	
147° 05'.9	35'.6	288° 27'.8	9'.8	41'.6	15'.0	60'.3
162° 05'.8	35'.1	302° 56'.6	9'.9	26'.6	15'.1	
177° 05'.6	19° 34'.5 S	317° 25'.5	9'.9	1° 11'.5 N	15'.0	60'.3
192° 05'.4	33'.9	331° 54'.4	9'.9	0° 56'.5 N	15'.1	
207° 05'.3	33'.3	346° 23'.3	9'.9	41'.4	15'.1	
222° 05'.1	32'.7	0° 52'.2	10'.0	26'.3	15'.0	
237° 04'.9	32'.2	15° 21'.2	9'.9	11'.3	15'.1	
252° 04'.8	31'.6	29° 50'.1	10'.0	0° 03'.8 S	15'.0	
267° 04'.6	31'.0	44° 19'.1	10'.0	18'.8	15'.0	
282° 04'.5	30'.4	58° 48'.1	10'.0	33'.8	15'.1	
297° 04'.3	29'.8	73° 17'.1	10'.0	48'.9	15'.0	60'.2
312° 04'.1	29'.2	87° 46'.1	10'.0	1° 03'.9 S	15'.0	
327° 04'.0	28'.7	102° 15'.1	10'.1	18'.9	15'.0	
342° 03'.8	28'.1	116° 44'.2	10'.0	33'.9	14'.9	
357° 03'.7	19° 27'.5 S	131° 13'.2	10'.1	1° 48'.8 S	15'.0	60'.2
12° 03'.5	26'.9	145° 42'.3	10'.0	2° 03'.8 S	14'.9	
27° 03'.3	26'.3	160° 11'.3	10'.1	18'.7	14'.9	
42° 03'.2	25'.7	174° 40'.4	10'.1	33'.6	14'.9	60'.1
57° 03'.0	25'.1	189° 09'.5	10'.1	48'.5	14'.9	
72° 02'.9	24'.6	203° 38'.6	10'.0	3° 03'.4 S	14'.8	
87° 02'.7	24'.0	218° 07'.6	10'.1	18'.2	14'.8	
102° 02'.6	23'.4	232° 36'.7	10'.1	33'.0	14'.8	
117° 02'.4	22'.8	247° 05'.8	10'.1	47'.8	14'.7	
132° 02'.2	22'.2	261° 34'.9	10'.1	4° 02'.5 S	14'.7	
147° 02'.1	21'.6	276° 04'.0	10'.1	17'.2	14'.7	60'.0
162° 01'.9	21'.0	290° 33'.1	10'.0	31'.9	14'.7	
177° 01'.8	19° 20'.4 S	305° 02'.1	10'.1	4° 46'.6 S	14'.6	60'.0
192° 01'.6	19'.8	319° 31'.2	10'.1	5° 01'.2 S	14'.5	
207° 01'.5	19'.2	334° 00'.3	10'.1	15'.7	14'.6	
222° 01'.3	18'.6	348° 29'.4	10'.0	30'.3	14'.5	
237° 01'.1	18'.0	2° 58'.4	10'.1	44'.8	14'.4	59'.9
252° 01'.0	17'.4	17° 27'.5	10'.0	59'.2	14'.4	
267° 00'.8	16'.8	31° 56'.5	10'.1	6° 13'.6 S	14'.4	
282° 00'.7	16'.2	46° 25'.6	10'.0	28'.0	14'.3	
297° 00'.5	15'.6	60° 54'.6	10'.1	42'.3	14'.3	
312° 00'.4	15'.0	75° 23'.7	10'.0	56'.6	14'.2	59'.8
327° 00'.2	14'.4	89° 52'.7	10'.0	7° 10'.8 S	14'.2	
342° 00'.1	13'.8	104° 21'.7	10'.0	25'.0	14'.1	
356° 59'.9	19° 13'.2 S	118° 50'.7	10'.0	7° 39'.1 S	14'.0	59'.8
11° 59'.8	12'.6	133° 19'.7	9'.9	53'.1	14'.0	
26° 59'.6	12'.0	147° 48'.6	10'.0	8° 07'.1 S	14'.0	59'.7
41° 59'.5	11'.4	162° 17'.6	9'.9	21'.1	13'.9	
56° 59'.3	10'.8	176° 46'.5	9'.9	35'.0	13'.8	
71° 59'.2	10'.2	191° 15'.4	9'.9	48'.8	13'.8	
86° 59'.0	09'.6	205° 44'.3	9'.9	9° 02'.6 S	13'.7	
101° 58'.9	09'.0	220° 13'.2	9'.9	16'.3	13'.7	59'.6
116° 58'.7	08'.4	234° 42'.1	9'.9	30'.0	13'.6	
131° 58'.6	07'.8	249° 11'.0	9'.8	43'.6	13'.5	
146° 58'.4	07'.2	263° 39'.8	9'.8	57'.1	13'.4	
161° 58'.3	06'.6	278° 08'.6	9'.8	10° 10'.5 S	13'.4	
SD 16'.2	d 0'.6	SD	16'.5	16'.4	16'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 22	Moonrise 23	Moonrise 24
N 72°	07:40	09:19	-	20:19	22:34	24:55
N 70°	07:28	08:53	10:43	20:21	22:27	24:36
68°	07:19	08:34	09:58	20:24	22:22	24:21
66°	07:10	08:18	09:28	20:26	22:17	24:09
64°	07:03	08:05	09:06	20:27	22:14	23:59
62°	06:57	07:54	08:49	20:29	22:10	23:51
60°	06:51	07:44	08:34	20:30	22:07	23:44
N 58°	06:46	07:35	08:22	20:31	22:05	23:38
56°	06:42	07:28	08:11	20:32	22:03	23:32
54°	06:38	07:21	08:02	20:33	22:01	23:27
52°	06:34	07:15	07:53	20:34	21:59	23:23
50°	06:30	07:10	07:46	20:34	21:57	23:19
45°	06:21	06:57	07:29	20:36	21:54	23:10
N 40°	06:14	06:47	07:16	20:37	21:51	23:03
35°	06:07	06:38	07:05	20:38	21:48	22:57
30°	06:00	06:29	06:55	20:39	21:46	22:52
20°	05:47	06:14	06:38	20:41	21:42	22:42
N 10°	05:35	06:00	06:22	20:43	21:39	22:34
0°	05:21	05:46	06:08	20:44	21:36	22:27
S 10°	05:05	05:31	05:54	20:46	21:32	22:20
20°	04:46	05:14	05:38	20:47	21:29	22:12
30°	04:22	04:54	05:20	20:49	21:26	22:03
35°	04:07	04:41	05:10	20:50	21:24	21:58
40°	03:48	04:27	04:58	20:51	21:21	21:52
45°	03:24	04:09	04:43	20:53	21:19	21:46
S 50°	02:52	03:45	04:26	20:54	21:16	21:38
52°	02:34	03:34	04:17	20:55	21:14	21:34
54°	02:12	03:21	04:08	20:56	21:13	21:30
56°	01:43	03:06	03:57	20:57	21:11	21:26
58°	00:51	02:48	03:45	20:58	21:09	21:21
S 60°	-	02:24	03:31	20:59	21:07	21:16
S 62°	-	01:53	03:14	21:00	21:05	21:10

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 22	Moonset 23	Moonset 24
N 72°	-	15:05	16:45	09:18	08:54	08:29
N 70°	13:41	15:31	16:56	09:12	08:55	08:39
68°	14:27	15:51	17:06	09:07	08:57	08:47
66°	14:56	16:07	17:14	09:02	08:58	08:53
64°	15:18	16:20	17:21	08:58	08:59	08:59
62°	15:35	16:31	17:27	08:55	09:00	09:04
60°	15:50	16:40	17:33	08:52	09:00	09:08
N 58°	16:02	16:49	17:38	08:49	09:01	09:12
56°	16:13	16:56	17:42	08:47	09:01	09:16
54°	16:23	17:03	17:47	08:45	09:02	09:19
52°	16:31	17:09	17:51	08:43	09:02	09:22
50°	16:38	17:15	17:54	08:41	09:03	09:24
45°	16:55	17:27	18:03	08:37	09:04	09:30
N 40°	17:08	17:37	18:10	08:34	09:05	09:35
35°	17:19	17:46	18:17	08:31	09:05	09:39
30°	17:29	17:55	18:24	08:29	09:06	09:43
20°	17:46	18:09	18:36	08:24	09:07	09:49
N 10°	18:01	18:23	18:49	08:21	09:08	09:55
0°	18:15	18:37	19:03	08:17	09:09	10:00
S 10°	18:30	18:52	19:18	08:13	09:09	10:05
20°	18:45	19:09	19:37	08:09	09:10	10:11
30°	19:03	19:29	20:01	08:04	09:11	10:17
35°	19:13	19:42	20:16	08:02	09:12	10:21
40°	19:25	19:56	20:34	07:58	09:12	10:25
45°	19:40	20:14	20:58	07:55	09:13	10:30
S 50°	19:57	20:37	21:30	07:50	09:14	10:36
52°	20:05	20:48	21:47	07:48	09:14	10:39
54°	20:15	21:01	22:08	07:46	09:15	10:42
56°	20:25	21:16	22:37	07:44	09:15	10:45
58°	20:37	21:34	23:23	07:41	09:15	10:49
S 60°	20:51	21:56	-	07:38	09:16	10:53
S 62°	21:08	22:27	-	07:34	09:17	10:58

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
22	11 21	11 29	12:11	02:04	14:31	18d 90%
23	11 37	11 45	12:12	02:56	15:22	19d 82%
24	11 53	12 00	12:12	03:48	16:13	20d 73%

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2011 January 25, 26, 27 (Tue, Wed, Thur)

GMT	ARIES	VENUS -4.3		MARS +1.1		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
25 00	123° 57'.5	226° 09'.0	19° 56'.9 S	174° 10'.8	19° 31'.7 S	123° 06'.2	0° 55'.4 S	287° 06'.8	4° 26'.1 S
01	139° 00'.0	241° 08'.6	57'.2	189° 11'.2	31'.2	138° 08'.3	55'.2	302° 09'.3	26'.1
02	154° 02'.5	256° 08'.1	57'.6	204° 11'.7	30'.7	153° 10'.3	55'.0	317° 11'.7	26'.1
03	169° 04'.9	271° 07'.7	57'.9	219° 12'.1	30'.2	168° 12'.4	54'.8	332° 14'.2	26'.0
04	184° 07'.4	286° 07'.2	58'.2	234° 12'.6	29'.7	183° 14'.4	54'.6	347° 16'.6	26'.0
05	199° 09'.9	301° 06'.8	58'.6	249° 13'.0	29'.2	198° 16'.4	54'.4	2° 19'.1	26'.0
06	214° 12'.3	316° 06'.3	58'.9	264° 13'.5	28'.7	213° 18'.5	54'.2	17° 21'.5	26'.0
07	229° 14'.8	331° 05'.9	59'.2	279° 13'.9	28'.2	228° 20'.5	54'.0	32° 24'.0	26'.0
08	244° 17'.3	346° 05'.4	59'.6	294° 14'.4	27'.7	243° 22'.6	53'.8	47° 26'.5	26'.0
09	259° 19'.7	1° 05'.0	59'.9	309° 14'.8	27'.2	258° 24'.6	53'.6	62° 28'.9	26'.0
10	274° 22'.2	16° 04'.6	20° 00'.3 S	324° 15'.3	26'.7	273° 26'.6	53'.5	77° 31'.4	26'.0
11	289° 24'.7	31° 04'.1	00'.6	339° 15'.7	26'.2	288° 28'.7	53'.3	92° 33'.8	26'.0
12	304° 27'.1	46° 03'.7	20° 00'.9 S	354° 16'.2	19° 25'.7 S	303° 30'.7	0° 53'.1 S	107° 36'.3	4° 26'.0 S
13	319° 29'.6	61° 03'.2	01'.3	9° 16'.6	25'.2	318° 32'.8	52'.9	122° 38'.7	26'.0
14	334° 32'.0	76° 02'.8	01'.6	24° 17'.1	24'.7	333° 34'.8	52'.7	137° 41'.2	25'.9
15	349° 34'.5	91° 02'.3	01'.9	39° 17'.5	24'.2	348° 36'.9	52'.5	152° 43'.6	25'.9
16	4° 37'.0	106° 01'.9	02'.2	54° 18'.0	23'.7	3° 38'.9	52'.3	167° 46'.1	25'.9
17	19° 39'.4	121° 01'.4	02'.6	69° 18'.4	23'.2	18° 40'.9	52'.1	182° 48'.6	25'.9
18	34° 41'.9	136° 01'.0	02'.9	84° 18'.9	22'.7	33° 43'.0	51'.9	197° 51'.0	25'.9
19	49° 44'.4	151° 00'.5	03'.2	99° 19'.3	22'.2	48° 45'.0	51'.7	212° 53'.5	25'.9
20	64° 46'.8	166° 00'.1	03'.6	114° 19'.8	21'.7	63° 47'.0	51'.5	227° 55'.9	25'.9
21	79° 49'.3	180° 59'.6	03'.9	129° 20'.2	21'.2	78° 49'.1	51'.3	242° 58'.4	25'.9
22	94° 51'.8	195° 59'.1	04'.2	144° 20'.7	20'.7	93° 51'.1	51'.2	258° 00'.9	25'.9
23	109° 54'.2	210° 58'.7	04'.5	159° 21'.1	20'.2	108° 53'.2	51'.0	273° 03'.3	25'.9
26 00	124° 56'.7	225° 58'.2	20° 04'.9 S	174° 21'.6	19° 19'.7 S	123° 55'.2	0° 50'.8 S	288° 05'.8	4° 25'.8 S
01	139° 59'.2	240° 57'.8	05'.2	189° 22'.0	19'.2	138° 57'.2	50'.6	303° 08'.2	25'.8
02	155° 01'.6	255° 57'.3	05'.5	204° 22'.5	18'.7	153° 59'.3	50'.4	318° 10'.7	25'.8
03	170° 04'.1	270° 56'.9	05'.8	219° 22'.9	18'.2	169° 01'.3	50'.2	333° 13'.1	25'.8
04	185° 06'.5	285° 56'.4	06'.2	234° 23'.4	17'.7	184° 03'.4	50'.0	348° 15'.6	25'.8
05	200° 09'.0	300° 55'.9	06'.5	249° 23'.9	17'.2	199° 05'.4	49'.8	3° 18'.1	25'.8
06	215° 11'.5	315° 55'.5	06'.8	264° 24'.3	16'.7	214° 07'.4	49'.6	18° 20'.5	25'.8
07	230° 13'.9	330° 55'.0	07'.1	279° 24'.8	16'.2	229° 09'.5	49'.4	33° 23'.0	25'.8
08	245° 16'.4	345° 54'.6	07'.4	294° 25'.2	15'.7	244° 11'.5	49'.2	48° 25'.4	25'.8
09	260° 18'.9	0° 54'.1	07'.8	309° 25'.7	15'.2	259° 13'.5	49'.0	63° 27'.9	25'.7
10	275° 21'.3	15° 53'.6	08'.1	324° 26'.1	14'.7	274° 15'.6	48'.8	78° 30'.4	25'.7
11	290° 23'.8	30° 53'.2	08'.4	339° 26'.6	14'.2	289° 17'.6	48'.7	93° 32'.8	25'.7
12	305° 26'.3	45° 52'.7	20° 08'.7 S	354° 27'.0	19° 13'.6 S	304° 19'.7	0° 48'.5 S	108° 35'.3	4° 25'.7 S
13	320° 28'.7	60° 52'.3	09'.0	9° 27'.5	13'.1	319° 21'.7	48'.3	123° 37'.7	25'.7
14	335° 31'.2	75° 51'.8	09'.3	24° 27'.9	12'.6	334° 23'.7	48'.1	138° 40'.2	25'.7
15	350° 33'.6	90° 51'.3	09'.6	39° 28'.4	12'.1	349° 25'.8	47'.9	153° 42'.7	25'.7
16	5° 36'.1	105° 50'.9	10'.0	54° 28'.9	11'.6	4° 27'.8	47'.7	168° 45'.1	25'.7
17	20° 38'.6	120° 50'.4	10'.3	69° 29'.3	11'.1	19° 29'.8	47'.5	183° 47'.6	25'.7
18	35° 41'.0	135° 49'.9	10'.6	84° 29'.8	10'.6	34° 31'.9	47'.3	198° 50'.1	25'.6
19	50° 43'.5	150° 49'.5	10'.9	99° 30'.2	10'.1	49° 33'.9	47'.1	213° 52'.5	25'.6
20	65° 46'.0	165° 49'.0	11'.2	114° 30'.7	09'.6	64° 35'.9	46'.9	228° 55'.0	25'.6
21	80° 48'.4	180° 48'.5	11'.5	129° 31'.1	09'.1	79° 38'.0	46'.7	243° 57'.4	25'.6
22	95° 50'.9	195° 48'.1	11'.8	144° 31'.6	08'.5	94° 40'.0	46'.5	258° 59'.9	25'.6
23	110° 53'.4	210° 47'.6	12'.1	159° 32'.0	08'.0	109° 42'.1	46'.3	274° 02'.4	25'.6
27 00	125° 55'.8	225° 47'.1	20° 12'.4 S	174° 32'.5	19° 07'.5 S	124° 44'.1	0° 46'.1 S	289° 04'.8	4° 25'.6 S
01	140° 58'.3	240° 46'.6	12'.7	189° 33'.0	07'.0	139° 46'.1	46'.0	304° 07'.3	25'.6
02	156° 00'.8	255° 46'.2	13'.1	204° 33'.4	06'.5	154° 48'.2	45'.8	319° 09'.7	25'.5
03	171° 03'.2	270° 45'.7	13'.4	219° 33'.9	06'.0	169° 50'.2	45'.6	334° 12'.2	25'.5
04	186° 05'.7	285° 45'.2	13'.7	234° 34'.3	05'.5	184° 52'.2	45'.4	349° 14'.7	25'.5
05	201° 08'.1	300° 44'.8	14'.0	249° 34'.8	04'.9	199° 54'.3	45'.2	4° 17'.1	25'.5
06	216° 10'.6	315° 44'.3	14'.3	264° 35'.2	04'.4	214° 56'.3	45'.0	19° 19'.6	25'.5
07	231° 13'.1	330° 43'.8	14'.6	279° 35'.7	03'.9	229° 58'.3	44'.8	34° 22'.1	25'.5
08	246° 15'.5	345° 43'.3	14'.9	294° 36'.2	03'.4	245° 00'.4	44'.6	49° 24'.5	25'.5
09	261° 18'.0	0° 42'.9	15'.2	309° 36'.6	02'.9	260° 02'.4	44'.4	64° 27'.0	25'.5
10	276° 20'.5	15° 42'.4	15'.5	324° 37'.1	02'.4	275° 04'.4	44'.2	79° 29'.5	25'.4
11	291° 22'.9	30° 41'.9	15'.8	339° 37'.5	01'.9	290° 06'.5	44'.0	94° 31'.9	25'.4
12	306° 25'.4	45° 41'.4	20° 16'.1 S	354° 38'.0	19° 01'.3 S	305° 08'.5	0° 43'.8 S	109° 34'.4	4° 25'.4 S
13	321° 27'.9	60° 41'.0	16'.4	9° 38'.4	00'.8	320° 10'.5	43'.6	124° 36'.9	25'.4
14	336° 30'.3	75° 40'.5	16'.7	24° 38'.9	00'.3	335° 12'.6	43'.4	139° 39'.3	25'.4
15	351° 32'.8	90° 40'.0	17'.0	39° 39'.4	18° 59'.8 S	350° 14'.6	43'.2	154° 41'.8	25'.4
16	6° 35'.3	105° 39'.5	17'.2	54° 39'.8	59'.3	5° 16'.6	43'.0	169° 44'.3	25'.4
17	21° 37'.7	120° 39'.0	17'.5	69° 40'.3	58'.7	20° 18'.7	42'.8	184° 46'.7	25'.4
18	36° 40'.2	135° 38'.6	17'.8	84° 40'.7	58'.2	35° 20'.7	42'.6	199° 49'.2	25'.3
19	51° 42'.6	150° 38'.1	18'.1	99° 41'.2	57'.7	50° 22'.7	42'.5	214° 51'.6	25'.3
20	66° 45'.1	165° 37'.6	18'.4	114° 41'.7	57'.2	65° 24'.8	42'.3	229° 54'.1	25'.3
21	81° 47'.6	180° 37'.1	18'.7	129° 42'.1	56'.7	80° 26'.8	42'.1	244° 56'.6	25'.3
22	96° 50'.0	195° 36'.6	19'.0	144° 42'.6	56'.1	95° 28'.8	41'.9	259° 59'.0	25'.3
23	111° 52'.5	210° 36'.1	19'.3	159° 43'.0	55'.6	110° 30'.8	41'.7	275° 01'.5	25'.3
	M.P. 15:38	v -0'.5	d 0'.3	v 0'.5	d 0'.5	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.8 S
Achernar	335° 28'.0	57° 11'.1 S
Acrux	173° 11'.0	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.9	55° 53'.6 N
Alkaid	153° 00'.1	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.5	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.6	26° 27'.3 S
Arcturus	145° 57'.3	19° 07'.2 N
Atria	107° 32'.3	69° 02'.6 S
Avior	234° 18'.1	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.4	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.3 N
Denebola	182° 35'.2	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.1	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.4	51° 29'.1 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.6	57° 10'.4 S
Gienah	175° 53'.9	17° 36'.3 S
Hadar	148° 50'.4	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.4	34° 22'.7 S
Kochab	137° 20'.0	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.6	36° 25'.4 S
Miaplacidus	221° 39'.2	69° 45'.8 S
Mirfak	308° 42'.7	49° 54'.3 N
Nunki	76° 00'.7	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 33'.1	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.3	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.4	8° 11'.5 S
Rigil Kent	139° 54'.2	60° 52'.6 S
Sabik	102° 14'.7	15° 44'.3 S
Schedar	349° 42'.8	56° 36'.2 N
Shaula	96° 24'.5	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 33'.0	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.8 S
Vega	80° 40'.5	38° 47'.5 N
Zuben'ubi	137° 07'.4	16° 05'.3 S

	SHA	Mer.Pass.
Venus	101° 01'.5	08:56
Mars	49° 24'.9	12:22
Jupiter	358° 58'.5	15:42
Saturn	163° 09'.1	04:47

SUN

GHA	Dec
176° 58'.1	19° 06'.0 S
191° 58'.0	05'.4
206° 57'.8	04'.8
221° 57'.7	04'.2
236° 57'.5	03'.6
251° 57'.4	02'.9
266° 57'.2	02'.3
281° 57'.1	01'.7
296° 57'.0	01'.1
311° 56'.8	00'.5
326° 56'.7	18° 59'.9 S
341° 56'.5	59'.3
356° 56'.4	18° 58'.6 S
11° 56'.2	58'.0
26° 56'.1	57'.4
41° 56'.0	56'.8
56° 55'.8	56'.2
71° 55'.7	55'.6
86° 55'.5	54'.9
101° 55'.4	54'.3
116° 55'.2	53'.7
131° 55'.1	53'.1
146° 55'.0	52'.5
161° 54'.8	51'.8
176° 54'.7	18° 51'.2 S
191° 54'.5	50'.6
206° 54'.4	50'.0
221° 54'.3	49'.3
236° 54'.1	48'.7
251° 54'.0	48'.1
266° 53'.9	47'.5
281° 53'.7	46'.8
296° 53'.6	46'.2
311° 53'.4	45'.6
326° 53'.3	45'.0
341° 53'.2	44'.3
356° 53'.0	18° 43'.7 S
11° 52'.9	43'.1
26° 52'.8	42'.4
41° 52'.6	41'.8
56° 52'.5	41'.2
71° 52'.4	40'.5
86° 52'.2	39'.9
101° 52'.1	39'.3
116° 52'.0	38'.6
131° 51'.8	38'.0
146° 51'.7	37'.4
161° 51'.6	36'.7
176° 51'.4	18° 36'.1 S
191° 51'.3	35'.5
206° 51'.2	34'.8
221° 51'.0	34'.2
236° 50'.9	33'.5
251° 50'.8	32'.9
266° 50'.6	32'.3
281° 50'.5	31'.6
296° 50'.4	31'.0
311° 50'.3	30'.3
326° 50'.1	29'.7
341° 50'.0	29'.1
356° 49'.9	18° 28'.4 S
11° 49'.8	27'.8
26° 49'.6	27'.1
41° 49'.5	26'.5
56° 49'.4	25'.8
71° 49'.2	25'.2
86° 49'.1	24'.5
101° 49'.0	23'.9
116° 48'.9	23'.2
131° 48'.7	22'.6
146° 48'.6	21'.9
161° 48'.5	21'.3
SD 16'.2	d 0'.6

MOON

GHA	v	Dec	d	HP
292° 37'.4	9'.8	10° 23'.9 S	13'.3	59'.5
307° 06'.2	9'.7	37'.2	13'.3	
321° 34'.9	9'.7	50'.5	13'.2	
336° 03'.6	9'.7	11° 03'.7 S	13'.1	
350° 32'.3	9'.7	16'.8	13'.0	59'.4
5° 01'.0	9'.7	29'.8	12'.9	
19° 29'.7	9'.6	42'.7	12'.9	
33° 58'.3	9'.6	55'.6	12'.8	
48° 26'.9	9'.6	12° 08'.4 S	12'.7	
62° 55'.5	9'.5	21'.1	12'.7	59'.3
77° 24'.0	9'.5	33'.8	12'.5	
91° 52'.5	9'.5	46'.3	12'.5	
106° 21'.0	9'.5	12° 58'.8 S	12'.4	59'.3
120° 49'.5	9'.4	13° 11'.2 S	12'.3	59'.2
135° 17'.9	9'.4	23'.5	12'.2	
149° 46'.3	9'.4	35'.7	12'.2	
164° 14'.7	9'.4	47'.9	12'.0	
178° 43'.1	9'.3	59'.9	12'.0	59'.1
193° 11'.4	9'.3	14° 11'.9 S	11'.8	
207° 39'.7	9'.2	23'.7	11'.8	
222° 07'.9	9'.3	35'.5	11'.7	
236° 36'.2	9'.1	47'.2	11'.6	59'.0
251° 04'.3	9'.2	58'.8	11'.4	
265° 32'.5	9'.1	15° 10'.2 S	11'.4	
280° 00'.6	9'.1	15° 21'.6 S	11'.3	59'.0
294° 28'.7	9'.1	32'.9	11'.2	58'.9
308° 56'.8	9'.0	44'.1	11'.1	
323° 24'.8	9'.0	55'.2	11'.0	
337° 52'.8	9'.0	16° 06'.2 S	10'.9	
352° 20'.8	8'.9	17'.1	10'.8	58'.8
6° 48'.7	8'.9	27'.9	10'.7	
21° 16'.6	8'.8	38'.6	10'.6	
35° 44'.4	8'.9	49'.2	10'.5	
50° 12'.3	8'.7	59'.7	10'.3	58'.7
64° 40'.0	8'.8	17° 10'.0 S	10'.3	
79° 07'.8	8'.7	20'.3	10'.1	
93° 35'.5	8'.7	17° 30'.4 S	10'.1	58'.7
108° 03'.2	8'.7	40'.5	9'.9	58'.6
122° 30'.9	8'.6	50'.4	9'.9	
136° 58'.5	8'.6	18° 00'.3 S	9'.7	
151° 26'.1	8'.5	10'.0	9'.6	
165° 53'.6	8'.5	19'.6	9'.4	58'.5
180° 21'.1	8'.5	29'.0	9'.4	
194° 48'.6	8'.4	38'.4	9'.3	
209° 16'.0	8'.5	47'.7	9'.1	
223° 43'.5	8'.3	56'.8	9'.0	58'.4
238° 10'.8	8'.4	19° 05'.8 S	8'.9	
252° 38'.2	8'.3	14'.7	8'.8	
267° 05'.5	8'.3	19° 23'.5 S	8'.7	58'.4
281° 32'.8	8'.2	32'.2	8'.5	58'.3
296° 00'.0	8'.2	40'.7	8'.4	
310° 27'.2	8'.2	49'.1	8'.3	
324° 54'.4	8'.2	57'.4	8'.2	
339° 21'.6	8'.1	20° 05'.6 S	8'.0	58'.2
353° 48'.7	8'.1	13'.6	8'.0	
8° 15'.8	8'.1	21'.6	7'.8	
22° 42'.9	8'.0	29'.4	7'.6	
37° 09'.9	8'.0	37'.0	7'.6	58'.1
51° 36'.9	8'.0	44'.6	7'.4	
66° 03'.9	7'.9	52'.0	7'.3	
80° 30'.8	7'.9	20° 59'.3 S	7'.1	58'.1
94° 57'.7	7'.9	21° 06'.4 S	7'.1	58'.0
109° 24'.6	7'.9	13'.5	6'.9	
123° 51'.5	7'.8	20'.4	6'.7	
138° 18'.3	7'.9	27'.1	6'.7	
152° 45'.2	7'.7	33'.8	6'.5	57'.9
167° 11'.9	7'.8	40'.3	6'.4	
181° 38'.7	7'.8	46'.7	6'.2	
196° 05'.5	7'.7	52'.9	6'.1	
210° 32'.2	7'.7	59'.0	6'.0	57'.8
224° 58'.9	7'.7	22° 05'.0 S	5'.8	
239° 25'.6	7'.6	10'.8	5'.7	
SD 16'.1		16'.0	15'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27
N 72°	07:31	09:06	11:47	00:55	03:41	-
N 70°	07:20	08:43	10:23	00:36	02:55	-
68°	07:12	08:25	09:45	00:21	02:25	04:44
66°	07:04	08:10	09:18	00:09	02:03	04:02
64°	06:58	07:58	08:58	-	01:46	03:33
62°	06:52	07:48	08:42	-	01:32	03:11
60°	06:47	07:39	08:28	-	01:20	02:54
N 58°	06:42	07:31	08:16	-	01:10	02:39
56°	06:38	07:24	08:06	-	01:01	02:27
54°	06:34	07:17	07:57	-	00:53	02:16
52°	06:30	07:12	07:49	-	00:46	02:06
50°	06:27	07:06	07:42	-	00:39	01:58
45°	06:19	06:55	07:27	-	00:26	01:40
N 40°	06:12	06:45	07:14	-	00:15	01:25
35°	06:06	06:36	07:03	-	00:05	01:13
30°	05:59	06:28	06:54	23:57	-	01:02
20°	05:47	06:14	06:37	23:43	-	00:43
N 10°	05:35	06:00	06:23	23:31	-	00:28
0°	05:22	05:47	06:09	23:19	-	00:13
S 10°	05:07	05:33	05:55	23:08	23:58	24:50
20°	04:49	05:17	05:40	22:56	23:42	24:32
30°	04:25	04:57	05:23	22:42	23:24	24:11
35°	04:11	04:45	05:13	22:34	23:14	23:59
40°	03:53	04:31	05:01	22:25	23:02	23:44
45°	03:30	04:13	04:47	22:15	22:48	23:28
S 50°	02:59	03:51	04:31	22:02	22:32	23:07
52°	02:42	03:40	04:23	21:57	22:24	22:58
54°	02:23	03:28	04:14	21:50	22:15	22:47
56°	01:57	03:14	04:04	21:43	22:05	22:34
58°	01:17	02:57	03:52	21:35	21:54	22:20
S 60°	-	02:35	03:39	21:26	21:41	22:03
S 62°	-	02:07	03:23	21:16	21:26	21:43

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 25	Moonset 26	Moonset 27
N 72°	12:39	15:20	16:55	07:58	07:02	-
N 70°	14:03	15:43	17:06	08:19	07:49	-
68°	14:41	16:01	17:14	08:35	08:21	07:54
66°	15:08	16:16	17:22	08:49	08:44	08:38
64°	15:28	16:28	17:28	09:00	09:02	09:07
62°	15:44	16:38	17:34	09:10	09:17	09:30
60°	15:58	16:47	17:39	09:18	09:30	09:48
N 58°	16:09	16:55	17:43	09:25	09:41	10:03
56°	16:19	17:02	17:48	09:32	09:51	10:16
54°	16:28	17:08	17:51	09:38	10:00	10:27
52°	16:36	17:14	17:55	09:43	10:07	10:37
50°	16:43	17:19	17:58	09:48	10:14	10:46
45°	16:59	17:31	18:06	09:58	10:29	11:05
N 40°	17:11	17:40	18:13	10:07	10:41	11:21
35°	17:22	17:49	18:20	10:14	10:52	11:34
30°	17:32	17:57	18:26	10:21	11:01	11:46
20°	17:48	18:11	18:38	10:32	11:17	12:05
N 10°	18:02	18:25	18:50	10:42	11:31	12:23
0°	18:16	18:38	19:03	10:52	11:44	12:39
S 10°	18:30	18:52	19:18	11:01	11:58	12:55
20°	18:45	19:08	19:36	11:11	12:12	13:12
30°	19:02	19:28	19:59	11:23	12:28	13:32
35°	19:12	19:40	20:14	11:30	12:38	13:44
40°	19:23	19:54	20:31	11:37	12:48	13:58
45°	19:37	20:11	20:54	11:46	13:01	14:13
S 50°	19:53	20:33	21:25	11:57	13:17	14:33
52°	20:01	20:43	21:40	12:02	13:24	14:43
54°	20:10	20:55	22:00	12:08	13:32	14:53
56°	20:20	21:09	22:25	12:14	13:42	15:05
58°	20:31	21:26	23:02	12:21	13:52	15:19
S 60°	20:44	21:47	-	12:29	14:04	15:35
S 62°	21:00	22:14	-	12:38	14:19	15:55

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
25	12 07	12 14	12:12	04:39	17:05	21d 62%
26	12 21	12 28	12:12	05:32	17:59	22d 51%
27	12 34	12 40	12:13	06:26	18:53	23d 40%

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2011 January 28, 29, 30 (Fri, Sat, Sun)

GMT	ARIES	VENUS -4.3		MARS +1.1		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
28 00	126° 55'.0	225° 35'.7	20° 19'.6 S	174° 43'.5	18° 55'.1 S	125° 32'.9	0° 41'.5 S	290° 04'.0	4° 25'.3 S
01	141° 57'.4	240° 35'.2	19'.9	189° 44'.0	54'.6	140° 34'.9	41'.3	305° 06'.4	25'.2
02	156° 59'.9	255° 34'.7	20'.2	204° 44'.4	54'.1	155° 36'.9	41'.1	320° 08'.9	25'.2
03	172° 02'.4	270° 34'.2	20'.4	219° 44'.9	53'.5	170° 39'.0	40'.9	335° 11'.4	25'.2
Friday 04	187° 04'.8	285° 33'.7	20'.7	234° 45'.4	53'.0	185° 41'.0	40'.7	350° 13'.8	25'.2
05	202° 07'.3	300° 33'.2	21'.0	249° 45'.8	52'.5	200° 43'.0	40'.5	5° 16'.3	25'.2
06	217° 09'.8	315° 32'.7	21'.3	264° 46'.3	52'.0	215° 45'.1	40'.3	20° 18'.8	25'.2
07	232° 12'.2	330° 32'.3	21'.6	279° 46'.7	51'.4	230° 47'.1	40'.1	35° 21'.3	25'.2
08	247° 14'.7	345° 31'.8	21'.9	294° 47'.2	50'.9	245° 49'.1	39'.9	50° 23'.7	25'.1
09	262° 17'.1	0° 31'.3	22'.1	309° 47'.7	50'.4	260° 51'.1	39'.7	65° 26'.2	25'.1
10	277° 19'.6	15° 30'.8	22'.4	324° 48'.1	49'.9	275° 53'.2	39'.5	80° 28'.7	25'.1
11	292° 22'.1	30° 30'.3	22'.7	339° 48'.6	49'.3	290° 55'.2	39'.3	95° 31'.1	25'.1
12	307° 24'.5	45° 29'.8	20° 23'.0 S	354° 49'.0	18° 48'.8 S	305° 57'.2	0° 39'.1 S	110° 33'.6	4° 25'.1 S
13	322° 27'.0	60° 29'.3	23'.3	9° 49'.5	48'.3	320° 59'.3	38'.9	125° 36'.1	25'.1
14	337° 29'.5	75° 28'.8	23'.5	24° 50'.0	47'.8	336° 01'.3	38'.7	140° 38'.5	25'.1
15	352° 31'.9	90° 28'.3	23'.8	39° 50'.4	47'.2	351° 03'.3	38'.5	155° 41'.0	25'.0
16	7° 34'.4	105° 27'.8	24'.1	54° 50'.9	46'.7	6° 05'.4	38'.3	170° 43'.5	25'.0
17	22° 36'.9	120° 27'.3	24'.4	69° 51'.4	46'.2	21° 07'.4	38'.1	185° 45'.9	25'.0
18	37° 39'.3	135° 26'.9	24'.6	84° 51'.8	45'.7	36° 09'.4	38'.0	200° 48'.4	25'.0
19	52° 41'.8	150° 26'.4	24'.9	99° 52'.3	45'.1	51° 11'.4	37'.8	215° 50'.9	25'.0
20	67° 44'.2	165° 25'.9	25'.2	114° 52'.8	44'.6	66° 13'.5	37'.6	230° 53'.4	25'.0
21	82° 46'.7	180° 25'.4	25'.5	129° 53'.2	44'.1	81° 15'.5	37'.4	245° 55'.8	25'.0
22	97° 49'.2	195° 24'.9	25'.7	144° 53'.7	43'.5	96° 17'.5	37'.2	260° 58'.3	24'.9
23	112° 51'.6	210° 24'.4	26'.0	159° 54'.1	43'.0	111° 19'.5	37'.0	276° 00'.8	24'.9
29 00	127° 54'.1	225° 23'.9	20° 26'.3 S	174° 54'.6	18° 42'.5 S	126° 21'.6	0° 36'.8 S	291° 03'.2	4° 24'.9 S
01	142° 56'.6	240° 23'.4	26'.5	189° 55'.1	42'.0	141° 23'.6	36'.6	306° 05'.7	24'.9
02	157° 59'.0	255° 22'.9	26'.8	204° 55'.5	41'.4	156° 25'.6	36'.4	321° 08'.2	24'.9
03	173° 01'.5	270° 22'.4	27'.1	219° 56'.0	40'.9	171° 27'.7	36'.2	336° 10'.6	24'.9
Saturday 04	188° 04'.0	285° 21'.9	27'.3	234° 56'.5	40'.4	186° 29'.7	36'.0	351° 13'.1	24'.8
05	203° 06'.4	300° 21'.4	27'.6	249° 56'.9	39'.8	201° 31'.7	35'.8	6° 15'.6	24'.8
06	218° 08'.9	315° 20'.9	27'.9	264° 57'.4	39'.3	216° 33'.7	35'.6	21° 18'.1	24'.8
07	233° 11'.4	330° 20'.4	28'.1	279° 57'.9	38'.8	231° 35'.8	35'.4	36° 20'.5	24'.8
08	248° 13'.8	345° 19'.9	28'.4	294° 58'.3	38'.2	246° 37'.8	35'.2	51° 23'.0	24'.8
09	263° 16'.3	0° 19'.4	28'.7	309° 58'.8	37'.7	261° 39'.8	35'.0	66° 25'.5	24'.8
10	278° 18'.7	15° 18'.9	28'.9	324° 59'.3	37'.2	276° 41'.8	34'.8	81° 28'.0	24'.8
11	293° 21'.2	30° 18'.4	29'.2	339° 59'.7	36'.6	291° 43'.9	34'.6	96° 30'.4	24'.7
12	308° 23'.7	45° 17'.9	20° 29'.4 S	355° 00'.2	18° 36'.1 S	306° 45'.9	0° 34'.4 S	111° 32'.9	4° 24'.7 S
13	323° 26'.1	60° 17'.4	29'.7	10° 00'.7	35'.6	321° 47'.9	34'.2	126° 35'.4	24'.7
14	338° 28'.6	75° 16'.9	30'.0	25° 01'.1	35'.0	336° 49'.9	34'.0	141° 37'.8	24'.7
15	353° 31'.1	90° 16'.3	30'.2	40° 01'.6	34'.5	351° 52'.0	33'.8	156° 40'.3	24'.7
16	8° 33'.5	105° 15'.8	30'.5	55° 02'.1	34'.0	6° 54'.0	33'.6	171° 42'.8	24'.7
17	23° 36'.0	120° 15'.3	30'.7	70° 02'.5	33'.4	21° 56'.0	33'.4	186° 45'.3	24'.6
18	38° 38'.5	135° 14'.8	31'.0	85° 03'.0	32'.9	36° 58'.0	33'.2	201° 47'.7	24'.6
19	53° 40'.9	150° 14'.3	31'.2	100° 03'.5	32'.3	52° 00'.1	33'.0	216° 50'.2	24'.6
20	68° 43'.4	165° 13'.8	31'.5	115° 03'.9	31'.8	67° 02'.1	32'.8	231° 52'.7	24'.6
21	83° 45'.9	180° 13'.3	31'.8	130° 04'.4	31'.3	82° 04'.1	32'.6	246° 55'.2	24'.6
22	98° 48'.3	195° 12'.8	32'.0	145° 04'.9	30'.7	97° 06'.1	32'.4	261° 57'.6	24'.6
23	113° 50'.8	210° 12'.3	32'.3	160° 05'.3	30'.2	112° 08'.2	32'.2	277° 00'.1	24'.5
30 00	128° 53'.2	225° 11'.8	20° 32'.5 S	175° 05'.8	18° 29'.7 S	127° 10'.2	0° 32'.0 S	292° 02'.6	4° 24'.5 S
01	143° 55'.7	240° 11'.3	32'.8	190° 06'.3	29'.1	142° 12'.2	31'.8	307° 05'.1	24'.5
02	158° 58'.2	255° 10'.8	33'.0	205° 06'.8	28'.6	157° 14'.2	31'.6	322° 07'.5	24'.5
03	174° 00'.6	270° 10'.2	33'.3	220° 07'.2	28'.0	172° 16'.2	31'.4	337° 10'.0	24'.5
Sunday 04	189° 03'.1	285° 09'.7	33'.5	235° 07'.7	27'.5	187° 18'.3	31'.2	352° 12'.5	24'.5
05	204° 05'.6	300° 09'.2	33'.7	250° 08'.2	27'.0	202° 20'.3	31'.0	7° 15'.0	24'.4
06	219° 08'.0	315° 08'.7	34'.0	265° 08'.6	26'.4	217° 22'.3	30'.8	22° 17'.4	24'.4
07	234° 10'.5	330° 08'.2	34'.2	280° 09'.1	25'.9	232° 24'.3	30'.6	37° 19'.9	24'.4
08	249° 13'.0	345° 07'.7	34'.5	295° 09'.6	25'.3	247° 26'.4	30'.4	52° 22'.4	24'.4
09	264° 15'.4	0° 07'.2	34'.7	310° 10'.0	24'.8	262° 28'.4	30'.2	67° 24'.9	24'.4
10	279° 17'.9	15° 06'.6	35'.0	325° 10'.5	24'.3	277° 30'.4	30'.0	82° 27'.4	24'.3
11	294° 20'.4	30° 06'.1	35'.2	340° 11'.0	23'.7	292° 32'.4	29'.8	97° 29'.8	24'.3
12	309° 22'.8	45° 05'.6	20° 35'.4 S	355° 11'.5	18° 23'.2 S	307° 34'.4	0° 29'.6 S	112° 32'.3	4° 24'.3 S
13	324° 25'.3	60° 05'.1	35'.7	10° 11'.9	22'.6	322° 36'.5	29'.4	127° 34'.8	24'.3
14	339° 27'.7	75° 04'.6	35'.9	25° 12'.4	22'.1	337° 38'.5	29'.2	142° 37'.3	24'.3
15	354° 30'.2	90° 04'.1	36'.2	40° 12'.9	21'.5	352° 40'.5	29'.0	157° 39'.7	24'.3
16	9° 32'.7	105° 03'.5	36'.4	55° 13'.3	21'.0	7° 42'.5	28'.8	172° 42'.2	24'.2
17	24° 35'.1	120° 03'.0	36'.6	70° 13'.8	20'.5	22° 44'.6	28'.6	187° 44'.7	24'.2
18	39° 37'.6	135° 02'.5	36'.9	85° 14'.3	19'.9	37° 46'.6	28'.4	202° 47'.2	24'.2
19	54° 40'.1	150° 02'.0	37'.1	100° 14'.8	19'.4	52° 48'.6	28'.2	217° 49'.7	24'.2
20	69° 42'.5	165° 01'.5	37'.3	115° 15'.2	18'.8	67° 50'.6	28'.0	232° 52'.1	24'.2
21	84° 45'.0	180° 00'.9	37'.6	130° 15'.7	18'.3	82° 52'.6	27'.9	247° 54'.6	24'.1
22	99° 47'.5	195° 00'.4	37'.8	145° 16'.2	17'.7	97° 54'.7	27'.7	262° 57'.1	24'.1
23	114° 49'.9	209° 59'.9	38'.0	160° 16'.6	17'.2	112° 56'.7	27'.5	277° 59'.6	24'.1
	M.P. 15:26	v -0'.5	d 0'.3	v 0'.5	d 0'.5	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.8 S
Achernar	335° 28'.0	57° 11'.1 S
Acrux	173° 11'.0	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.8	55° 53'.6 N
Alkaid	153° 00'.1	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.5	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.5	26° 27'.3 S
Arcturus	145° 57'.2	19° 07'.2 N
Atria	107° 32'.3	69° 02'.6 S
Avior	234° 18'.1	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.4	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.3 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.1	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.3	51° 29'.1 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.6	57° 10'.4 S
Gienah	175° 53'.9	17° 36'.3 S
Hadar	148° 50'.3	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.4	34° 22'.7 S
Kochab	137° 19'.9	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.6	36° 25'.4 S
Miaplacidus	221° 39'.2	69° 45'.8 S
Mirfak	308° 42'.7	49° 54'.3 N
Nunki	76° 00'.7	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 34'.2	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.3	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.4	8° 11'.5 S
Rigil Kent	139° 54'.1	60° 52'.6 S
Sabik	102° 14'.7	15° 44'.3 S
Schedar	349° 42'.8	56° 36'.2 N
Shaula	96° 24'.5	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.9	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.8 S
Vega	80° 40'.5	38° 47'.5 N
Zuben'ubi	137° 07'.3	16° 05'.3 S

	SHA	Mer.Pass.
Venus	97° 29'.8	08:59
Mars	47° 00'.5	12:20
Jupiter	358° 27'.5	15:32
Saturn	163° 09'.1	04:35

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 48'.4	18° 20'.6 S	253° 52'.2	7'.7	22° 16'.5 S	5'.6	57'.8
191° 48'.3	20'.0	268° 18'.9	7'.6	22'.1	5'.4	57'.7
206° 48'.1	19'.3	282° 45'.5	7'.6	27'.5	5'.3	
221° 48'.0	18'.7	297° 12'.1	7'.6	32'.8	5'.2	
236° 47'.9	18'.0	311° 38'.7	7'.6	38'.0	5'.0	
251° 47'.8	17'.4	326° 05'.3	7'.5	43'.0	4'.9	57'.6
266° 47'.6	16'.7	340° 31'.8	7'.6	47'.9	4'.7	
281° 47'.5	16'.1	354° 58'.4	7'.5	52'.6	4'.7	
296° 47'.4	15'.4	9° 24'.9	7'.5	57'.3	4'.4	
311° 47'.3	14'.8	23° 51'.4	7'.6	23° 01'.7 S	4'.4	57'.5
326° 47'.2	14'.1	38° 18'.0	7'.5	06'.1	4'.2	
341° 47'.0	13'.4	52° 44'.5	7'.5	10'.3	4'.0	
356° 46'.9	18° 12'.8 S	67° 11'.0	7'.4	23° 14'.3 S	3'.9	57'.5
11° 46'.8	12'.1	81° 37'.4	7'.5	18'.2	3'.8	57'.4
26° 46'.7	11'.5	96° 03'.9	7'.5	22'.0	3'.6	
41° 46'.6	10'.8	110° 30'.4	7'.5	25'.6	3'.5	
56° 46'.4	10'.1	124° 56'.9	7'.4	29'.1	3'.4	
71° 46'.3	09'.5	139° 23'.3	7'.5	32'.5	3'.2	57'.3
86° 46'.2	08'.8	153° 49'.8	7'.5	35'.7	3'.1	
101° 46'.1	08'.2	168° 16'.3	7'.4	38'.8	2'.9	
116° 46'.0	07'.5	182° 42'.7	7'.5	41'.7	2'.8	
131° 45'.9	06'.8	197° 09'.2	7'.5	44'.5	2'.7	57'.2
146° 45'.7	06'.2	211° 35'.7	7'.5	47'.2	2'.5	
161° 45'.6	05'.5	226° 02'.2	7'.4	49'.7	2'.3	
176° 45'.5	18° 04'.8 S	240° 28'.6	7'.5	23° 52'.0 S	2'.3	57'.2
191° 45'.4	04'.2	254° 55'.1	7'.5	54'.3	2'.1	57'.1
206° 45'.3	03'.5	269° 21'.6	7'.5	56'.4	1'.9	
221° 45'.2	02'.8	283° 48'.1	7'.5	58'.3	1'.8	
236° 45'.1	02'.2	298° 14'.6	7'.5	24° 00'.1 S	1'.7	
251° 44'.9	01'.5	312° 41'.1	7'.6	01'.8	1'.5	
266° 44'.8	00'.8	327° 07'.7	7'.5	03'.3	1'.4	57'.0
281° 44'.7	00'.2	341° 34'.2	7'.6	04'.7	1'.2	
296° 44'.6	17° 59'.5 S	356° 00'.8	7'.5	05'.9	1'.1	
311° 44'.5	58'.8	10° 27'.3	7'.6	07'.0	1'.0	
326° 44'.4	58'.2	24° 53'.9	7'.6	08'.0	0'.8	56'.9
341° 44'.3	57'.5	39° 20'.5	7'.7	08'.8	0'.7	
356° 44'.2	17° 56'.8 S	53° 47'.2	7'.6	24° 09'.5 S	0'.6	56'.9
11° 44'.1	56'.1	68° 13'.8	7'.7	10'.1	0'.4	
26° 43'.9	55'.5	82° 40'.5	7'.7	10'.5	0'.2	56'.8
41° 43'.8	54'.8	97° 07'.2	7'.7	10'.7	0'.2	
56° 43'.7	54'.1	111° 33'.9	7'.7	10'.9	0'.1	
71° 43'.6	53'.5	126° 00'.6	7'.8	10'.8	0'.1	
86° 43'.5	52'.8	140° 27'.4	7'.8	10'.7	0'.3	
101° 43'.4	52'.1	154° 54'.2	7'.8	10'.4	0'.4	56'.7
116° 43'.3	51'.4	169° 21'.0	7'.9	10'.0	0'.6	
131° 43'.2	50'.8	183° 47'.9	7'.9	09'.4	0'.7	
146° 43'.1	50'.1	198° 14'.8	7'.9	08'.7	0'.8	
161° 43'.0	49'.4	212° 41'.7	7'.9	07'.9	1'.0	56'.6
176° 42'.9	17° 48'.7 S	227° 08'.6	8'.0	24° 06'.9 S	1'.1	56'.6
191° 42'.8	48'.0	241° 35'.6	8'.0	05'.8	1'.3	
206° 42'.6	47'.4	256° 02'.6	8'.1	04'.5	1'.3	
221° 42'.5	46'.7	270° 29'.7	8'.1	03'.2	1'.5	
236° 42'.4	46'.0	284° 56'.8	8'.1	01'.7	1'.7	56'.5
251° 42'.3	45'.3	299° 23'.9	8'.2	00'.0	1'.8	
266° 42'.2	44'.6	313° 51'.1	8'.2	23° 58'.2 S	1'.9	
281° 42'.1	44'.0	328° 18'.3	8'.3	56'.3	2'.0	
296° 42'.0	43'.3	342° 45'.6	8'.3	54'.3	2'.2	56'.4
311° 41'.9	42'.6	357° 12'.9	8'.3	52'.1	2'.3	
326° 41'.8	41'.9	11° 40'.2	8'.4	49'.8	2'.5	
341° 41'.7	41'.2	26° 07'.6	8'.4	47'.3	2'.5	
356° 41'.6	17° 40'.5 S	40° 35'.0	8'.5	23° 44'.8 S	2'.7	56'.4
11° 41'.5	39'.9	55° 02'.5	8'.5	42'.1	2'.9	56'.3
26° 41'.4	39'.2	69° 30'.0	8'.6	39'.2	2'.9	
41° 41'.3	38'.5	83° 57'.6	8'.6	36'.3	3'.1	
56° 41'.2	37'.8	98° 25'.2	8'.7	33'.2	3'.2	
71° 41'.1	37'.1	112° 52'.9	8'.7	30'.0	3'.3	
86° 41'.0	36'.4	127° 20'.6	8'.8	26'.7	3'.5	56'.2
101° 40'.9	35'.7	141° 48'.4	8'.9	23'.2	3'.6	
116° 40'.8	35'.0	156° 16'.3	8'.9	19'.6	3'.7	
131° 40'.7	34'.4	170° 44'.2	8'.9	15'.9	3'.8	
146° 40'.6	33'.7	185° 12'.1	9'.0	12'.1	4'.0	56'.1
161° 40'.5	33'.0	199° 40'.1	9'.1	08'.1	4'.1	
SD 16'.2	d 0'.7	SD	15'.7	15'.5	15'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 28	Moonrise 29	Moonrise 30
N 72°	07:21	08:53	10:59	-	-	-
N 70°	07:12	08:32	10:04	-	-	-
68°	07:04	08:16	09:32	-	-	-
66°	06:57	08:02	09:08	06:06	-	09:02
64°	06:52	07:51	08:49	05:16	06:42	07:33
62°	06:47	07:42	08:34	04:45	06:02	06:55
60°	06:42	07:33	08:22	04:21	05:35	06:29
N 58°	06:38	07:26	08:11	04:02	05:13	06:08
56°	06:34	07:19	08:01	03:47	04:56	05:50
54°	06:30	07:13	07:53	03:33	04:41	05:36
52°	06:27	07:08	07:45	03:22	04:28	05:23
50°	06:24	07:03	07:38	03:11	04:17	05:12
45°	06:17	06:52	07:24	02:50	03:53	04:49
N 40°	06:10	06:43	07:12	02:32	03:35	04:30
35°	06:04	06:34	07:01	02:18	03:19	04:14
30°	05:58	06:27	06:52	02:05	03:05	04:01
20°	05:47	06:13	06:36	01:44	02:42	03:37
N 10°	05:35	06:01	06:23	01:25	02:22	03:17
0°	05:22	05:48	06:10	01:08	02:03	02:58
S 10°	05:08	05:34	05:56	00:50	01:45	02:40
20°	04:51	05:19	05:42	00:32	01:25	02:20
30°	04:28	05:00	05:26	00:11	01:02	01:57
35°	04:14	04:48	05:16	-	00:48	01:43
40°	03:57	04:35	05:05	-	00:33	01:27
45°	03:35	04:18	04:52	-	00:14	01:09
S 50°	03:06	03:57	04:36	23:52	-	00:45
52°	02:51	03:47	04:28	23:41	-	00:34
54°	02:32	03:35	04:20	23:28	-	00:21
56°	02:09	03:22	04:10	23:14	-	00:07
58°	01:36	03:06	04:00	22:57	23:49	24:56
S 60°	-	02:46	03:47	22:37	23:28	24:37
S 62°	-	02:21	03:32	22:12	23:02	24:13

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 28	Moonset 29	Moonset 30
N 72°	13:28	15:34	17:07	-	-	-
N 70°	14:23	15:55	17:16	-	-	-
68°	14:55	16:11	17:23	-	-	-
66°	15:19	16:25	17:30	08:29	-	09:24
64°	15:38	16:36	17:36	09:20	09:50	10:54
62°	15:53	16:45	17:41	09:51	10:30	11:31
60°	16:05	16:54	17:45	10:15	10:57	11:57
N 58°	16:16	17:01	17:49	10:34	11:18	12:18
56°	16:26	17:08	17:53	10:50	11:36	12:35
54°	16:34	17:13	17:56	11:04	11:51	12:50
52°	16:42	17:19	18:00	11:16	12:04	13:02
50°	16:48	17:24	18:03	11:26	12:15	13:13
45°	17:03	17:35	18:10	11:48	12:39	13:36
N 40°	17:15	17:44	18:16	12:06	12:58	13:55
35°	17:25	17:52	18:22	12:21	13:14	14:10
30°	17:34	17:59	18:28	12:34	13:27	14:24
20°	17:50	18:13	18:40	12:57	13:51	14:47
N 10°	18:04	18:26	18:51	13:16	14:11	15:06
0°	18:17	18:38	19:04	13:34	14:30	15:25
S 10°	18:30	18:52	19:18	13:52	14:49	15:43
20°	18:44	19:07	19:35	14:12	15:09	16:02
30°	19:00	19:26	19:57	14:34	15:32	16:25
35°	19:10	19:37	20:11	14:47	15:46	16:38
40°	19:21	19:51	20:28	15:03	16:02	16:53
45°	19:34	20:07	20:50	15:21	16:20	17:11
S 50°	19:49	20:28	21:18	15:43	16:44	17:33
52°	19:57	20:38	21:33	15:54	16:55	17:44
54°	20:05	20:49	21:51	16:06	17:08	17:56
56°	20:14	21:03	22:14	16:20	17:22	18:10
58°	20:25	21:18	22:45	16:37	17:40	18:26
S 60°	20:37	21:37	23:47	16:57	18:01	18:45
S 62°	20:52	22:01	-	17:22	18:27	19:09

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
28	12 46	12 52	12:13	07:21	19:49	24d 29%
29	12 58	13 03	12:13	08:17	20:44	25d 20%
30	13 08	13 13	12:13	09:12	21:38	26d 13%

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2011 Jan 31, Feb. 1, 2 (Mon, Tue, Wed)

GMT	ARIES	VENUS -4.3		MARS +1.1		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
31 Monday 00	129° 52'.4	224° 59'.4	20° 38'.3 S	175° 17'.1	18° 16'.6 S	127° 58'.7	0° 27'.3 S	293° 02'.0	4° 24'.1 S
01	144° 54'.9	239° 58'.8	38'.5	190° 17'.6	16'.1	143° 00'.7	27'.1	308° 04'.5	24'.1
02	159° 57'.3	254° 58'.3	38'.7	205° 18'.1	15'.5	158° 02'.7	26'.9	323° 07'.0	24'.1
03	174° 59'.8	269° 57'.8	39'.0	220° 18'.5	15'.0	173° 04'.8	26'.7	338° 09'.5	24'.0
04	190° 02'.2	284° 57'.3	39'.2	235° 19'.0	14'.4	188° 06'.8	26'.5	353° 12'.0	24'.0
05	205° 04'.7	299° 56'.8	39'.4	250° 19'.5	13'.9	203° 08'.8	26'.3	8° 14'.4	24'.0
06	220° 07'.2	314° 56'.2	39'.6	265° 20'.0	13'.3	218° 10'.8	26'.1	23° 16'.9	24'.0
07	235° 09'.6	329° 55'.7	39'.9	280° 20'.4	12'.8	233° 12'.8	25'.9	38° 19'.4	24'.0
08	250° 12'.1	344° 55'.2	40'.1	295° 20'.9	12'.2	248° 14'.8	25'.7	53° 21'.9	23'.9
09	265° 14'.6	359° 54'.6	40'.3	310° 21'.4	11'.7	263° 16'.9	25'.5	68° 24'.4	23'.9
10	280° 17'.0	14° 54'.1	40'.5	325° 21'.9	11'.1	278° 18'.9	25'.2	83° 26'.8	23'.9
11	295° 19'.5	29° 53'.6	40'.8	340° 22'.3	10'.6	293° 20'.9	25'.0	98° 29'.3	23'.9
12	310° 22'.0	44° 53'.1	20° 41'.0 S	355° 22'.8	18° 10'.0 S	308° 22'.9	0° 24'.8 S	113° 31'.8	4° 23'.9 S
13	325° 24'.4	59° 52'.5	41'.2	10° 23'.3	09'.5	323° 24'.9	24'.6	128° 34'.3	23'.8
14	340° 26'.9	74° 52'.0	41'.4	25° 23'.8	08'.9	338° 27'.0	24'.4	143° 36'.8	23'.8
15	355° 29'.3	89° 51'.5	41'.6	40° 24'.2	08'.4	353° 29'.0	24'.2	158° 39'.3	23'.8
16	10° 31'.8	104° 50'.9	41'.9	55° 24'.7	07'.8	8° 31'.0	24'.0	173° 41'.7	23'.8
17	25° 34'.3	119° 50'.4	42'.1	70° 25'.2	07'.3	23° 33'.0	23'.8	188° 44'.2	23'.8
18	40° 36'.7	134° 49'.9	42'.3	85° 25'.7	06'.7	38° 35'.0	23'.6	203° 46'.7	23'.7
19	55° 39'.2	149° 49'.3	42'.5	100° 26'.1	06'.2	53° 37'.0	23'.4	218° 49'.2	23'.7
20	70° 41'.7	164° 48'.8	42'.7	115° 26'.6	05'.6	68° 39'.1	23'.2	233° 51'.7	23'.7
21	85° 44'.1	179° 48'.3	42'.9	130° 27'.1	05'.1	83° 41'.1	23'.0	248° 54'.2	23'.7
22	100° 46'.6	194° 47'.8	43'.1	145° 27'.6	04'.5	98° 43'.1	22'.8	263° 56'.6	23'.7
23	115° 49'.1	209° 47'.2	43'.4	160° 28'.0	04'.0	113° 45'.1	22'.6	278° 59'.1	23'.6
1 Tuesday 00	130° 51'.5	224° 46'.7	20° 43'.6 S	175° 28'.5	18° 03'.4 S	128° 47'.1	0° 22'.4 S	294° 01'.6	4° 23'.6 S
01	145° 54'.0	239° 46'.1	43'.8	190° 29'.0	02'.9	143° 49'.1	22'.2	309° 04'.1	23'.6
02	160° 56'.5	254° 45'.6	44'.0	205° 29'.5	02'.3	158° 51'.2	22'.0	324° 06'.6	23'.6
03	175° 58'.9	269° 45'.1	44'.2	220° 30'.0	01'.7	173° 53'.2	21'.8	339° 09'.1	23'.6
04	191° 01'.4	284° 44'.5	44'.4	235° 30'.4	01'.2	188° 55'.2	21'.6	354° 11'.5	23'.5
05	206° 03'.8	299° 44'.0	44'.6	250° 30'.9	00'.6	203° 57'.2	21'.4	9° 14'.0	23'.5
06	221° 06'.3	314° 43'.5	44'.8	265° 31'.4	00'.1	218° 59'.2	21'.2	24° 16'.5	23'.5
07	236° 08'.8	329° 42'.9	45'.0	280° 31'.9	17° 59'.5 S	234° 01'.2	21'.0	39° 19'.0	23'.5
08	251° 11'.2	344° 42'.4	45'.2	295° 32'.3	59'.0	249° 03'.2	20'.8	54° 21'.5	23'.5
09	266° 13'.7	359° 41'.9	45'.4	310° 32'.8	58'.4	264° 05'.3	20'.6	69° 24'.0	23'.4
10	281° 16'.2	14° 41'.3	45'.6	325° 33'.3	57'.8	279° 07'.3	20'.4	84° 26'.4	23'.4
11	296° 18'.6	29° 40'.8	45'.8	340° 33'.8	57'.3	294° 09'.3	20'.2	99° 28'.9	23'.4
12	311° 21'.1	44° 40'.2	20° 46'.0 S	355° 34'.3	17° 56'.7 S	309° 11'.3	0° 20'.0 S	114° 31'.4	4° 23'.4 S
13	326° 23'.6	59° 39'.7	46'.2	10° 34'.7	56'.2	324° 13'.3	19'.8	129° 33'.9	23'.3
14	341° 26'.0	74° 39'.2	46'.4	25° 35'.2	55'.6	339° 15'.3	19'.6	144° 36'.4	23'.3
15	356° 28'.5	89° 38'.6	46'.6	40° 35'.7	55'.0	354° 17'.3	19'.4	159° 38'.9	23'.3
16	11° 31'.0	104° 38'.1	46'.8	55° 36'.2	54'.5	9° 19'.4	19'.2	174° 41'.4	23'.3
17	26° 33'.4	119° 37'.5	47'.0	70° 36'.7	53'.9	24° 21'.4	19'.0	189° 43'.8	23'.3
18	41° 35'.9	134° 37'.0	47'.2	85° 37'.1	53'.4	39° 23'.4	18'.8	204° 46'.3	23'.2
19	56° 38'.3	149° 36'.4	47'.4	100° 37'.6	52'.8	54° 25'.4	18'.6	219° 48'.8	23'.2
20	71° 40'.8	164° 35'.9	47'.6	115° 38'.1	52'.2	69° 27'.4	18'.4	234° 51'.3	23'.2
21	86° 43'.3	179° 35'.4	47'.8	130° 38'.6	51'.7	84° 29'.4	18'.2	249° 53'.8	23'.2
22	101° 45'.7	194° 34'.8	48'.0	145° 39'.1	51'.1	99° 31'.4	18'.0	264° 56'.3	23'.2
23	116° 48'.2	209° 34'.3	48'.2	160° 39'.5	50'.6	114° 33'.5	17'.8	279° 58'.8	23'.1
2 Wednesday 00	131° 50'.7	224° 33'.7	20° 48'.4 S	175° 40'.0	17° 50'.0 S	129° 35'.5	0° 17'.6 S	295° 01'.3	4° 23'.1 S
01	146° 53'.1	239° 33'.2	48'.6	190° 40'.5	49'.4	144° 37'.5	17'.4	310° 03'.7	23'.1
02	161° 55'.6	254° 32'.6	48'.7	205° 41'.0	48'.9	159° 39'.5	17'.2	325° 06'.2	23'.1
03	176° 58'.1	269° 32'.1	48'.9	220° 41'.5	48'.3	174° 41'.5	17'.0	340° 08'.7	23'.0
04	192° 00'.5	284° 31'.5	49'.1	235° 42'.0	47'.7	189° 43'.5	16'.8	355° 11'.2	23'.0
05	207° 03'.0	299° 31'.0	49'.3	250° 42'.4	47'.2	204° 45'.5	16'.6	10° 13'.7	23'.0
06	222° 05'.5	314° 30'.4	49'.5	265° 42'.9	46'.6	219° 47'.5	16'.4	25° 16'.2	23'.0
07	237° 07'.9	329° 29'.9	49'.7	280° 43'.4	46'.0	234° 49'.5	16'.2	40° 18'.7	23'.0
08	252° 10'.4	344° 29'.3	49'.9	295° 43'.9	45'.5	249° 51'.6	16'.0	55° 21'.2	22'.9
09	267° 12'.8	359° 28'.8	50'.0	310° 44'.4	44'.9	264° 53'.6	15'.8	70° 23'.7	22'.9
10	282° 15'.3	14° 28'.2	50'.2	325° 44'.9	44'.3	279° 55'.6	15'.6	85° 26'.1	22'.9
11	297° 17'.8	29° 27'.7	50'.4	340° 45'.3	43'.8	294° 57'.6	15'.4	100° 28'.6	22'.9
12	312° 20'.2	44° 27'.1	20° 50'.6 S	355° 45'.8	17° 43'.2 S	309° 59'.6	0° 15'.2 S	115° 31'.1	4° 22'.8 S
13	327° 22'.7	59° 26'.6	50'.8	10° 46'.3	42'.6	325° 01'.6	15'.0	130° 33'.6	22'.8
14	342° 25'.2	74° 26'.0	50'.9	25° 46'.8	42'.1	340° 03'.6	14'.7	145° 36'.1	22'.8
15	357° 27'.6	89° 25'.5	51'.1	40° 47'.3	41'.5	355° 05'.6	14'.5	160° 38'.6	22'.8
16	12° 30'.1	104° 24'.9	51'.3	55° 47'.8	40'.9	10° 07'.6	14'.3	175° 41'.1	22'.7
17	27° 32'.6	119° 24'.4	51'.5	70° 48'.2	40'.4	25° 09'.7	14'.1	190° 43'.6	22'.7
18	42° 35'.0	134° 23'.8	51'.6	85° 48'.7	39'.8	40° 11'.7	13'.9	205° 46'.1	22'.7
19	57° 37'.5	149° 23'.3	51'.8	100° 49'.2	39'.2	55° 13'.7	13'.7	220° 48'.6	22'.7
20	72° 39'.9	164° 22'.7	52'.0	115° 49'.7	38'.7	70° 15'.7	13'.5	235° 51'.0	22'.7
21	87° 42'.4	179° 22'.2	52'.2	130° 50'.2	38'.1	85° 17'.7	13'.3	250° 53'.5	22'.6
22	102° 44'.9	194° 21'.6	52'.3	145° 50'.7	37'.5	100° 19'.7	13'.1	265° 56'.0	22'.6
23	117° 47'.3	209° 21'.1	52'.5	160° 51'.2	37'.0	115° 21'.7	12'.9	280° 58'.5	22'.6
	M.P. 15:14	v -0'.5	d 0'.2	v 0'.5	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.8 S
Achernar	335° 28'.1	57° 11'.0 S
Acrux	173° 10'.9	63° 09'.5 S
Adhara	255° 13'.5	28° 59'.4 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.8	55° 53'.6 N
Alkaid	153° 00'.0	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.5	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.5	26° 27'.3 S
Arcturus	145° 57'.2	19° 07'.2 N
Atria	107° 32'.2	69° 02'.6 S
Avior	234° 18'.1	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.4	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.0	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.3	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.9 S
Gacrux	172° 02'.6	57° 10'.4 S
Gienah	175° 53'.8	17° 36'.3 S
Hadar	148° 50'.3	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.4	34° 22'.7 S
Kochab	137° 19'.8	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.5	36° 25'.4 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 42'.7	49° 54'.3 N
Nunki	76° 00'.7	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 35'.5	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.2	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.4	8° 11'.5 S
Rigil Kent	139° 54'.1	60° 52'.6 S
Sabik	102° 14'.7	15° 44'.3 S
Schedar	349° 42'.8	56° 36'.2 N
Shaula	96° 24'.5	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.9	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.8 S
Vega	80° 40'.5	38° 47'.5 N
Zuben'ubi	137° 07'.3	16° 05'.3 S

	SHA	Mer.Pass.
Venus	93° 55'.2	09:01
Mars	44° 37'.0	12:18
Jupiter	357° 55'.6	15:23
Saturn	163° 10'.1	04:23

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 40'.4	17° 32'.3 S	214° 08'.2	9'.1	23° 04'.0 S	4'.2	56'.1
191° 40'.3	31'.6	228° 36'.3	9'.2	22° 59'.8 S	4'.3	
206° 40'.2	30'.9	243° 04'.5	9'.2	55'.5	4'.4	
221° 40'.1	30'.2	257° 32'.7	9'.3	51'.1	4'.6	56'.0
236° 40'.0	29'.5	272° 01'.0	9'.3	46'.5	4'.7	
251° 39'.9	28'.8	286° 29'.3	9'.4	41'.8	4'.8	
266° 39'.8	28'.1	300° 57'.7	9'.5	37'.0	4'.9	
281° 39'.7	27'.4	315° 26'.2	9'.6	32'.1	5'.0	
296° 39'.6	26'.7	329° 54'.8	9'.6	27'.1	5'.1	55'.9
311° 39'.5	26'.0	344° 23'.4	9'.6	22'.0	5'.3	
326° 39'.4	25'.3	358° 52'.0	9'.8	16'.7	5'.3	
341° 39'.3	24'.6	13° 20'.8	9'.7	11'.4	5'.5	
356° 39'.2	17° 23'.9 S	27° 49'.5	9'.9	22° 05'.9 S	5'.6	55'.9
11° 39'.1	23'.2	42° 18'.4	9'.9	00'.3	5'.7	55'.8
26° 39'.1	22'.5	56° 47'.3	10'.0	21° 54'.6 S	5'.8	
41° 39'.0	21'.8	71° 16'.3	10'.1	48'.8	5'.9	
56° 38'.9	21'.1	85° 45'.4	10'.1	42'.9	6'.0	
71° 38'.8	20'.4	100° 14'.5	10'.2	36'.9	6'.2	
86° 38'.7	19'.7	114° 43'.7	10'.2	30'.7	6'.2	55'.7
101° 38'.6	19'.0	129° 12'.9	10'.4	24'.5	6'.3	
116° 38'.5	18'.3	143° 42'.3	10'.4	18'.2	6'.5	
131° 38'.4	17'.6	158° 11'.7	10'.4	11'.7	6'.5	
146° 38'.3	16'.9	172° 41'.1	10'.6	05'.2	6'.7	
161° 38'.2	16'.2	187° 10'.7	10'.6	20° 58'.5 S	6'.7	
176° 38'.1	17° 15'.5 S	201° 40'.3	10'.6	20° 51'.8 S	6'.9	55'.6
191° 38'.0	14'.8	216° 09'.9	10'.8	44'.9	6'.9	
206° 38'.0	14'.1	230° 39'.7	10'.8	38'.0	7'.1	
221° 37'.9	13'.4	245° 09'.5	10'.9	30'.9	7'.1	
236° 37'.8	12'.7	259° 39'.4	10'.9	23'.8	7'.2	
251° 37'.7	12'.0	274° 09'.3	11'.0	16'.6	7'.4	55'.5
266° 37'.6	11'.3	288° 39'.3	11'.1	09'.2	7'.4	
281° 37'.5	10'.6	303° 09'.4	11'.2	01'.8	7'.5	
296° 37'.4	09'.9	317° 39'.6	11'.2	19° 54'.3 S	7'.6	
311° 37'.3	09'.2	332° 09'.8	11'.3	46'.7	7'.7	
326° 37'.3	08'.5	346° 40'.1	11'.4	39'.0	7'.8	
341° 37'.2	07'.7	1° 10'.5	11'.4	31'.2	7'.9	55'.4
356° 37'.1	17° 07'.0 S	15° 40'.9	11'.5	19° 23'.3 S	8'.0	55'.4
11° 37'.0	06'.3	30° 11'.4	11'.6	15'.3	8'.0	
26° 36'.9	05'.6	44° 42'.0	11'.7	07'.3	8'.2	
41° 36'.8	04'.9	59° 12'.7	11'.7	18° 59'.1 S	8'.2	
56° 36'.7	04'.2	73° 43'.4	11'.8	50'.9	8'.3	55'.3
71° 36'.7	03'.5	88° 14'.2	11'.9	42'.6	8'.4	
86° 36'.6	02'.8	102° 45'.1	11'.9	34'.2	8'.5	
101° 36'.5	02'.1	117° 16'.0	12'.0	25'.7	8'.6	
116° 36'.4	01'.3	131° 47'.0	12'.1	17'.1	8'.6	
131° 36'.3	00'.6	146° 18'.1	12'.2	08'.5	8'.7	
146° 36'.2	16° 59'.9 S	160° 49'.3	12'.2	17° 59'.8 S	8'.8	55'.2
161° 36'.2	59'.2	175° 20'.5	12'.3	51'.0	8'.9	
176° 36'.1	16° 58'.5 S	189° 51'.8	12'.3	17° 42'.1 S	9'.0	55'.2
191° 36'.0	57'.8	204° 23'.1	12'.5	33'.1	9'.0	
206° 35'.9	57'.0	218° 54'.6	12'.5	24'.1	9'.1	
221° 35'.8	56'.3	233° 26'.1	12'.5	15'.0	9'.2	
236° 35'.8	55'.6	247° 57'.6	12'.6	05'.8	9'.2	55'.1
251° 35'.7	54'.9	262° 29'.2	12'.8	16° 56'.6 S	9'.3	
266° 35'.6	54'.2	277° 01'.0	12'.7	47'.3	9'.4	
281° 35'.5	53'.4	291° 32'.7	12'.9	37'.9	9'.5	
296° 35'.4	52'.7	306° 04'.6	12'.9	28'.4	9'.5	
311° 35'.4	52'.0	320° 36'.5	12'.9	18'.9	9'.6	
326° 35'.3	51'.3	335° 08'.4	13'.1	09'.3	9'.7	55'.0
341° 35'.2	50'.6	349° 40'.5	13'.1	15° 59'.6 S	9'.7	
356° 35'.1	16° 49'.8 S	4° 12'.6	13'.1	15° 49'.9 S	9'.8	55'.0
11° 35'.1	49'.1	18° 44'.7	13'.3	40'.1	9'.8	
26° 35'.0	48'.4	33° 17'.0	13'.3	30'.3	9'.9	
41° 34'.9	47'.7	47° 49'.3	13'.3	20'.4	10'.0	
56° 34'.8	46'.9	62° 21'.6	13'.5	10'.4	10'.1	54'.9
71° 34'.7	46'.2	76° 54'.1	13'.5	00'.3	10'.0	
86° 34'.7	45'.5	91° 26'.6	13'.5	14° 50'.3 S	10'.2	
101° 34'.6	44'.8	105° 59'.1	13'.6	40'.1	10'.2	
116° 34'.5	44'.0	120° 31'.7	13'.7	29'.9	10'.3	
131° 34'.5	43'.3	135° 04'.4	13'.8	19'.6	10'.3	
146° 34'.4	42'.6	149° 37'.2	13'.8	09'.3	10'.4	
161° 34'.3	41'.8	164° 10'.0	13'.8	13° 58'.9 S	10'.4	54'.8
SD 16'.2	d 0'.7	SD	15'.2	15'.1	15'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 31	Moonrise 1	Moonrise 2
N 72°	07:11	08:40	10:30	-	-	09:55
N 70°	07:03	08:21	09:47	-	10:14	09:13
68°	06:56	08:06	09:19	-	09:05	08:45
66°	06:50	07:54	08:57	08:36	08:29	08:23
64°	06:45	07:44	08:40	07:54	08:03	08:06
62°	06:41	07:35	08:27	07:25	07:42	07:52
60°	06:37	07:27	08:15	07:04	07:25	07:40
N 58°	06:33	07:20	08:04	06:46	07:11	07:29
56°	06:29	07:14	07:56	06:31	06:59	07:20
54°	06:26	07:09	07:48	06:18	06:49	07:12
52°	06:23	07:04	07:41	06:06	06:39	07:05
50°	06:20	06:59	07:34	05:56	06:31	06:58
45°	06:14	06:49	07:20	05:35	06:12	06:44
N 40°	06:08	06:40	07:09	05:17	05:58	06:32
35°	06:02	06:33	06:59	05:03	05:45	06:22
30°	05:57	06:25	06:51	04:50	05:34	06:13
20°	05:46	06:13	06:36	04:29	05:15	05:58
N 10°	05:35	06:01	06:22	04:10	04:59	05:44
0°	05:23	05:48	06:10	03:52	04:43	05:31
S 10°	05:09	05:35	05:57	03:35	04:28	05:19
20°	04:53	05:21	05:44	03:16	04:11	05:05
30°	04:32	05:02	05:28	02:54	03:52	04:50
35°	04:18	04:51	05:19	02:41	03:41	04:41
40°	04:02	04:39	05:09	02:26	03:28	04:30
45°	03:41	04:23	04:56	02:09	03:13	04:18
S 50°	03:13	04:03	04:41	01:47	02:54	04:03
52°	02:59	03:53	04:34	01:37	02:45	03:56
54°	02:42	03:42	04:26	01:25	02:35	03:48
56°	02:21	03:30	04:17	01:11	02:24	03:39
58°	01:53	03:15	04:07	00:56	02:11	03:30
S 60°	01:07	02:57	03:55	00:37	01:56	03:18
S 62°	-	02:35	03:42	00:13	01:37	03:05

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 31	Moonset 1	Moonset 2
N 72°	13:58	15:49	17:18	-	-	13:49
N 70°	14:41	16:07	17:26	-	11:49	14:29
68°	15:09	16:22	17:32	-	12:57	14:56
66°	15:31	16:34	17:38	11:41	13:33	15:16
64°	15:48	16:44	17:43	12:23	13:58	15:33
62°	16:01	16:53	17:47	12:51	14:18	15:46
60°	16:13	17:01	17:51	13:12	14:34	15:57
N 58°	16:23	17:07	17:55	13:30	14:48	16:07
56°	16:32	17:13	17:58	13:45	15:00	16:16
54°	16:40	17:19	18:02	13:57	15:10	16:23
52°	16:47	17:24	18:05	14:08	15:19	16:30
50°	16:54	17:28	18:07	14:18	15:27	16:36
45°	17:07	17:39	18:14	14:39	15:44	16:49
N 40°	17:19	17:47	18:20	14:56	15:58	17:00
35°	17:28	17:55	18:25	15:10	16:10	17:09
30°	17:37	18:02	18:31	15:22	16:20	17:17
20°	17:52	18:15	18:41	15:42	16:37	17:31
N 10°	18:05	18:27	18:52	16:00	16:53	17:43
0°	18:17	18:39	19:04	16:17	17:07	17:54
S 10°	18:30	18:52	19:17	16:34	17:21	18:05
20°	18:43	19:06	19:34	16:51	17:36	18:16
30°	18:58	19:24	19:55	17:12	17:53	18:30
35°	19:07	19:35	20:08	17:24	18:03	18:37
40°	19:18	19:48	20:24	17:37	18:14	18:46
45°	19:30	20:03	20:45	17:53	18:27	18:56
S 50°	19:45	20:23	21:12	18:13	18:43	19:08
52°	19:52	20:32	21:26	18:22	18:51	19:14
54°	20:00	20:43	21:43	18:32	18:59	19:20
56°	20:09	20:55	22:03	18:44	19:09	19:27
58°	20:19	21:10	22:30	18:57	19:19	19:35
S 60°	20:30	21:27	23:12	19:13	19:31	19:43
S 62°	20:43	21:49	-	19:32	19:45	19:53

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
31	13 18	13 23	12:13	10:05	22:30	27d 7%
1	13 27	13 31	12:14	10:55	23:19	28d 3%
2	13 36	13 39	12:14	11:43	24:05	29d 0%

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2011 February 3, 4, 5 (Thur, Fri, Saturday)

GMT	ARIES	VENUS -4.2		MARS +1.1		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
3 00	132° 49'.8	224° 20'.5	20° 52'.7 S	175° 51'.6	17° 36'.4 S	130° 23'.7	0° 12'.7 S	296° 01'.0	4° 22'.6 S
01	147° 52'.3	239° 19'.9	52'.8	190° 52'.1	35'.8	145° 25'.7	12'.5	311° 03'.5	22'.5
02	162° 54'.7	254° 19'.4	53'.0	205° 52'.6	35'.2	160° 27'.7	12'.3	326° 06'.0	22'.5
03	177° 57'.2	269° 18'.8	53'.2	220° 53'.1	34'.7	175° 29'.7	12'.1	341° 08'.5	22'.5
Thursday 04	192° 59'.7	284° 18'.3	53'.3	235° 53'.6	34'.1	190° 31'.8	11'.9	356° 11'.0	22'.5
05	208° 02'.1	299° 17'.7	53'.5	250° 54'.1	33'.5	205° 33'.8	11'.7	11° 13'.5	22'.4
06	223° 04'.6	314° 17'.2	53'.7	265° 54'.6	33'.0	220° 35'.8	11'.5	26° 16'.0	22'.4
07	238° 07'.1	329° 16'.6	53'.8	280° 55'.0	32'.4	235° 37'.8	11'.3	41° 18'.5	22'.4
08	253° 09'.5	344° 16'.0	54'.0	295° 55'.5	31'.8	250° 39'.8	11'.1	56° 21'.0	22'.4
09	268° 12'.0	359° 15'.5	54'.2	310° 56'.0	31'.2	265° 41'.8	10'.9	71° 23'.4	22'.3
10	283° 14'.4	14° 14'.9	54'.3	325° 56'.5	30'.7	280° 43'.8	10'.7	86° 25'.9	22'.3
11	298° 16'.9	29° 14'.4	54'.5	340° 57'.0	30'.1	295° 45'.8	10'.5	101° 28'.4	22'.3
12	313° 19'.4	44° 13'.8	20° 54'.6 S	355° 57'.5	17° 29'.5 S	310° 47'.8	0° 10'.3 S	116° 30'.9	4° 22'.3 S
13	328° 21'.8	59° 13'.2	54'.8	10° 58'.0	28'.9	325° 49'.8	10'.1	131° 33'.4	22'.2
14	343° 24'.3	74° 12'.7	54'.9	25° 58'.5	28'.4	340° 51'.8	09'.8	146° 35'.9	22'.2
15	358° 26'.8	89° 12'.1	55'.1	40° 59'.0	27'.8	355° 53'.8	09'.6	161° 38'.4	22'.2
16	13° 29'.2	104° 11'.6	55'.3	55° 59'.4	27'.2	10° 55'.8	09'.4	176° 40'.9	22'.2
17	28° 31'.7	119° 11'.0	55'.4	70° 59'.9	26'.6	25° 57'.9	09'.2	191° 43'.4	22'.1
18	43° 34'.2	134° 10'.4	55'.6	86° 00'.4	26'.1	40° 59'.9	09'.0	206° 45'.9	22'.1
19	58° 36'.6	149° 09'.9	55'.7	101° 00'.9	25'.5	56° 01'.9	08'.8	221° 48'.4	22'.1
20	73° 39'.1	164° 09'.3	55'.9	116° 01'.4	24'.9	71° 03'.9	08'.6	236° 50'.9	22'.1
21	88° 41'.6	179° 08'.7	56'.0	131° 01'.9	24'.3	86° 05'.9	08'.4	251° 53'.4	22'.0
22	103° 44'.0	194° 08'.2	56'.2	146° 02'.4	23'.7	101° 07'.9	08'.2	266° 55'.9	22'.0
23	118° 46'.5	209° 07'.6	56'.3	161° 02'.9	23'.2	116° 09'.9	08'.0	281° 58'.4	22'.0
4 00	133° 48'.9	224° 07'.0	20° 56'.5 S	176° 03'.4	17° 22'.6 S	131° 11'.9	0° 07'.8 S	297° 00'.9	4° 22'.0 S
01	148° 51'.4	239° 06'.5	56'.6	191° 03'.8	22'.0	146° 13'.9	07'.6	312° 03'.4	21'.9
02	163° 53'.9	254° 05'.9	56'.8	206° 04'.3	21'.4	161° 15'.9	07'.4	327° 05'.9	21'.9
03	178° 56'.3	269° 05'.3	56'.9	221° 04'.8	20'.9	176° 17'.9	07'.2	342° 08'.4	21'.9
Friday 04	193° 58'.8	284° 04'.8	57'.1	236° 05'.3	20'.3	191° 19'.9	07'.0	357° 10'.8	21'.9
05	209° 01'.3	299° 04'.2	57'.2	251° 05'.8	19'.7	206° 21'.9	06'.8	12° 13'.3	21'.8
06	224° 03'.7	314° 03'.6	57'.3	266° 06'.3	19'.1	221° 23'.9	06'.6	27° 15'.8	21'.8
07	239° 06'.2	329° 03'.1	57'.5	281° 06'.8	18'.5	236° 25'.9	06'.4	42° 18'.3	21'.8
08	254° 08'.7	344° 02'.5	57'.6	296° 07'.3	17'.9	251° 27'.9	06'.2	57° 20'.8	21'.8
09	269° 11'.1	359° 01'.9	57'.8	311° 07'.8	17'.4	266° 29'.9	05'.9	72° 23'.3	21'.7
10	284° 13'.6	14° 01'.4	57'.9	326° 08'.3	16'.8	281° 31'.9	05'.7	87° 25'.8	21'.7
11	299° 16'.0	29° 00'.8	58'.0	341° 08'.8	16'.2	296° 33'.9	05'.5	102° 28'.3	21'.7
12	314° 18'.5	44° 00'.2	20° 58'.2 S	356° 09'.3	17° 15'.6 S	311° 35'.9	0° 05'.3 S	117° 30'.8	4° 21'.7 S
13	329° 21'.0	58° 59'.6	58'.3	11° 09'.7	15'.0	326° 38'.0	05'.1	132° 33'.3	21'.6
14	344° 23'.4	73° 59'.1	58'.4	26° 10'.2	14'.5	341° 40'.0	04'.9	147° 35'.8	21'.6
15	359° 25'.9	88° 58'.5	58'.6	41° 10'.7	13'.9	356° 42'.0	04'.7	162° 38'.3	21'.6
16	14° 28'.4	103° 57'.9	58'.7	56° 11'.2	13'.3	11° 44'.0	04'.5	177° 40'.8	21'.6
17	29° 30'.8	118° 57'.4	58'.8	71° 11'.7	12'.7	26° 46'.0	04'.3	192° 43'.3	21'.5
18	44° 33'.3	133° 56'.8	59'.0	86° 12'.2	12'.1	41° 48'.0	04'.1	207° 45'.8	21'.5
19	59° 35'.8	148° 56'.2	59'.1	101° 12'.7	11'.5	56° 50'.0	03'.9	222° 48'.3	21'.5
20	74° 38'.2	163° 55'.6	59'.2	116° 13'.2	11'.0	71° 52'.0	03'.7	237° 50'.8	21'.4
21	89° 40'.7	178° 55'.1	59'.4	131° 13'.7	10'.4	86° 54'.0	03'.5	252° 53'.3	21'.4
22	104° 43'.2	193° 54'.5	59'.5	146° 14'.2	09'.8	101° 56'.0	03'.3	267° 55'.8	21'.4
23	119° 45'.6	208° 53'.9	59'.6	161° 14'.7	09'.2	116° 58'.0	03'.1	282° 58'.3	21'.4
5 00	134° 48'.1	223° 53'.3	20° 59'.8 S	176° 15'.2	17° 08'.6 S	132° 00'.0	0° 02'.9 S	298° 00'.8	4° 21'.3 S
01	149° 50'.5	238° 52'.8	59'.9	191° 15'.7	08'.0	147° 02'.0	02'.6	313° 03'.3	21'.3
02	164° 53'.0	253° 52'.2	21° 00'.0 S	206° 16'.2	07'.4	162° 04'.0	02'.4	328° 05'.8	21'.3
03	179° 55'.5	268° 51'.6	00'.1	221° 16'.7	06'.8	177° 06'.0	02'.2	343° 08'.3	21'.3
Saturday 04	194° 57'.9	283° 51'.0	00'.3	236° 17'.2	06'.3	192° 08'.0	02'.0	358° 10'.8	21'.2
05	210° 00'.4	298° 50'.5	00'.4	251° 17'.7	05'.7	207° 10'.0	01'.8	13° 13'.3	21'.2
06	225° 02'.9	313° 49'.9	00'.5	266° 18'.2	05'.1	222° 12'.0	01'.6	28° 15'.8	21'.2
07	240° 05'.3	328° 49'.3	00'.6	281° 18'.6	04'.5	237° 14'.0	01'.4	43° 18'.3	21'.1
08	255° 07'.8	343° 48'.7	00'.7	296° 19'.1	03'.9	252° 16'.0	01'.2	58° 20'.8	21'.1
09	270° 10'.3	358° 48'.1	00'.9	311° 19'.6	03'.3	267° 18'.0	01'.0	73° 23'.3	21'.1
10	285° 12'.7	13° 47'.6	01'.0	326° 20'.1	02'.7	282° 20'.0	00'.8	88° 25'.8	21'.1
11	300° 15'.2	28° 47'.0	01'.1	341° 20'.6	02'.1	297° 22'.0	00'.6	103° 28'.3	21'.0
12	315° 17'.7	43° 46'.4	21° 01'.2 S	356° 21'.1	17° 01'.6 S	312° 24'.0	0° 00'.4 S	118° 30'.8	4° 21'.0 S
13	330° 20'.1	58° 45'.8	01'.3	11° 21'.6	01'.0	327° 26'.0	00'.2	133° 33'.3	21'.0
14	345° 22'.6	73° 45'.2	01'.4	26° 22'.1	00'.4	342° 28'.0	00'.0	148° 35'.8	21'.0
15	0° 25'.0	88° 44'.7	01'.5	41° 22'.6	16° 59'.8 S	357° 30'.0	00'.3	163° 38'.3	20'.9
16	15° 27'.5	103° 44'.1	01'.7	56° 23'.1	59'.2	12° 32'.0	00'.5	178° 40'.8	20'.9
17	30° 30'.0	118° 43'.5	01'.8	71° 23'.6	58'.6	27° 34'.0	00'.7	193° 43'.3	20'.9
18	45° 32'.4	133° 42'.9	01'.9	86° 24'.1	58'.0	42° 36'.0	00'.9	208° 45'.8	20'.8
19	60° 34'.9	148° 42'.3	02'.0	101° 24'.6	57'.4	57° 38'.0	01'.1	223° 48'.3	20'.8
20	75° 37'.4	163° 41'.8	02'.1	116° 25'.1	56'.8	72° 40'.0	01'.3	238° 50'.9	20'.8
21	90° 39'.8	178° 41'.2	02'.2	131° 25'.6	56'.2	87° 42'.0	01'.5	253° 53'.4	20'.8
22	105° 42'.3	193° 40'.6	02'.3	146° 26'.1	55'.6	102° 44'.0	01'.7	268° 55'.9	20'.7
23	120° 44'.8	208° 40'.0	02'.4	161° 26'.6	55'.0	117° 46'.0	01'.9	283° 58'.4	20'.7
	M.P. 15:02	v -0'.6	d 0'.1	v 0'.5	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.8 S
Achernar	335° 28'.1	57° 11'.0 S
Acrux	173° 10'.9	63° 09'.6 S
Adhara	255° 13'.5	28° 59'.5 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.7	55° 53'.6 N
Alkaid	153° 00'.0	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.5 S
Alnilam	275° 47'.8	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.5	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.8 N
Ankaa	353° 17'.5	42° 14'.9 S
Antares	112° 28'.5	26° 27'.4 S
Arcturus	145° 57'.2	19° 07'.2 N
Atria	107° 32'.1	69° 02'.6 S
Avior	234° 18'.1	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.5	52° 42'.3 S
Capella	280° 36'.6	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.0	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.3	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.5	57° 10'.5 S
Gienah	175° 53'.8	17° 36'.3 S
Hadar	148° 50'.2	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.3	34° 22'.7 S
Kochab	137° 19'.8	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.5	36° 25'.4 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 42'.7	49° 54'.3 N
Nunki	76° 00'.7	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 37'.0	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.2	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 54'.0	60° 52'.6 S
Sabik	102° 14'.7	15° 44'.3 S
Schedar	349° 42'.9	56° 36'.2 N
Shaula	96° 24'.5	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.9	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.8 S
Vega	80° 40'.4	38° 47'.5 N
Zuben'ubi	137° 07'.3	16° 05'.3 S

	SHA	Mer.Pass.
Venus	90° 18'.1	09:04
Mars	42° 14'.4	12:15
Jupiter	357° 22'.9	15:13
Saturn	163° 11'.9	04:11

SUN										
GHA	Dec	GHA	v	Dec	d	HP
176° 34'.2	16° 41'.1 S	178° 42'.8	13'.9	13° 48'.5 S	10'.5	54'.8
191° 34'.2	40'.4	193° 15'.7	14'.0	38'.0	10'.6	
206° 34'.1	39'.7	207° 48'.7	14'.1	27'.4	10'.6	
221° 34'.0	38'.9	222° 21'.8	14'.1	16'.8	10'.6	
236° 33'.9	38'.2	236° 54'.9	14'.1	06'.2	10'.7	
251° 33'.9	37'.5	251° 28'.0	14'.2	12° 55'.5 S	10'.7	
266° 33'.8	36'.7	266° 01'.2	14'.3	44'.8	10'.8	54'.7
281° 33'.7	36'.0	280° 34'.5	14'.3	34'.0	10'.8	
296° 33'.7	35'.3	295° 07'.8	14'.4	23'.2	10'.9	
311° 33'.6	34'.5	309° 41'.2	14'.5	12'.3	10'.9	
326° 33'.5	33'.8	324° 14'.7	14'.4	01'.4	11'.0	
341° 33'.4	33'.1	338° 48'.1	14'.6	11° 50'.4 S	11'.0	
356° 33'.4	16° 32'.3 S	353° 21'.7	14'.6	11° 39'.4 S	11'.1	54'.7
11° 33'.3	31'.6	7° 55'.3	14'.6	28'.3	11'.1	54'.6
26° 33'.2	30'.9	22° 28'.9	14'.7	17'.2	11'.1	
41° 33'.2	30'.1	37° 02'.6	14'.8	06'.1	11'.2	
56° 33'.1	29'.4	51° 36'.4	14'.8	10° 54'.9 S	11'.2	
71° 33'.0	28'.6	66° 10'.2	14'.9	43'.7	11'.2	
86° 33'.0	27'.9	80° 44'.1	14'.9	32'.5	11'.3	
101° 32'.9	27'.2	95° 18'.0	14'.9	21'.2	11'.4	
116° 32'.8	26'.4	109° 51'.9	15'.0	09'.8	11'.3	54'.5
131° 32'.8	25'.7	124° 25'.9	15'.1	9° 58'.5 S	11'.4	
146° 32'.7	25'.0	139° 00'.0	15'.0	47'.1	11'.4	
161° 32'.6	24'.2	153° 34'.0	15'.2	35'.7	11'.5	
176° 32'.6	16° 23'.5 S	168° 08'.2	15'.2	9° 24'.2 S	11'.5	54'.5
191° 32'.5	22'.7	182° 42'.4	15'.2	12'.7	11'.5	
206° 32'.5	22'.0	197° 16'.6	15'.3	01'.2	11'.5	
221° 32'.4	21'.2	211° 50'.9	15'.3	8° 49'.7 S	11'.6	
236° 32'.3	20'.5	226° 25'.2	15'.3	38'.1	11'.6	54'.4
251° 32'.3	19'.8	240° 59'.5	15'.4	26'.5	11'.7	
266° 32'.2	19'.0	255° 33'.9	15'.5	14'.8	11'.6	
281° 32'.1	18'.3	270° 08'.4	15'.4	03'.2	11'.7	
296° 32'.1	17'.5	284° 42'.8	15'.5	7° 51'.5 S	11'.7	
311° 32'.0	16'.8	299° 17'.3	15'.6	39'.8	11'.8	
326° 32'.0	16'.0	313° 51'.9	15'.6	28'.0	11'.7	
341° 31'.9	15'.3	328° 26'.5	15'.6	16'.3	11'.8	
356° 31'.8	16° 14'.5 S	343° 01'.1	15'.7	7° 04'.5 S	11'.8	54'.4
11° 31'.8	13'.8	357° 35'.8	15'.7	6° 52'.7 S	11'.9	54'.3
26° 31'.7	13'.0	12° 10'.5	15'.7	40'.8	11'.8	
41° 31'.7	12'.3	26° 45'.2	15'.8	29'.0	11'.9	
56° 31'.6	11'.6	41° 20'.0	15'.8	17'.1	11'.9	
71° 31'.5	10'.8	55° 54'.8	15'.8	05'.2	11'.9	
86° 31'.5	10'.1	70° 29'.6	15'.8	5° 53'.3 S	11'.9	
101° 31'.4	09'.3	85° 04'.4	15'.9	41'.4	11'.9	
116° 31'.4	08'.6	99° 39'.3	16'.0	29'.5	12'.0	
131° 31'.3	07'.8	114° 14'.3	15'.9	17'.5	12'.0	
146° 31'.2	07'.0	128° 49'.2	16'.0	05'.5	11'.9	
161° 31'.2	06'.3	143° 24'.2	16'.0	4° 53'.6 S	12'.0	
176° 31'.1	16° 05'.5 S	157° 59'.2	16'.0	4° 41'.6 S	12'.0	54'.2
191° 31'.1	04'.8	172° 34'.2	16'.1	29'.6	12'.1	
206° 31'.0	04'.0	187° 09'.3	16'.1	17'.5	12'.0	
221° 31'.0	03'.3	201° 44'.4	16'.1	05'.5	12'.1	
236° 30'.9	02'.5	216° 19'.5	16'.1	3° 53'.4 S	12'.0	
251° 30'.9	01'.8	230° 54'.6	16'.1	41'.4	12'.1	
266° 30'.8	01'.0	245° 29'.7	16'.2	29'.3	12'.0	
281° 30'.8	00'.3	260° 04'.9	16'.2	17'.3	12'.1	
296° 30'.7	15° 59'.5 S	274° 40'.1	16'.2	05'.2	12'.1	
311° 30'.6	58'.7	289° 15'.3	16'.2	2° 53'.1 S	12'.1	
326° 30'.6	58'.0	303° 50'.5	16'.3	41'.0	12'.1	
341° 30'.5	57'.2	318° 25'.8	16'.3	28'.9	12'.1	
356° 30'.5	15° 56'.5 S	333° 01'.1	16'.2	2° 16'.8 S	12'.1	54'.1
11° 30'.4	55'.7	347° 36'.3	16'.3	04'.7	12'.1	
26° 30'.4	55'.0	2° 11'.6	16'.4	1° 52'.6 S	12'.1	
41° 30'.3	54'.2	16° 47'.0	16'.3	40'.5	12'.2	
56° 30'.3	53'.4	31° 22'.3	16'.3	28'.3	12'.1	
71° 30'.2	52'.7	45° 57'.6	16'.4	16'.2	12'.1	
86° 30'.2	51'.9	60° 33'.0	16'.3	04'.1	12'.1	
101° 30'.1	51'.2	75° 08'.3	16'.4	0° 52'.0 S	12'.1	
116° 30'.1	50'.4	89° 43'.7	16'.4	39'.9	12'.2	
131° 30'.0	49'.6	104° 19'.1	16'.4	27'.7	12'.1	
146° 30'.0	48'.9	118° 54'.5	16'.4	15'.6	12'.1	
161° 29'.9	48'.1	133° 29'.9	16'.4	03'.5	12'.1	
SD 16'.2	d 0'.7	SD	14'.9	14'.8	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 3	Moonrise 4	Moonrise 5
N 72°	07:00	08:26	10:06	09:10	08:42	08:20
N 70°	06:53	08:10	09:31	08:49	08:31	08:16
68°	06:47	07:56	09:06	08:32	08:22	08:13
66°	06:42	07:45	08:47	08:19	08:14	08:10
64°	06:38	07:36	08:31	08:08	08:08	08:08
62°	06:34	07:28	08:18	07:58	08:02	08:05
60°	06:31	07:21	08:08	07:50	07:57	08:04
N 58°	06:28	07:15	07:58	07:42	07:53	08:02
56°	06:25	07:09	07:50	07:36	07:49	08:00
54°	06:22	07:04	07:42	07:30	07:45	07:59
52°	06:19	06:59	07:36	07:25	07:42	07:58
50°	06:17	06:55	07:30	07:20	07:39	07:57
45°	06:11	06:46	07:17	07:10	07:33	07:54
N 40°	06:05	06:38	07:06	07:01	07:28	07:52
35°	06:00	06:30	06:57	06:54	07:23	07:50
30°	05:55	06:24	06:49	06:47	07:19	07:49
20°	05:45	06:12	06:35	06:36	07:12	07:46
N 10°	05:35	06:00	06:22	06:26	07:06	07:43
0°	05:24	05:49	06:10	06:17	07:00	07:41
S 10°	05:11	05:37	05:58	06:07	06:54	07:39
20°	04:55	05:22	05:46	05:57	06:48	07:36
30°	04:35	05:05	05:31	05:46	06:40	07:34
35°	04:22	04:55	05:22	05:39	06:36	07:32
40°	04:06	04:43	05:12	05:32	06:32	07:30
45°	03:46	04:28	05:01	05:23	06:26	07:28
S 50°	03:20	04:09	04:46	05:12	06:19	07:26
52°	03:07	04:00	04:40	05:07	06:16	07:24
54°	02:51	03:50	04:32	05:01	06:13	07:23
56°	02:32	03:38	04:24	04:55	06:09	07:22
58°	02:08	03:24	04:14	04:48	06:05	07:20
S 60°	01:32	03:08	04:04	04:40	06:00	07:19
S 62°	-	02:47	03:51	04:31	05:55	07:17

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 3	Moonset 4	Moonset 5
N 72°	14:23	16:03	17:30	16:07	18:03	19:51
N 70°	14:58	16:19	17:36	16:26	18:12	19:52
68°	15:23	16:33	17:42	16:41	18:19	19:53
66°	15:42	16:44	17:47	16:53	18:25	19:54
64°	15:57	16:53	17:51	17:03	18:30	19:55
62°	16:10	17:01	17:55	17:12	18:34	19:55
60°	16:21	17:08	17:58	17:19	18:38	19:56
N 58°	16:31	17:14	18:01	17:25	18:41	19:56
56°	16:39	17:19	18:04	17:31	18:44	19:56
54°	16:46	17:24	18:07	17:36	18:47	19:57
52°	16:53	17:29	18:09	17:40	18:49	19:57
50°	16:59	17:33	18:12	17:45	18:51	19:57
45°	17:12	17:43	18:18	17:53	18:56	19:58
N 40°	17:22	17:51	18:23	18:01	19:00	19:58
35°	17:31	17:58	18:28	18:07	19:03	19:59
30°	17:39	18:04	18:33	18:12	19:06	19:59
20°	17:53	18:16	18:43	18:22	19:11	20:00
N 10°	18:06	18:28	18:53	18:30	19:16	20:00
0°	18:17	18:39	19:04	18:38	19:20	20:01
S 10°	18:29	18:51	19:17	18:45	19:24	20:01
20°	18:42	19:05	19:32	18:53	19:28	20:02
30°	18:56	19:22	19:53	19:03	19:33	20:02
35°	19:05	19:32	20:05	19:08	19:36	20:03
40°	19:15	19:44	20:21	19:14	19:39	20:03
45°	19:26	19:59	20:40	19:21	19:43	20:03
S 50°	19:40	20:18	21:06	19:29	19:47	20:04
52°	19:47	20:27	21:19	19:33	19:49	20:04
54°	19:54	20:37	21:34	19:37	19:51	20:04
56°	20:02	20:48	21:52	19:41	19:53	20:04
58°	20:12	21:02	22:16	19:46	19:56	20:05
S 60°	20:22	21:18	22:50	19:52	19:59	20:05
S 62°	20:35	21:37	-	19:58	20:02	20:05

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
3	13 43	13 46	12:14	12:27	00:05	0d 0%
4	13 50	13 53	12:14	13:10	00:49	1d 2%
5	13 55	13 58	12:14	13:51	01:31	2d 5%

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2011 February 6, 7, 8 (Sun, Mon, Tue)

GMT	ARIES	VENUS -4.2		MARS +1.1		JUPITER -2.1		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
6 00	135° 47'.2	223° 39'.4	21° 02'.5 S	176° 27'.1	16° 54'.4 S	132° 48'.0	0° 02'.1 N	299° 00'.9	4° 20'.7 S
01	150° 49'.7	238° 38'.8	02'.6	191° 27'.6	53'.9	147° 50'.0	02'.3	314° 03'.4	20'.6
02	165° 52'.1	253° 38'.3	02'.7	206° 28'.1	53'.3	162° 52'.0	02'.5	329° 05'.9	20'.6
03	180° 54'.6	268° 37'.7	02'.8	221° 28'.6	52'.7	177° 54'.0	02'.7	344° 08'.4	20'.6
Sunday 04	195° 57'.1	283° 37'.1	02'.9	236° 29'.1	52'.1	192° 56'.0	03'.0	359° 10'.9	20'.6
05	210° 59'.5	298° 36'.5	03'.0	251° 29'.6	51'.5	207° 58'.0	03'.2	14° 13'.4	20'.5
06	226° 02'.0	313° 35'.9	03'.1	266° 30'.1	50'.9	223° 00'.0	03'.4	29° 15'.9	20'.5
07	241° 04'.5	328° 35'.3	03'.2	281° 30'.6	50'.3	238° 02'.0	03'.6	44° 18'.4	20'.5
08	256° 06'.9	343° 34'.7	03'.3	296° 31'.1	49'.7	253° 04'.0	03'.8	59° 20'.9	20'.4
09	271° 09'.4	358° 34'.2	03'.4	311° 31'.6	49'.1	268° 06'.0	04'.0	74° 23'.4	20'.4
10	286° 11'.9	13° 33'.6	03'.5	326° 32'.1	48'.5	283° 08'.0	04'.2	89° 25'.9	20'.4
11	301° 14'.3	28° 33'.0	03'.6	341° 32'.6	47'.9	298° 10'.0	04'.4	104° 28'.4	20'.4
12	316° 16'.8	43° 32'.4	21° 03'.7 S	356° 33'.1	16° 47'.3 S	313° 12'.0	0° 04'.6 N	119° 30'.9	4° 20'.3 S
13	331° 19'.3	58° 31'.8	03'.8	11° 33'.6	46'.7	328° 14'.0	04'.8	134° 33'.4	20'.3
14	346° 21'.7	73° 31'.2	03'.9	26° 34'.1	46'.1	343° 16'.0	05'.0	149° 35'.9	20'.3
15	1° 24'.2	88° 30'.6	04'.0	41° 34'.6	45'.5	358° 18'.0	05'.2	164° 38'.4	20'.2
16	16° 26'.6	103° 30'.0	04'.1	56° 35'.1	44'.9	13° 20'.0	05'.5	179° 41'.0	20'.2
17	31° 29'.1	118° 29'.4	04'.2	71° 35'.6	44'.3	28° 22'.0	05'.7	194° 43'.5	20'.2
18	46° 31'.6	133° 28'.9	04'.2	86° 36'.1	43'.7	43° 24'.0	05'.9	209° 46'.0	20'.1
19	61° 34'.0	148° 28'.3	04'.3	101° 36'.6	43'.1	58° 26'.0	06'.1	224° 48'.5	20'.1
20	76° 36'.5	163° 27'.7	04'.4	116° 37'.1	42'.5	73° 27'.9	06'.3	239° 51'.0	20'.1
21	91° 39'.0	178° 27'.1	04'.5	131° 37'.6	41'.9	88° 29'.9	06'.5	254° 53'.5	20'.1
22	106° 41'.4	193° 26'.5	04'.6	146° 38'.1	41'.3	103° 31'.9	06'.7	269° 56'.0	20'.0
23	121° 43'.9	208° 25'.9	04'.7	161° 38'.6	40'.7	118° 33'.9	06'.9	284° 58'.5	20'.0
7 00	136° 46'.4	223° 25'.3	21° 04'.8 S	176° 39'.1	16° 40'.1 S	133° 35'.9	0° 07'.1 N	300° 01'.0	4° 20'.0 S
01	151° 48'.8	238° 24'.7	04'.8	191° 39'.6	39'.5	148° 37'.9	07'.3	315° 03'.5	19'.9
02	166° 51'.3	253° 24'.1	04'.9	206° 40'.1	38'.9	163° 39'.9	07'.5	330° 06'.0	19'.9
03	181° 53'.7	268° 23'.5	05'.0	221° 40'.7	38'.3	178° 41'.9	07'.8	345° 08'.5	19'.9
Monday 04	196° 56'.2	283° 22'.9	05'.1	236° 41'.2	37'.7	193° 43'.9	08'.0	0° 11'.0	19'.8
05	211° 58'.7	298° 22'.3	05'.2	251° 41'.7	37'.1	208° 45'.9	08'.2	15° 13'.6	19'.8
06	227° 01'.1	313° 21'.8	05'.2	266° 42'.2	36'.5	223° 47'.9	08'.4	30° 16'.1	19'.8
07	242° 03'.6	328° 21'.2	05'.3	281° 42'.7	35'.9	238° 49'.9	08'.6	45° 18'.6	19'.8
08	257° 06'.1	343° 20'.6	05'.4	296° 43'.2	35'.3	253° 51'.9	08'.8	60° 21'.1	19'.7
09	272° 08'.5	358° 20'.0	05'.5	311° 43'.7	34'.7	268° 53'.9	09'.0	75° 23'.6	19'.7
10	287° 11'.0	13° 19'.4	05'.5	326° 44'.2	34'.1	283° 55'.9	09'.2	90° 26'.1	19'.7
11	302° 13'.5	28° 18'.8	05'.6	341° 44'.7	33'.5	298° 57'.9	09'.4	105° 28'.6	19'.6
12	317° 15'.9	43° 18'.2	21° 05'.7 S	356° 45'.2	16° 32'.9 S	313° 59'.9	0° 09'.6 N	120° 31'.1	4° 19'.6 S
13	332° 18'.4	58° 17'.6	05'.7	11° 45'.7	32'.3	329° 01'.9	09'.8	135° 33'.6	19'.6
14	347° 20'.9	73° 17'.0	05'.8	26° 46'.2	31'.7	344° 03'.9	10'.1	150° 36'.1	19'.5
15	2° 23'.3	88° 16'.4	05'.9	41° 46'.7	31'.1	359° 05'.9	10'.3	165° 38'.7	19'.5
16	17° 25'.8	103° 15'.8	06'.0	56° 47'.2	30'.5	14° 07'.8	10'.5	180° 41'.2	19'.5
17	32° 28'.2	118° 15'.2	06'.0	71° 47'.7	29'.8	29° 09'.8	10'.7	195° 43'.7	19'.4
18	47° 30'.7	133° 14'.6	06'.1	86° 48'.2	29'.2	44° 11'.8	10'.9	210° 46'.2	19'.4
19	62° 33'.2	148° 14'.0	06'.1	101° 48'.7	28'.6	59° 13'.8	11'.1	225° 48'.7	19'.4
20	77° 35'.6	163° 13'.4	06'.2	116° 49'.3	28'.0	74° 15'.8	11'.3	240° 51'.2	19'.4
21	92° 38'.1	178° 12'.8	06'.3	131° 49'.8	27'.4	89° 17'.8	11'.5	255° 53'.7	19'.3
22	107° 40'.6	193° 12'.2	06'.3	146° 50'.3	26'.8	104° 19'.8	11'.7	270° 56'.2	19'.3
23	122° 43'.0	208° 11'.6	06'.4	161° 50'.8	26'.2	119° 21'.8	11'.9	285° 58'.7	19'.3
8 00	137° 45'.5	223° 11'.0	21° 06'.5 S	176° 51'.3	16° 25'.6 S	134° 23'.8	0° 12'.2 N	301° 01'.3	4° 19'.2 S
01	152° 48'.0	238° 10'.4	06'.5	191° 51'.8	25'.0	149° 25'.8	12'.4	316° 03'.8	19'.2
02	167° 50'.4	253° 09'.8	06'.6	206° 52'.3	24'.4	164° 27'.8	12'.6	331° 06'.3	19'.2
03	182° 52'.9	268° 09'.2	06'.6	221° 52'.8	23'.8	179° 29'.8	12'.8	346° 08'.8	19'.1
04	197° 55'.3	283° 08'.6	06'.7	236° 53'.3	23'.2	194° 31'.8	13'.0	1° 11'.3	19'.1
Tuesday 05	212° 57'.8	298° 08'.0	06'.7	251° 53'.8	22'.6	209° 33'.8	13'.2	16° 13'.8	19'.1
06	228° 00'.3	313° 07'.4	06'.8	266° 54'.3	21'.9	224° 35'.7	13'.4	31° 16'.3	19'.0
07	243° 02'.7	328° 06'.8	06'.9	281° 54'.8	21'.3	239° 37'.7	13'.6	46° 18'.8	19'.0
08	258° 05'.2	343° 06'.2	06'.9	296° 55'.4	20'.7	254° 39'.7	13'.8	61° 21'.4	19'.0
09	273° 07'.7	358° 05'.6	07'.0	311° 55'.9	20'.1	269° 41'.7	14'.1	76° 23'.9	18'.9
10	288° 10'.1	13° 05'.0	07'.0	326° 56'.4	19'.5	284° 43'.7	14'.3	91° 26'.4	18'.9
11	303° 12'.6	28° 04'.4	07'.1	341° 56'.9	18'.9	299° 45'.7	14'.5	106° 28'.9	18'.9
12	318° 15'.1	43° 03'.8	21° 07'.1 S	356° 57'.4	16° 18'.3 S	314° 47'.7	0° 14'.7 N	121° 31'.4	4° 18'.8 S
13	333° 17'.5	58° 03'.2	07'.2	11° 57'.9	17'.7	329° 49'.7	14'.9	136° 33'.9	18'.8
14	348° 20'.0	73° 02'.6	07'.2	26° 58'.4	17'.1	344° 51'.7	15'.1	151° 36'.4	18'.8
15	3° 22'.5	88° 02'.0	07'.2	41° 58'.9	16'.4	359° 53'.7	15'.3	166° 39'.0	18'.7
16	18° 24'.9	103° 01'.4	07'.3	56° 59'.4	15'.8	14° 55'.7	15'.5	181° 41'.5	18'.7
17	33° 27'.4	118° 00'.8	07'.3	71° 59'.9	15'.2	29° 57'.6	15'.7	196° 44'.0	18'.7
18	48° 29'.8	133° 00'.2	07'.4	87° 00'.5	14'.6	44° 59'.6	16'.0	211° 46'.5	18'.6
19	63° 32'.3	147° 59'.6	07'.4	102° 01'.0	14'.0	60° 01'.6	16'.2	226° 49'.0	18'.6
20	78° 34'.8	162° 58'.9	07'.5	117° 01'.5	13'.4	75° 03'.6	16'.4	241° 51'.5	18'.6
21	93° 37'.2	177° 58'.3	07'.5	132° 02'.0	12'.8	90° 05'.6	16'.6	256° 54'.0	18'.5
22	108° 39'.7	192° 57'.7	07'.5	147° 02'.5	12'.1	105° 07'.6	16'.8	271° 56'.6	18'.5
23	123° 42'.2	207° 57'.1	07'.6	162° 03'.0	11'.5	120° 09'.6	17'.0	286° 59'.1	18'.5
	M.P. 14:50	v -0'.6	d 0'.1	v 0'.5	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.8 S
Achernar	335° 28'.1	57° 11'.0 S
Acrux	173° 10'.9	63° 09'.6 S
Adhara	255° 13'.5	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.7	55° 53'.6 N
Alkaid	153° 00'.0	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.4	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.3 N
Altair	62° 10'.2	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.9 S
Antares	112° 28'.5	26° 27'.4 S
Arcturus	145° 57'.2	19° 07'.2 N
Atria	107° 32'.1	69° 02'.6 S
Avior	234° 18'.1	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.5	52° 42'.4 S
Capella	280° 36'.7	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.0	61° 41'.1 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.3	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.5	57° 10'.5 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.4 S
Hamal	328° 02'.7	23° 31'.0 N
Kaus Aust.	83° 46'.3	34° 22'.7 S
Kochab	137° 19'.7	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.5	36° 25'.4 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 42'.7	49° 54'.3 N
Nunki	76° 00'.7	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.9 S
Polaris	318° 38'.4	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.2	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 54'.0	60° 52'.7 S
Sabik	102° 14'.6	15° 44'.3 S
Schedar	349° 42'.9	56° 36'.2 N
Shaula	96° 24'.4	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.9	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.8 S
Vega	80° 40'.4	38° 47'.5 N
Zuben'ubi	137° 07'.3	16° 05'.3 S

	SHA	Mer.Pass.
Venus	86° 39'.0	09:07
Mars	39° 52'.8	12:13
Jupiter	356° 49'.6	15:04
Saturn	163° 14'.7	03:59

SUN				
GHA	Dec	GHA	v	Dec	d	HP
176° 29'.9	15° 47'.3 S	148° 05'.3	16'.4	0° 08'.6 N	12'.1	54'.1
191° 29'.8	46'.6	162° 40'.7	16'.4	20'.7	12'.1	
206° 29'.8	45'.8	177° 16'.1	16'.5	32'.8	12'.1	
221° 29'.8	45'.0	191° 51'.6	16'.4	44'.9	12'.1	
236° 29'.7	44'.3	206° 27'.0	16'.4	57'.0	12'.1	
251° 29'.7	43'.5	221° 02'.4	16'.5	1° 09'.1 N	12'.1	
266° 29'.6	42'.7	235° 37'.9	16'.4	21'.2	12'.0	
281° 29'.6	42'.0	250° 13'.3	16'.4	33'.2	12'.1	54'.0
296° 29'.5	41'.2	264° 48'.7	16'.5	45'.3	12'.0	
311° 29'.5	40'.4	279° 24'.2	16'.4	57'.3	12'.1	
326° 29'.4	39'.7	293° 59'.6	16'.5	2° 09'.4 N	12'.0	
341° 29'.4	38'.9	308° 35'.1	16'.4	21'.4	12'.0	
356° 29'.4	15° 38'.1 S	323° 10'.5	16'.4	2° 33'.4 N	12'.0	54'.0
11° 29'.3	37'.4	337° 45'.9	16'.4	45'.4	12'.0	
26° 29'.3	36'.6	352° 21'.3	16'.5	57'.4	12'.0	
41° 29'.2	35'.8	6° 56'.8	16'.4	3° 09'.4 N	12'.0	
56° 29'.2	35'.0	21° 32'.2	16'.4	21'.4	11'.9	
71° 29'.1	34'.3	36° 07'.6	16'.4	33'.3	12'.0	
86° 29'.1	33'.5	50° 43'.0	16'.4	45'.3	11'.9	
101° 29'.1	32'.7	65° 18'.4	16'.3	57'.2	11'.9	
116° 29'.0	32'.0	79° 53'.7	16'.4	4° 09'.1 N	11'.9	
131° 29'.0	31'.2	94° 29'.1	16'.4	21'.0	11'.9	
146° 28'.9	30'.4	109° 04'.5	16'.3	32'.9	11'.8	
161° 28'.9	29'.6	123° 39'.8	16'.3	44'.7	11'.8	
176° 28'.9	15° 28'.9 S	138° 15'.1	16'.3	4° 56'.5 N	11'.9	54'.0
191° 28'.8	28'.1	152° 50'.4	16'.4	5° 08'.4 N	11'.7	
206° 28'.8	27'.3	167° 25'.8	16'.2	20'.1	11'.8	
221° 28'.7	26'.5	182° 01'.0	16'.3	31'.9	11'.8	
236° 28'.7	25'.8	196° 36'.3	16'.3	43'.7	11'.7	
251° 28'.7	25'.0	211° 11'.6	16'.2	55'.4	11'.7	
266° 28'.6	24'.2	225° 46'.8	16'.2	6° 07'.1 N	11'.7	
281° 28'.6	23'.4	240° 22'.0	16'.2	18'.8	11'.6	
296° 28'.6	22'.6	254° 57'.2	16'.2	30'.4	11'.7	
311° 28'.5	21'.9	269° 32'.4	16'.1	42'.1	11'.6	
326° 28'.5	21'.1	284° 07'.5	16'.2	53'.7	11'.6	
341° 28'.4	20'.3	298° 42'.7	16'.1	7° 05'.3 N	11'.5	
356° 28'.4	15° 19'.5 S	313° 17'.8	16'.1	7° 16'.8 N	11'.5	54'.0
11° 28'.4	18'.7	327° 52'.9	16'.0	28'.3	11'.5	
26° 28'.3	18'.0	342° 27'.9	16'.1	39'.8	11'.5	
41° 28'.3	17'.2	357° 03'.0	16'.0	51'.3	11'.5	
56° 28'.3	16'.4	11° 38'.0	15'.9	8° 02'.8 N	11'.4	54'.1
71° 28'.2	15'.6	26° 12'.9	16'.0	14'.2	11'.4	
86° 28'.2	14'.8	40° 47'.9	15'.9	25'.6	11'.3	
101° 28'.2	14'.0	55° 22'.8	15'.9	36'.9	11'.3	
116° 28'.1	13'.3	69° 57'.7	15'.9	48'.2	11'.3	
131° 28'.1	12'.5	84° 32'.6	15'.8	59'.5	11'.3	
146° 28'.1	11'.7	99° 07'.4	15'.8	9° 10'.8 N	11'.2	
161° 28'.1	10'.9	113° 42'.2	15'.8	22'.0	11'.2	
176° 28'.0	15° 10'.1 S	128° 17'.0	15'.7	9° 33'.2 N	11'.1	54'.1
191° 28'.0	09'.3	142° 51'.7	15'.7	44'.3	11'.1	
206° 28'.0	08'.5	157° 26'.4	15'.6	55'.4	11'.1	
221° 27'.9	07'.8	172° 01'.0	15'.7	10° 06'.5 N	11'.0	
236° 27'.9	07'.0	186° 35'.7	15'.6	17'.5	11'.0	
251° 27'.9	06'.2	201° 10'.3	15'.5	28'.5	11'.0	
266° 27'.8	05'.4	215° 44'.8	15'.5	39'.5	10'.9	
281° 27'.8	04'.6	230° 19'.3	15'.5	50'.4	10'.9	
296° 27'.8	03'.8	244° 53'.8	15'.4	11° 01'.3 N	10'.8	
311° 27'.8	03'.0	259° 28'.2	15'.4	12'.1	10'.8	54'.2
326° 27'.7	02'.2	274° 02'.6	15'.3	22'.9	10'.8	
341° 27'.7	01'.4	288° 36'.9	15'.4	33'.7	10'.7	
356° 27'.7	15° 00'.7 S	303° 11'.3	15'.2	11° 44'.4 N	10'.7	54'.2
11° 27'.7	14° 59'.9 S	317° 45'.5	15'.2	55'.1	10'.6	
26° 27'.6	59'.1	332° 19'.7	15'.2	12° 05'.7 N	10'.6	
41° 27'.6	58'.3	346° 53'.9	15'.1	16'.3	10'.5	
56° 27'.6	57'.5	1° 28'.0	15'.1	26'.8	10'.5	
71° 27'.6	56'.7	16° 02'.1	15'.0	37'.3	10'.5	
86° 27'.5	55'.9	30° 36'.1	15'.0	47'.8	10'.3	
101° 27'.5	55'.1	45° 10'.1	14'.9	58'.1	10'.4	54'.3
116° 27'.5	54'.3	59° 44'.0	14'.9	13° 08'.5 N	10'.3	
131° 27'.5	53'.5	74° 17'.9	14'.8	18'.8	10'.2	
146° 27'.4	52'.7	88° 51'.7	14'.8	29'.0	10'.2	
161° 27'.4	51'.9	103° 25'.5	14'.8	39'.2	10'.2	
SD 16'.2	d 0'.8	SD	14'.7	14'.7	14'.8	

MOON				
GHA	v	Dec	d	HP
148° 05'.3	16'.4	0° 08'.6 N	12'.1	54'.1
162° 40'.7	16'.4	20'.7	12'.1	
177° 16'.1	16'.5	32'.8	12'.1	
191° 51'.6	16'.4	44'.9	12'.1	
206° 27'.0	16'.4	57'.0	12'.1	
221° 02'.4	16'.5	1° 09'.1 N	12'.1	
235° 37'.9	16'.4	21'.2	12'.0	
250° 13'.3	16'.4	33'.2	12'.1	54'.0
264° 48'.7	16'.5	45'.3	12'.0	
279° 24'.2	16'.4	57'.3	12'.1	
293° 59'.6	16'.5	2° 09'.4 N	12'.0	
308° 35'.1	16'.4	21'.4	12'.0	
323° 10'.5	16'.4	2° 33'.4 N	12'.0	54'.0
337° 45'.9	16'.4	45'.4	12'.0	
352° 21'.3	16'.5	57'.4	12'.0	
6° 56'.8	16'.4	3° 09'.4 N	12'.0	
21° 32'.2	16'.4	21'.4	11'.9	
36° 07'.6	16'.4	33'.3	12'.0	
50° 43'.0	16'.4	45'.3	11'.9	
65° 18'.4	16'.3	57'.2	11'.9	
79° 53'.7	16'.4	4° 09'.1 N	11'.9	
94° 29'.1	16'.4	21'.0	11'.9	
109° 04'.5	16'.3	32'.9	11'.8	
123° 39'.8	16'.3	44'.7	11'.8	
138° 15'.1	16'.3	4° 56'.5 N	11'.9	54'.0
152° 50'.4	16'.4	5° 08'.4 N	11'.7	
167° 25'.8	16'.2	20'.1	11'.8	
182° 01'.0	16'.3	31'.9	11'.8	
196° 36'.3	16'.3	43'.7	11'.7	
211° 11'.6	16'.2	55'.4	11'.7	
225° 46'.8	16'.2	6° 07'.1 N	11'.7	
240° 22'.0	16'.2	18'.8	11'.6	
254° 57'.2	16'.2	30'.4	11'.7	
269° 32'.4	16'.1	42'.1	11'.6	
284° 07'.5	16'.2	53'.7	11'.6	
298° 42'.7	16'.1	7° 05'.3 N	11'.5	
313° 17'.8	16'.1	7° 16'.8 N	11'.5	54'.0
327° 52'.9	16'.0	28'.3	11'.5	
342° 27'.9	16'.1	39'.8	11'.5	
357° 03'.0	16'.0	51'.3	11'.5	
11° 38'.0	15'.9	8° 02'.8 N	11'.4	54'.1
26° 12'.9	16'.0	14'.2	11'.4	
40° 47'.9	15'.9	25'.6	11'.3	
55° 22'.8	15'.9	36'.9	11'.3	
69° 57'.7	15'.9	48'.2	11'.3	
84° 32'.6	15'.8	59'.5	11'.3	
99° 07'.4	15'.8	9° 10'.8 N	11'.2	
113° 42'.2	15'.8	22'.0	11'.2	
128° 17'.0	15'.7	9° 33'.2 N	11'.1	54'.1
142° 51'.7	15'.7	44'.3	11'.1	
157° 26'.4	15'.6	55'.4	11'.1	
172° 01'.0	15'.7	10° 06'.5 N	11'.0	
186° 35'.7	15'.6	17'.5	11'.0	
201° 10'.3	15'.5	28'.5	11'.0	
215° 44'.8	15'.5	39'.5	10'.9	
230° 19'.3	15'.5	50'.4	10'.9	
244° 53'.8	15'.4	11° 01'.3 N	10'.8	
259° 28'.2	15'.4	12'.1	10'.8	54'.2
274° 02'.6	15'.3	22'.9	10'.8	
288° 36'.9	15'.4	33'.7	10'.7	
303° 11'.3	15'.2	11° 44'.4 N	10'.7	54'.2
317° 45'.5	15'.2	55'.1	10'.6	
332° 19'.7	15'.2	12° 05'.7 N	10'.6	
346° 53'.9	15'.1	16'.3	10'.5	
1° 28'.0	15'.1	26'.8	10'.5	
16° 02'.1	15'.0	37'.3	10'.5	
30° 36'.1	15'.0	47'.8	10'.3	
45° 10'.1	14'.9	58'.1	10'.4	54'.3
59° 44'.0	14'.9	13° 08'.5 N	10'.3	
74° 17'.9	14'.8	18'.8	10'.2	
88° 51'.7	14'.8	29'.0	10'.2	
103° 25'.5	14'.8	39'.2	10'.2	
SD	14'.7	14'.7	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 6	Moonrise 7	Moonrise 8
N 72°	06:48	08:13	09:45	08:00	07:40	07:15
N 70°	06:43	07:58	09:15	08:02	07:48	07:33
68°	06:38	07:46	08:53	08:04	07:56	07:46
66°	06:34	07:36	08:36	08:06	08:02	07:58
64°	06:31	07:28	08:22	08:07	08:07	08:07
62°	06:28	07:21	08:10	08:08	08:11	08:15
60°	06:25	07:14	08:00	08:09	08:15	08:22
N 58°	06:22	07:09	07:51	08:10	08:19	08:29
56°	06:19	07:04	07:44	08:11	08:22	08:34
54°	06:17	06:59	07:37	08:12	08:25	08:39
52°	06:15	06:55	07:31	08:12	08:27	08:44
50°	06:12	06:51	07:25	08:13	08:30	08:48
45°	06:07	06:42	07:13	08:14	08:35	08:57
N 40°	06:03	06:35	07:03	08:16	08:39	09:04
35°	05:58	06:28	06:54	08:17	08:43	09:11
30°	05:53	06:22	06:47	08:17	08:46	09:17
20°	05:44	06:11	06:33	08:19	08:52	09:27
N 10°	05:35	06:00	06:22	08:20	08:57	09:35
0°	05:24	05:49	06:11	08:22	09:02	09:44
S 10°	05:12	05:38	05:59	08:23	09:07	09:52
20°	04:57	05:24	05:47	08:24	09:12	10:01
30°	04:38	05:08	05:33	08:26	09:18	10:11
35°	04:25	04:58	05:25	08:27	09:22	10:17
40°	04:11	04:46	05:16	08:28	09:26	10:24
45°	03:52	04:32	05:05	08:29	09:31	10:32
S 50°	03:27	04:15	04:52	08:31	09:36	10:42
52°	03:15	04:06	04:45	08:32	09:39	10:46
54°	03:01	03:57

2011 February 9, 10, 11 (Wed, Thur, Fri)

GMT	ARIES	VENUS -4.2		MARS +1.1		JUPITER -2.1		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
9 00	138° 44'.6	222° 56'.5	21° 07'.6 S	177° 03'.5	16° 10'.9 S	135° 11'.6	0° 17'.2 N	302° 01'.6	4° 18'.4 S
01	153° 47'.1	237° 55'.9	07'.7	192° 04'.0	10'.3	150° 13'.6	17'.4	317° 04'.1	18'.4
02	168° 49'.6	252° 55'.3	07'.7	207° 04'.6	09'.7	165° 15'.6	17'.6	332° 06'.6	18'.4
03	183° 52'.0	267° 54'.7	07'.7	222° 05'.1	09'.1	180° 17'.5	17'.9	347° 09'.1	18'.3
04	198° 54'.5	282° 54'.1	07'.8	237° 05'.6	08'.4	195° 19'.5	18'.1	2° 11'.7	18'.3
05	213° 57'.0	297° 53'.5	07'.8	252° 06'.1	07'.8	210° 21'.5	18'.3	17° 14'.2	18'.3
06	228° 59'.4	312° 52'.9	07'.8	267° 06'.6	07'.2	225° 23'.5	18'.5	32° 16'.7	18'.2
07	244° 01'.9	327° 52'.3	07'.9	282° 07'.1	06'.6	240° 25'.5	18'.7	47° 19'.2	18'.2
08	259° 04'.3	342° 51'.7	07'.9	297° 07'.6	06'.0	255° 27'.5	18'.9	62° 21'.7	18'.2
09	274° 06'.8	357° 51'.0	07'.9	312° 08'.2	05'.4	270° 29'.5	19'.1	77° 24'.2	18'.1
10	289° 09'.3	12° 50'.4	07'.9	327° 08'.7	04'.7	285° 31'.5	19'.3	92° 26'.8	18'.1
11	304° 11'.7	27° 49'.8	08'.0	342° 09'.2	04'.1	300° 33'.5	19'.6	107° 29'.3	18'.1
12	319° 14'.2	42° 49'.2	21° 08'.0 S	357° 09'.7	16° 03'.5 S	315° 35'.4	0° 19'.8 N	122° 31'.8	4° 18'.0 S
13	334° 16'.7	57° 48'.6	08'.0	12° 10'.2	02'.9	330° 37'.4	20'.0	137° 34'.3	18'.0
14	349° 19'.1	72° 48'.0	08'.0	27° 10'.7	02'.3	345° 39'.4	20'.2	152° 36'.8	18'.0
15	4° 21'.6	87° 47'.4	08'.1	42° 11'.2	01'.6	0° 41'.4	20'.4	167° 39'.4	17'.9
16	19° 24'.1	102° 46'.8	08'.1	57° 11'.8	01'.0	15° 43'.4	20'.6	182° 41'.9	17'.9
17	34° 26'.5	117° 46'.2	08'.1	72° 12'.3	00'.4	30° 45'.4	20'.8	197° 44'.4	17'.9
18	49° 29'.0	132° 45'.6	08'.1	87° 12'.8	15° 59'.8 S	45° 47'.4	21'.0	212° 46'.9	17'.8
19	64° 31'.4	147° 44'.9	08'.2	102° 13'.3	59'.2	60° 49'.4	21'.3	227° 49'.4	17'.8
20	79° 33'.9	162° 44'.3	08'.2	117° 13'.8	58'.5	75° 51'.3	21'.5	242° 51'.9	17'.8
21	94° 36'.4	177° 43'.7	08'.2	132° 14'.3	57'.9	90° 53'.3	21'.7	257° 54'.5	17'.7
22	109° 38'.8	192° 43'.1	08'.2	147° 14'.9	57'.3	105° 55'.3	21'.9	272° 57'.0	17'.7
23	124° 41'.3	207° 42'.5	08'.2	162° 15'.4	56'.7	120° 57'.3	22'.1	287° 59'.5	17'.7
10 00	139° 43'.8	222° 41'.9	21° 08'.2 S	177° 15'.9	15° 56'.1 S	135° 59'.3	0° 22'.3 N	303° 02'.0	4° 17'.6 S
01	154° 46'.2	237° 41'.3	08'.2	192° 16'.4	55'.4	151° 01'.3	22'.5	318° 04'.5	17'.6
02	169° 48'.7	252° 40'.7	08'.3	207° 16'.9	54'.8	166° 03'.3	22'.7	333° 07'.1	17'.6
03	184° 51'.2	267° 40'.0	08'.3	222° 17'.4	54'.2	181° 05'.2	23'.0	348° 09'.6	17'.5
04	199° 53'.6	282° 39'.4	08'.3	237° 18'.0	53'.6	196° 07'.2	23'.2	3° 12'.1	17'.5
05	214° 56'.1	297° 38'.8	08'.3	252° 18'.5	52'.9	211° 09'.2	23'.4	18° 14'.6	17'.5
06	229° 58'.6	312° 38'.2	08'.3	267° 19'.0	52'.3	226° 11'.2	23'.6	33° 17'.1	17'.4
07	245° 01'.0	327° 37'.6	08'.3	282° 19'.5	51'.7	241° 13'.2	23'.8	48° 19'.7	17'.4
08	260° 03'.5	342° 37'.0	08'.3	297° 20'.0	51'.1	256° 15'.2	24'.0	63° 22'.2	17'.3
09	275° 05'.9	357° 36'.3	08'.3	312° 20'.6	50'.4	271° 17'.2	24'.2	78° 24'.7	17'.3
10	290° 08'.4	12° 35'.7	08'.3	327° 21'.1	49'.8	286° 19'.1	24'.4	93° 27'.2	17'.3
11	305° 10'.9	27° 35'.1	08'.3	342° 21'.6	49'.2	301° 21'.1	24'.7	108° 29'.8	17'.2
12	320° 13'.3	42° 34'.5	21° 08'.3 S	357° 22'.1	15° 48'.6 S	316° 23'.1	0° 24'.9 N	123° 32'.3	4° 17'.2 S
13	335° 15'.8	57° 33'.9	08'.3	12° 22'.6	47'.9	331° 25'.1	25'.1	138° 34'.8	17'.2
14	350° 18'.3	72° 33'.3	08'.3	27° 23'.1	47'.3	346° 27'.1	25'.3	153° 37'.3	17'.1
15	5° 20'.7	87° 32'.6	08'.3	42° 23'.7	46'.7	1° 29'.1	25'.5	168° 39'.8	17'.1
16	20° 23'.2	102° 32'.0	08'.3	57° 24'.2	46'.1	16° 31'.1	25'.7	183° 42'.4	17'.1
17	35° 25'.7	117° 31'.4	08'.3	72° 24'.7	45'.4	31° 33'.0	25'.9	198° 44'.9	17'.0
18	50° 28'.1	132° 30'.8	08'.3	87° 25'.2	44'.8	46° 35'.0	26'.1	213° 47'.4	17'.0
19	65° 30'.6	147° 30'.2	08'.3	102° 25'.7	44'.2	61° 37'.0	26'.4	228° 49'.9	17'.0
20	80° 33'.1	162° 29'.6	08'.3	117° 26'.3	43'.6	76° 39'.0	26'.6	243° 52'.5	16'.9
21	95° 35'.5	177° 28'.9	08'.3	132° 26'.8	42'.9	91° 41'.0	26'.8	258° 55'.0	16'.9
22	110° 38'.0	192° 28'.3	08'.3	147° 27'.3	42'.3	106° 43'.0	27'.0	273° 57'.5	16'.8
23	125° 40'.4	207° 27'.7	08'.3	162° 27'.8	41'.7	121° 44'.9	27'.2	289° 00'.0	16'.8
11 00	140° 42'.9	222° 27'.1	21° 08'.3 S	177° 28'.4	15° 41'.0 S	136° 46'.9	0° 27'.4 N	304° 02'.6	4° 16'.8 S
01	155° 45'.4	237° 26'.5	08'.3	192° 28'.9	40'.4	151° 48'.9	27'.6	319° 05'.1	16'.7
02	170° 47'.8	252° 25'.8	08'.3	207° 29'.4	39'.8	166° 50'.9	27'.9	334° 07'.6	16'.7
03	185° 50'.3	267° 25'.2	08'.3	222° 29'.9	39'.2	181° 52'.9	28'.1	349° 10'.1	16'.7
04	200° 52'.8	282° 24'.6	08'.3	237° 30'.4	38'.5	196° 54'.9	28'.3	4° 12'.6	16'.6
05	215° 55'.2	297° 24'.0	08'.2	252° 31'.0	37'.9	211° 56'.8	28'.5	19° 15'.2	16'.6
06	230° 57'.7	312° 23'.4	08'.2	267° 31'.5	37'.3	226° 58'.8	28'.7	34° 17'.7	16'.6
07	246° 00'.2	327° 22'.7	08'.2	282° 32'.0	36'.6	242° 00'.8	28'.9	49° 20'.2	16'.5
08	261° 02'.6	342° 22'.1	08'.2	297° 32'.5	36'.0	257° 02'.8	29'.1	64° 22'.7	16'.5
09	276° 05'.1	357° 21'.5	08'.2	312° 33'.1	35'.4	272° 04'.8	29'.4	79° 25'.3	16'.4
10	291° 07'.5	12° 20'.9	08'.2	327° 33'.6	34'.7	287° 06'.8	29'.6	94° 27'.8	16'.4
11	306° 10'.0	27° 20'.3	08'.1	342° 34'.1	34'.1	302° 08'.7	29'.8	109° 30'.3	16'.4
12	321° 12'.5	42° 19'.6	21° 08'.1 S	357° 34'.6	15° 33'.5 S	317° 10'.7	0° 30'.0 N	124° 32'.9	4° 16'.3 S
13	336° 14'.9	57° 19'.0	08'.1	12° 35'.2	32'.8	332° 12'.7	30'.2	139° 35'.4	16'.3
14	351° 17'.4	72° 18'.4	08'.1	27° 35'.7	32'.2	347° 14'.7	30'.4	154° 37'.9	16'.3
15	6° 19'.9	87° 17'.8	08'.1	42° 36'.2	31'.6	2° 16'.7	30'.6	169° 40'.4	16'.2
16	21° 22'.3	102° 17'.2	08'.0	57° 36'.7	30'.9	17° 18'.6	30'.9	184° 43'.0	16'.2
17	36° 24'.8	117° 16'.5	08'.0	72° 37'.2	30'.3	32° 20'.6	31'.1	199° 45'.5	16'.1
18	51° 27'.3	132° 15'.9	08'.0	87° 37'.8	29'.7	47° 22'.6	31'.3	214° 48'.0	16'.1
19	66° 29'.7	147° 15'.3	08'.0	102° 38'.3	29'.0	62° 24'.6	31'.5	229° 50'.5	16'.1
20	81° 32'.2	162° 14'.7	07'.9	117° 38'.8	28'.4	77° 26'.6	31'.7	244° 53'.1	16'.0
21	96° 34'.7	177° 14'.0	07'.9	132° 39'.3	27'.8	92° 28'.6	31'.9	259° 55'.6	16'.0
22	111° 37'.1	192° 13'.4	07'.9	147° 39'.9	27'.1	107° 30'.5	32'.1	274° 58'.1	16'.0
23	126° 39'.6	207° 12'.8	07'.8	162° 40'.4	26'.5	122° 32'.5	32'.4	290° 00'.6	15'.9
	M.P. 14:39	v -0'.6	d 0'.0	v 0'.5	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.8 S
Achernar	335° 28'.1	57° 11'.0 S
Acrux	173° 10'.9	63° 09'.6 S
Adhara	255° 13'.5	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.7	55° 53'.6 N
Alkaid	152° 59'.9	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.4	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.2	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.9 S
Antares	112° 28'.4	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 32'.0	69° 02'.6 S
Avior	234° 18'.1	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.5	52° 42'.4 S
Capella	280° 36'.7	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.0	61° 41'.2 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.5	57° 10'.5 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.3	34° 22'.7 S
Kochab	137° 19'.6	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.5	36° 25'.5 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 42'.8	49° 54'.3 N
Nunki	76° 00'.7	26° 16'.9 S
Peacock	53° 22'.4	56° 41'.8 S
Polaris	318° 39'.7	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.2	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.9	60° 52'.7 S
Sabik	102° 14'.6	15° 44'.3 S
Schedar	349° 42'.9	56° 36'.2 N
Shaula	96° 24'.4	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.9	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.8 S
Vega	80° 40'.4	38° 47'.5 N
Zuben'ubi	137° 07'.2	16° 05'.3 S

	SHA	Mer.Pass.
Venus	82° 58'.1	09:10
Mars	37° 32'.1	12:11
Jupiter	356° 15'.5	14:54
Saturn	163° 18'.3	03:47

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 27'.4	14° 51'.1 S	117° 59'.3	14'.6	13° 49'.4 N	10'.1	54'.3
191° 27'.4	50'.3	132° 32'.9	14'.7	59'.5	10'.0	
206° 27'.3	49'.5	147° 06'.6	14'.5	14° 09'.5 N	10'.0	
221° 27'.3	48'.7	161° 40'.1	14'.5	19'.5	9'.9	
236° 27'.3	47'.9	176° 13'.6	14'.5	29'.4	9'.9	54'.4
251° 27'.3	47'.1	190° 47'.1	14'.4	39'.3	9'.8	
266° 27'.3	46'.3	205° 20'.5	14'.3	49'.1	9'.8	
281° 27'.2	45'.5	219° 53'.8	14'.3	58'.9	9'.7	
296° 27'.2	44'.7	234° 27'.1	14'.2	15° 08'.6 N	9'.7	
311° 27'.2	43'.9	249° 00'.3	14'.2	18'.3	9'.6	
326° 27'.2	43'.1	263° 33'.5	14'.1	27'.9	9'.5	
341° 27'.2	42'.3	278° 06'.6	14'.1	37'.4	9'.5	54'.5
356° 27'.1	14° 41'.5 S	292° 39'.7	13'.9	15° 46'.9 N	9'.4	54'.5
11° 27'.1	40'.7	307° 12'.6	14'.0	56'.3	9'.3	
26° 27'.1	39'.9	321° 45'.6	13'.8	16° 05'.6 N	9'.3	
41° 27'.1	39'.1	336° 18'.4	13'.8	14'.9	9'.2	
56° 27'.1	38'.3	350° 51'.2	13'.8	24'.1	9'.2	
71° 27'.1	37'.5	5° 24'.0	13'.6	33'.3	9'.1	54'.6
86° 27'.0	36'.7	19° 56'.6	13'.6	42'.4	9'.0	
101° 27'.0	35'.9	34° 29'.2	13'.6	51'.4	9'.0	
116° 27'.0	35'.1	49° 01'.8	13'.5	17° 00'.4 N	8'.9	
131° 27'.0	34'.3	63° 34'.3	13'.4	09'.3	8'.8	
146° 27'.0	33'.5	78° 06'.7	13'.3	18'.1	8'.7	54'.7
161° 27'.0	32'.7	92° 39'.0	13'.3	26'.8	8'.7	
176° 27'.0	14° 31'.9 S	107° 11'.3	13'.2	17° 35'.5 N	8'.6	54'.7
191° 26'.9	31'.1	121° 43'.5	13'.1	44'.1	8'.6	
206° 26'.9	30'.3	136° 15'.6	13'.1	52'.7	8'.4	
221° 26'.9	29'.5	150° 47'.7	13'.0	18° 01'.1 N	8'.4	
236° 26'.9	28'.7	165° 19'.7	12'.9	09'.5	8'.4	54'.8
251° 26'.9	27'.8	179° 51'.6	12'.9	17'.9	8'.2	
266° 26'.9	27'.0	194° 23'.5	12'.8	26'.1	8'.2	
281° 26'.9	26'.2	208° 55'.3	12'.7	34'.3	8'.1	
296° 26'.9	25'.4	223° 27'.0	12'.6	42'.4	8'.0	54'.9
311° 26'.8	24'.6	237° 58'.6	12'.6	50'.4	7'.9	
326° 26'.8	23'.8	252° 30'.2	12'.5	58'.3	7'.9	
341° 26'.8	23'.0	267° 01'.7	12'.4	19° 06'.2 N	7'.7	
356° 26'.8	14° 22'.2 S	281° 33'.1	12'.4	19° 13'.9 N	7'.7	54'.9
11° 26'.8	21'.4	296° 04'.5	12'.2	21'.6	7'.7	55'.0
26° 26'.8	20'.5	310° 35'.7	12'.2	29'.3	7'.5	
41° 26'.8	19'.7	325° 06'.9	12'.2	36'.8	7'.4	
56° 26'.8	18'.9	339° 38'.1	12'.0	44'.2	7'.4	
71° 26'.8	18'.1	354° 09'.1	12'.0	51'.6	7'.3	55'.1
86° 26'.8	17'.3	8° 40'.1	11'.9	58'.9	7'.2	
101° 26'.8	16'.5	23° 11'.0	11'.8	20° 06'.1 N	7'.1	
116° 26'.7	15'.7	37° 41'.8	11'.8	13'.2	7'.0	
131° 26'.7	14'.8	52° 12'.6	11'.7	20'.2	6'.9	55'.2
146° 26'.7	14'.0	66° 43'.3	11'.6	27'.1	6'.8	
161° 26'.7	13'.2	81° 13'.9	11'.5	33'.9	6'.8	
176° 26'.7	14° 12'.4 S	95° 44'.4	11'.4	20° 40'.7 N	6'.6	55'.2
191° 26'.7	11'.6	110° 14'.8	11'.4	47'.3	6'.6	55'.3
206° 26'.7	10'.8	124° 45'.2	11'.3	53'.9	6'.4	
221° 26'.7	09'.9	139° 15'.5	11'.2	21° 00'.3 N	6'.4	
236° 26'.7	09'.1	153° 45'.7	11'.1	06'.7	6'.3	
251° 26'.7	08'.3	168° 15'.8	11'.1	13'.0	6'.2	55'.4
266° 26'.7	07'.5	182° 45'.9	11'.0	19'.2	6'.0	
281° 26'.7	06'.7	197° 15'.9	10'.9	25'.2	6'.0	
296° 26'.7	05'.9	211° 45'.8	10'.8	31'.2	5'.9	55'.5
311° 26'.7	05'.0	226° 15'.6	10'.7	37'.1	5'.8	
326° 26'.7	04'.2	240° 45'.3	10'.7	42'.9	5'.7	
341° 26'.7	03'.4	255° 15'.0	10'.6	48'.6	5'.5	
356° 26'.7	14° 02'.6 S	269° 44'.6	10'.5	21° 54'.1 N	5'.5	55'.6
11° 26'.7	01'.7	284° 14'.1	10'.4	59'.6	5'.4	
26° 26'.7	00'.9	298° 43'.5	10'.4	22° 05'.0 N	5'.2	
41° 26'.7	00'.1	313° 12'.9	10'.3	10'.2	5'.2	55'.7
56° 26'.7	13° 59'.3 S	327° 42'.2	10'.2	15'.4	5'.0	
71° 26'.7	58'.5	342° 11'.4	10'.1	20'.4	5'.0	
86° 26'.7	57'.6	356° 40'.5	10'.1	25'.4	4'.8	
101° 26'.7	56'.8	11° 09'.6	10'.0	30'.2	4'.8	55'.8
116° 26'.7	56'.0	25° 38'.6	9'.9	35'.0	4'.6	
131° 26'.7	55'.2	40° 07'.5	9'.8	39'.6	4'.5	
146° 26'.7	54'.3	54° 36'.3	9'.7	44'.1	4'.4	55'.9
161° 26'.7	53'.5	69° 05'.0	9'.7	48'.5	4'.2	
SD 16'.2	d 0'.8	SD	14'.8	15'.0	15'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 9	Moonrise 10	Moonrise 11
N 72°	06:37	07:59	09:26	06:41	-	-
N 70°	06:33	07:46	09:00	07:13	06:39	-
68°	06:29	07:36	08:41	07:36	07:21	06:51
66°	06:26	07:27	08:25	07:54	07:50	07:46
64°	06:23	07:20	08:12	08:08	08:12	08:19
62°	06:20	07:13	08:02	08:21	08:29	08:43
60°	06:18	07:07	07:52	08:31	08:44	09:03
N 58°	06:16	07:02	07:44	08:41	08:57	09:19
56°	06:14	06:58	07:37	08:49	09:08	09:33
54°	06:12	06:54	07:31	08:56	09:17	09:45
52°	06:10	06:50	07:25	09:03	09:26	09:55
50°	06:08	06:46	07:20	09:09	09:33	10:05
45°	06:04	06:38	07:09	09:21	09:50	10:24
N 40°	06:00	06:31	07:00	09:32	10:04	10:41
35°	05:55	06:25	06:51	09:41	10:15	10:54
30°	05:51	06:20	06:44	09:49	10:25	11:06
20°	05:43	06:09	06:32	10:03	10:43	11:27
N 10°	05:34	05:59	06:21	10:15	10:58	11:45
0°	05:25	05:49	06:11	10:27	11:13	12:02
S 10°	05:13	05:39	06:00	10:39	11:27	12:18
20°	04:59	05:26	05:49	10:51	11:43	12:37
30°	04:41	05:11	05:36	11:05	12:01	12:57
35°	04:29	05:01	05:28	11:14	12:11	13:10
40°	04:15	04:50	05:20	11:23	12:23	13:24
45°	03:57	04:37	05:09	11:35	12:38	13:41
S 50°	03:34	04:21	04:57	11:48	12:55	14:02
52°	03:23	04:13	04:51	11:55	13:04	14:12
54°	03:10	04:04	04:45	12:02	13:13	14:23
56°	02:54	03:54	04:38	12:10	13:23	14:36
58°	02:34	03:42	04:29	12:19	13:35	14:51
S 60°	02:09	03:28	04:20	12:29	13:49	15:08
S 62°	01:31	03:11	04:10	12:41	14:06	15:30

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 9	Moonset 10	Moonset 11
N 72°	15:04	16:31	17:54	01:31	-	-
N 70°	15:30	16:44	17:58	01:01	03:08	-
68°	15:49	16:54	18:01	00:39	02:27	04:36
66°	16:05	17:03	18:04	00:23	01:59	03:42
64°	16:17	17:10	18:07	00:09	01:38	03:10
62°	16:28	17:16	18:09	-	01:21	02:46
60°	16:37	17:22	18:11	-	01:07	02:27
N 58°	16:45	17:27	18:14	-	00:55	02:11
56°	16:52	17:32	18:16	-	00:45	01:58
54°	16:58	17:36	18:18	-	00:36	01:46
52°	17:04	17:40	18:19	-	00:28	01:36
50°	17:09	17:43	18:21	-	00:20	01:27
45°	17:20	17:51	18:25	-	00:05	01:08
N 40°	17:29	17:57	18:29	23:52	-	00:52
35°	17:37	18:04	18:33	23:41	-	00:39
30°	17:44	18:09	18:37	23:32	-	00:28
20°	17:57	18:19	18:45	23:16	-	00:08
N 10°	18:07	18:29	18:54	23:02	23:52	24:44
0°	18:18	18:39	19:04	22:49	23:36	24:26
S 10°	18:28	18:50	19:15	22:36	23:20	24:08
20°	18:39	19:02	19:29	22:22	23:03	23:50
30°	18:52	19:17	19:47	22:06	22:44	23:28
35°	19:00	19:26	19:59	21:57	22:33	23:15
40°	19:08	19:37	20:12	21:46	22:20	23:00
45°	19:18	19:50	20:30	21:34	22:05	22:43
S 50°	19:30	20:07	20:52	21:19	21:47	22:21
52°	19:36	20:14	21:04	21:12	21:38	22:11
54°	19:42	20:23	21:17	21:04	21:28	22:00
56°	19:49	20:33	21:32	20:56	21:17	21:47
58°	19:57	20:45	21:51	20:46	21:05	21:31
S 60°	20:06	20:58	22:15	20:35	20:50	21:13
S 62°	20:17	21:14	22:50	20:23	20:33	20:51

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
9	14 10	14 11	12:14	16:38	04:16	6d 33%
10	14 12	14 13	12:14	17:24	05:01	7d 42%
11	14 13	14 13	12:14	18:14	05:49	8d 52%

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2011 February 12, 13, 14 (Sat, Sun, Monday)

GMT	ARIES	VENUS -4.2		MARS +1.1		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
12 Saturday 00	141° 42'.0	222° 12'.2	21° 07'.8 S	177° 40'.9	15° 25'.9 S	137° 34'.5	0° 32'.6 N	305° 03'.2	4° 15'.9 S
01	156° 44'.5	237° 11'.5	07'.8	192° 41'.5	25'.2	152° 36'.5	32'.8	320° 05'.7	15'.8
02	171° 47'.0	252° 10'.9	07'.7	207° 42'.0	24'.6	167° 38'.5	33'.0	335° 08'.2	15'.8
03	186° 49'.4	267° 10'.3	07'.7	222° 42'.5	24'.0	182° 40'.4	33'.2	350° 10'.8	15'.8
04	201° 51'.9	282° 09'.7	07'.7	237° 43'.0	23'.3	197° 42'.4	33'.4	5° 13'.3	15'.7
05	216° 54'.4	297° 09'.0	07'.6	252° 43'.6	22'.7	212° 44'.4	33'.7	20° 15'.8	15'.7
06	231° 56'.8	312° 08'.4	07'.6	267° 44'.1	22'.0	227° 46'.4	33'.9	35° 18'.3	15'.7
07	246° 59'.3	327° 07'.8	07'.6	282° 44'.6	21'.4	242° 48'.4	34'.1	50° 20'.9	15'.6
08	262° 01'.8	342° 07'.2	07'.5	297° 45'.1	20'.8	257° 50'.3	34'.3	65° 23'.4	15'.6
09	277° 04'.2	357° 06'.5	07'.5	312° 45'.7	20'.1	272° 52'.3	34'.5	80° 25'.9	15'.5
10	292° 06'.7	12° 05'.9	07'.4	327° 46'.2	19'.5	287° 54'.3	34'.7	95° 28'.5	15'.5
11	307° 09'.2	27° 05'.3	07'.4	342° 46'.7	18'.9	302° 56'.3	34'.9	110° 31'.0	15'.5
12	322° 11'.6	42° 04'.6	21° 07'.4 S	357° 47'.3	15° 18'.2 S	317° 58'.3	0° 35'.2 N	125° 33'.5	4° 15'.4 S
13	337° 14'.1	57° 04'.0	07'.3	12° 47'.8	17'.6	333° 00'.2	35'.4	140° 36'.0	15'.4
14	352° 16'.5	72° 03'.4	07'.3	27° 48'.3	16'.9	348° 02'.2	35'.6	155° 38'.6	15'.3
15	7° 19'.0	87° 02'.8	07'.2	42° 48'.8	16'.3	3° 04'.2	35'.8	170° 41'.1	15'.3
16	22° 21'.5	102° 02'.1	07'.2	57° 49'.4	15'.7	18° 06'.2	36'.0	185° 43'.6	15'.3
17	37° 23'.9	117° 01'.5	07'.1	72° 49'.9	15'.0	33° 08'.1	36'.2	200° 46'.2	15'.2
18	52° 26'.4	132° 00'.9	07'.1	87° 50'.4	14'.4	48° 10'.1	36'.5	215° 48'.7	15'.2
19	67° 28'.9	147° 00'.3	07'.0	102° 51'.0	13'.7	63° 12'.1	36'.7	230° 51'.2	15'.2
20	82° 31'.3	161° 59'.6	07'.0	117° 51'.5	13'.1	78° 14'.1	36'.9	245° 53'.8	15'.1
21	97° 33'.8	176° 59'.0	06'.9	132° 52'.0	12'.5	93° 16'.1	37'.1	260° 56'.3	15'.1
22	112° 36'.3	191° 58'.4	06'.9	147° 52'.5	11'.8	108° 18'.0	37'.3	275° 58'.8	15'.0
23	127° 38'.7	206° 57'.7	06'.8	162° 53'.1	11'.2	123° 20'.0	37'.5	291° 01'.4	15'.0
13 Sunday 00	142° 41'.2	221° 57'.1	21° 06'.8 S	177° 53'.6	15° 10'.5 S	138° 22'.0	0° 37'.7 N	306° 03'.9	4° 15'.0 S
01	157° 43'.7	236° 56'.5	06'.7	192° 54'.1	09'.9	153° 24'.0	38'.0	321° 06'.4	14'.9
02	172° 46'.1	251° 55'.9	06'.6	207° 54'.7	09'.2	168° 25'.9	38'.2	336° 09'.0	14'.9
03	187° 48'.6	266° 55'.2	06'.6	222° 55'.2	08'.6	183° 27'.9	38'.4	351° 11'.5	14'.8
04	202° 51'.0	281° 54'.6	06'.5	237° 55'.7	08'.0	198° 29'.9	38'.6	6° 14'.0	14'.8
05	217° 53'.5	296° 54'.0	06'.5	252° 56'.3	07'.3	213° 31'.9	38'.8	21° 16'.5	14'.8
06	232° 56'.0	311° 53'.3	06'.4	267° 56'.8	06'.7	228° 33'.9	39'.0	36° 19'.1	14'.7
07	247° 58'.4	326° 52'.7	06'.3	282° 57'.3	06'.0	243° 35'.8	39'.3	51° 21'.6	14'.7
08	263° 00'.9	341° 52'.1	06'.3	297° 57'.9	05'.4	258° 37'.8	39'.5	66° 24'.1	14'.6
09	278° 03'.4	356° 51'.4	06'.2	312° 58'.4	04'.7	273° 39'.8	39'.7	81° 26'.7	14'.6
10	293° 05'.8	11° 50'.8	06'.1	327° 58'.9	04'.1	288° 41'.8	39'.9	96° 29'.2	14'.6
11	308° 08'.3	26° 50'.2	06'.1	342° 59'.5	03'.4	303° 43'.7	40'.1	111° 31'.7	14'.5
12	323° 10'.8	41° 49'.5	21° 06'.0 S	358° 00'.0	15° 02'.8 S	318° 45'.7	0° 40'.3 N	126° 34'.3	4° 14'.5 S
13	338° 13'.2	56° 48'.9	05'.9	13° 00'.5	02'.2	333° 47'.7	40'.6	141° 36'.8	14'.4
14	353° 15'.7	71° 48'.3	05'.9	28° 01'.1	01'.5	348° 49'.7	40'.8	156° 39'.3	14'.4
15	8° 18'.1	86° 47'.7	05'.8	43° 01'.6	00'.9	3° 51'.6	41'.0	171° 41'.9	14'.4
16	23° 20'.6	101° 47'.0	05'.7	58° 02'.1	00'.2	18° 53'.6	41'.2	186° 44'.4	14'.3
17	38° 23'.1	116° 46'.4	05'.7	73° 02'.7	14° 59'.6 S	33° 55'.6	41'.4	201° 46'.9	14'.3
18	53° 25'.5	131° 45'.8	05'.6	88° 03'.2	58'.9	48° 57'.6	41'.6	216° 49'.5	14'.2
19	68° 28'.0	146° 45'.1	05'.5	103° 03'.7	58'.3	63° 59'.6	41'.9	231° 52'.0	14'.2
20	83° 30'.5	161° 44'.5	05'.4	118° 04'.3	57'.6	79° 01'.5	42'.1	246° 54'.6	14'.2
21	98° 32'.9	176° 43'.9	05'.4	133° 04'.8	57'.0	94° 03'.5	42'.3	261° 57'.1	14'.1
22	113° 35'.4	191° 43'.2	05'.3	148° 05'.3	56'.3	109° 05'.5	42'.5	276° 59'.6	14'.1
23	128° 37'.9	206° 42'.6	05'.2	163° 05'.9	55'.7	124° 07'.5	42'.7	292° 02'.2	14'.0
14 Monday 00	143° 40'.3	221° 42'.0	21° 05'.1 S	178° 06'.4	14° 55'.0 S	139° 09'.4	0° 42'.9 N	307° 04'.7	4° 14'.0 S
01	158° 42'.8	236° 41'.3	05'.1	193° 06'.9	54'.4	154° 11'.4	43'.2	322° 07'.2	14'.0
02	173° 45'.3	251° 40'.7	05'.0	208° 07'.5	53'.7	169° 13'.4	43'.4	337° 09'.8	13'.9
03	188° 47'.7	266° 40'.1	04'.9	223° 08'.0	53'.1	184° 15'.4	43'.6	352° 12'.3	13'.9
04	203° 50'.2	281° 39'.4	04'.8	238° 08'.5	52'.4	199° 17'.3	43'.8	7° 14'.8	13'.8
05	218° 52'.6	296° 38'.8	04'.7	253° 09'.1	51'.8	214° 19'.3	44'.0	22° 17'.4	13'.8
06	233° 55'.1	311° 38'.2	04'.6	268° 09'.6	51'.1	229° 21'.3	44'.2	37° 19'.9	13'.8
07	248° 57'.6	326° 37'.5	04'.6	283° 10'.1	50'.5	244° 23'.3	44'.5	52° 22'.4	13'.7
08	264° 00'.0	341° 36'.9	04'.5	298° 10'.7	49'.8	259° 25'.2	44'.7	67° 25'.0	13'.7
09	279° 02'.5	356° 36'.2	04'.4	313° 11'.2	49'.2	274° 27'.2	44'.9	82° 27'.5	13'.6
10	294° 05'.0	11° 35'.6	04'.3	328° 11'.8	48'.5	289° 29'.2	45'.1	97° 30'.1	13'.6
11	309° 07'.4	26° 35'.0	04'.2	343° 12'.3	47'.9	304° 31'.1	45'.3	112° 32'.6	13'.5
12	324° 09'.9	41° 34'.3	21° 04'.1 S	358° 12'.8	14° 47'.2 S	319° 33'.1	0° 45'.5 N	127° 35'.1	4° 13'.5 S
13	339° 12'.4	56° 33'.7	04'.0	13° 13'.4	46'.6	334° 35'.1	45'.8	142° 37'.7	13'.5
14	354° 14'.8	71° 33'.1	03'.9	28° 13'.9	45'.9	349° 37'.1	46'.0	157° 40'.2	13'.4
15	9° 17'.3	86° 32'.4	03'.8	43° 14'.4	45'.3	4° 39'.0	46'.2	172° 42'.7	13'.4
16	24° 19'.8	101° 31'.8	03'.7	58° 15'.0	44'.6	19° 41'.0	46'.4	187° 45'.3	13'.3
17	39° 22'.2	116° 31'.2	03'.6	73° 15'.5	44'.0	34° 43'.0	46'.6	202° 47'.8	13'.3
18	54° 24'.7	131° 30'.5	03'.6	88° 16'.1	43'.3	49° 45'.0	46'.9	217° 50'.4	13'.3
19	69° 27'.1	146° 29'.9	03'.5	103° 16'.6	42'.7	64° 46'.9	47'.1	232° 52'.9	13'.2
20	84° 29'.6	161° 29'.3	03'.4	118° 17'.1	42'.0	79° 48'.9	47'.3	247° 55'.4	13'.2
21	99° 32'.1	176° 28'.6	03'.3	133° 17'.7	41'.4	94° 50'.9	47'.5	262° 58'.0	13'.1
22	114° 34'.5	191° 28'.0	03'.2	148° 18'.2	40'.7	109° 52'.9	47'.7	278° 00'.5	13'.1
23	129° 37'.0	206° 27'.3	03'.1	163° 18'.7	40'.0	124° 54'.8	47'.9	293° 03'.0	13'.0
	M.P. 14:27	v -0'.6	d 0'.1	v 0'.5	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.8 S
Achernar	335° 28'.2	57° 11'.0 S
Acrux	173° 10'.8	63° 09'.6 S
Adhara	255° 13'.5	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.7	55° 53'.6 N
Alkaid	152° 59'.9	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.4	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.2	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.9 S
Antares	112° 28'.4	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 32'.0	69° 02'.6 S
Avior	234° 18'.1	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.5	52° 42'.4 S
Capella	280° 36'.7	46° 00'.6 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 53'.0	61° 41'.2 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.4	57° 10'.5 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.1	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.3	34° 22'.7 S
Kochab	137° 19'.6	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.4	36° 25'.5 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 42'.8	49° 54'.3 N
Nunki	76° 00'.6	26° 16'.9 S
Peacock	53° 22'.3	56° 41'.8 S
Polaris	318° 40'.9	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.2	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.9	60° 52'.7 S
Sabik	102° 14'.6	15° 44'.3 S
Schedar	349° 42'.9	56° 36'.2 N
Shaula	96° 24'.4	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.4	38° 47'.5 N
Zuben'ubi	137° 07'.2	16° 05'.4 S

	SHA	Mer.Pass.
Venus	79° 15'.9	09:13
Mars	35° 12'.4	12:08
Jupiter	355° 40'.8	14:45
Saturn	163° 22'.7	03:35

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 26'.7	13° 52'.7 S	83° 33'.7	9'.6	22° 52'.7 N	4'.2	55'.9
191° 26'.7	51'.9	98° 02'.3	9'.5	56'.9	4'.0	56'.0
206° 26'.7	51'.0	112° 30'.8	9'.5	23° 00'.9 N	4'.0	
221° 26'.7	50'.2	126° 59'.3	9'.3	04'.9	3'.8	
236° 26'.7	49'.4	141° 27'.6	9'.4	08'.7	3'.7	56'.1
251° 26'.7	48'.5	155° 56'.0	9'.2	12'.4	3'.6	
266° 26'.7	47'.7	170° 24'.2	9'.1	16'.0	3'.4	
281° 26'.7	46'.9	184° 52'.3	9'.1	19'.4	3'.4	56'.2
296° 26'.7	46'.1	199° 20'.4	9'.0	22'.8	3'.2	
311° 26'.7	45'.2	213° 48'.4	9'.0	26'.0	3'.1	
326° 26'.7	44'.4	228° 16'.4	8'.9	29'.1	3'.0	56'.3
341° 26'.7	43'.6	242° 44'.3	8'.8	32'.1	2'.8	
356° 26'.7	13° 42'.7 S	257° 12'.1	8'.7	23° 34'.9 N	2'.7	56'.3
11° 26'.7	41'.9	271° 39'.8	8'.7	37'.6	2'.6	56'.4
26° 26'.8	41'.1	286° 07'.5	8'.6	40'.2	2'.5	
41° 26'.8	40'.2	300° 35'.1	8'.5	42'.7	2'.3	
56° 26'.8	39'.4	315° 02'.6	8'.5	45'.0	2'.3	56'.5
71° 26'.8	38'.6	329° 30'.1	8'.4	47'.3	2'.0	
86° 26'.8	37'.7	343° 57'.5	8'.3	49'.3	2'.0	56'.6
101° 26'.8	36'.9	358° 24'.8	8'.3	51'.3	1'.8	
116° 26'.8	36'.1	12° 52'.1	8'.2	53'.1	1'.7	
131° 26'.8	35'.2	27° 19'.3	8'.1	54'.8	1'.6	56'.7
146° 26'.8	34'.4	41° 46'.4	8'.1	56'.4	1'.4	
161° 26'.8	33'.6	56° 13'.5	8'.0	57'.8	1'.3	
176° 26'.8	13° 32'.7 S	70° 40'.5	8'.0	23° 59'.1 N	1'.2	56'.8
191° 26'.9	31'.9	85° 07'.5	7'.9	24° 00'.3 N	1'.0	
206° 26'.9	31'.1	99° 34'.4	7'.8	01'.3	0'.9	
221° 26'.9	30'.2	114° 01'.2	7'.8	02'.2	0'.8	56'.9
236° 26'.9	29'.4	128° 28'.0	7'.7	03'.0	0'.6	
251° 26'.9	28'.5	142° 54'.7	7'.7	03'.6	0'.5	57'.0
266° 26'.9	27'.7	157° 21'.4	7'.7	04'.1	0'.3	
281° 26'.9	26'.9	171° 48'.1	7'.5	04'.4	0'.2	
296° 26'.9	26'.0	186° 14'.6	7'.5	04'.6	0'.1	57'.1
311° 27'.0	25'.2	200° 41'.1	7'.5	04'.7	0'.1	
326° 27'.0	24'.4	215° 07'.6	7'.4	04'.6	0'.2	57'.2
341° 27'.0	23'.5	229° 34'.0	7'.4	04'.4	0'.3	
356° 27'.0	13° 22'.7 S	244° 00'.4	7'.3	24° 04'.1 N	0'.5	57'.2
11° 27'.0	21'.8	258° 26'.7	7'.3	03'.6	0'.7	57'.3
26° 27'.0	21'.0	272° 53'.0	7'.2	02'.9	0'.8	
41° 27'.0	20'.2	287° 19'.2	7'.2	02'.1	0'.9	57'.4
56° 27'.1	19'.3	301° 45'.4	7'.2	01'.2	1'.1	
71° 27'.1	18'.5	316° 11'.6	7'.1	00'.1	1'.2	
86° 27'.1	17'.6	330° 37'.7	7'.0	23° 58'.9 N	1'.3	57'.5
101° 27'.1	16'.8	345° 03'.7	7'.0	57'.6	1'.5	
116° 27'.1	15'.9	359° 29'.7	7'.0	56'.1	1'.7	
131° 27'.1	15'.1	13° 55'.7	7'.0	54'.4	1'.8	57'.6
146° 27'.2	14'.3	28° 21'.7	6'.9	52'.6	1'.9	
161° 27'.2	13'.4	42° 47'.6	6'.9	50'.7	2'.1	57'.7
176° 27'.2	13° 12'.6 S	57° 13'.5	6'.8	23° 48'.6 N	2'.2	57'.7
191° 27'.2	11'.7	71° 39'.3	6'.8	46'.4	2'.4	
206° 27'.2	10'.9	86° 05'.1	6'.8	44'.0	2'.5	57'.8
221° 27'.3	10'.0	100° 30'.9	6'.7	41'.5	2'.7	
236° 27'.3	09'.2	114° 56'.6	6'.8	38'.8	2'.8	57'.9
251° 27'.3	08'.3	129° 22'.4	6'.6	36'.0	3'.0	
266° 27'.3	07'.5	143° 48'.0	6'.7	33'.0	3'.1	
281° 27'.3	06'.6	158° 13'.7	6'.7	29'.9	3'.3	58'.0
296° 27'.4	05'.8	172° 39'.4	6'.6	26'.6	3'.4	
311° 27'.4	04'.9	187° 05'.0	6'.6	23'.2	3'.6	58'.1
326° 27'.4	04'.1	201° 30'.6	6'.6	19'.6	3'.7	
341° 27'.4	03'.3	215° 56'.2	6'.5	15'.9	3'.9	58'.2
356° 27'.4	13° 02'.4 S	230° 21'.7	6'.6	23° 12'.0 N	4'.0	58'.2
11° 27'.5	01'.6	244° 47'.3	6'.5	08'.0	4'.1	
26° 27'.5	00'.7	259° 12'.8	6'.5	03'.9	4'.4	58'.3
41° 27'.5	12° 59'.9 S	273° 38'.3	6'.5	22° 59'.5 N	4'.4	
56° 27'.5	59'.0	288° 03'.8	6'.5	55'.1	4'.6	58'.4
71° 27'.6	58'.2	302° 29'.3	6'.4	50'.5	4'.8	
86° 27'.6	57'.3	316° 54'.7	6'.5	45'.7	4'.9	
101° 27'.6	56'.4	331° 20'.2	6'.5	40'.8	5'.1	58'.5
116° 27'.6	55'.6	345° 45'.7	6'.4	35'.7	5'.2	
131° 27'.7	54'.7	0° 11'.1	6'.4	30'.5	5'.3	58'.6
146° 27'.7	53'.9	14° 36'.5	6'.5	25'.2	5'.5	
161° 27'.7	53'.0	29° 02'.0	6'.4	19'.7	5'.7	
SD 16'.2	d 0'.8	SD	15'.4	15'.6	15'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 12	Moonrise 13	Moonrise 14
N 72°	06:24	07:45	09:07	-	-	-
N 70°	06:22	07:34	08:45	-	-	-
68°	06:19	07:25	08:28	-	-	-
66°	06:17	07:17	08:14	07:43	07:50	09:35
64°	06:15	07:11	08:03	08:36	09:15	10:30
62°	06:13	07:05	07:53	09:08	09:53	11:03
60°	06:11	07:00	07:45	09:32	10:19	11:27
N 58°	06:10	06:56	07:37	09:52	10:40	11:46
56°	06:08	06:52	07:31	10:08	10:57	12:02
54°	06:06	06:48	07:25	10:22	11:12	12:16
52°	06:05	06:44	07:20	10:34	11:24	12:28
50°	06:03	06:41	07:15	10:44	11:35	12:39
45°	06:00	06:34	07:05	11:07	11:59	13:01
N 40°	05:56	06:28	06:56	11:25	12:17	13:18
35°	05:53	06:23	06:49	11:40	12:33	13:33
30°	05:49	06:17	06:42	11:53	12:47	13:46
20°	05:42	06:08	06:31	12:16	13:10	14:08
N 10°	05:34	05:59	06:20	12:35	13:30	14:28
0°	05:25	05:50	06:11	12:54	13:49	14:46
S 10°	05:14	05:39	06:01	13:12	14:07	15:03
20°	05:01	05:28	05:51	13:32	14:27	15:22
30°	04:44	05:13	05:38	13:55	14:51	15:44
35°	04:33	05:05	05:31	14:08	15:04	15:57
40°	04:19	04:54	05:23	14:23	15:20	16:12
45°	04:03	04:42	05:14	14:42	15:39	16:30
S 50°	03:41	04:26	05:02	15:05	16:02	16:51
52°	03:31	04:19	04:57	15:16	16:14	17:02
54°	03:18	04:11	04:51	15:29	16:26	17:13
56°	03:04	04:01	04:44	15:43	16:41	17:27
58°	02:46	03:50	04:37	16:00	16:58	17:42
S 60°	02:24	03:38	04:28	16:21	17:20	18:01
S 62°	01:53	03:23	04:19	16:47	17:46	18:23

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 12	Moonset 13	Moonset 14
N 72°	15:23	16:45	18:06	-	-	-
N 70°	15:45	16:56	18:09	-	-	-
68°	16:02	17:05	18:11	-	-	-
66°	16:16	17:12	18:13	05:32	07:18	07:31
64°	16:27	17:19	18:15	04:39	05:52	06:36
62°	16:37	17:24	18:17	04:07	05:15	06:03
60°	16:45	17:29	18:18	03:43	04:49	05:38
N 58°	16:52	17:34	18:20	03:24	04:28	05:19
56°	16:59	17:38	18:22	03:08	04:11	05:03
54°	17:04	17:41	18:23	02:54	03:56	04:49
52°	17:10	17:45	18:24	02:43	03:44	04:37
50°	17:14	17:48	18:26	02:32	03:33	04:26
45°	17:24	17:55	18:29	02:10	03:09	04:03
N 40°	17:33	18:01	18:33	01:52	02:51	03:45
35°	17:40	18:06	18:36	01:38	02:35	03:30
30°	17:47	18:11	18:40	01:25	02:22	03:17
20°	17:58	18:21	18:47	01:03	01:58	02:54
N 10°	18:08	18:30	18:55	00:44	01:38	02:34
0°	18:18	18:39	19:04	00:26	01:20	02:16
S 10°	18:27	18:49	19:14	00:08	01:01	01:57
20°	18:38	19:00	19:27	-	00:41	01:37
30°	18:50	19:15	19:44	-	00:18	01:14
35°	18:56	19:23	19:55	-	00:04	01:01
40°	19:04	19:33	20:08	23:48	-	00:45
45°	19:14	19:45	20:24	23:30	-	00:27
S 50°	19:25	20:01	20:45	23:06	-	00:03
52°	19:30	20:08	20:56	22:55	23:52	25:02
54°	19:36	20:16	21:08	22:43	23:39	24:50
56°	19:43	20:25	21:22	22:28	23:25	24:38
58°	19:50	20:36	21:39	22:11	23:08	24:22
S 60°	19:58	20:48	22:00	21:50	22:47	24:04
S 62°	20:08	21:03	22:29	21:23	22:20	23:42

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
12	14 13	14 13	12:14	19:07	06:40	9d 62%
13	14 13	14 12	12:14	20:02	07:34	10d 72%
14	14 11	14 10	12:14	20:59	08:31	11d 81%

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2011 February 15, 16, 17 (Tue, Wed, Thur)

GMT	ARIES	VENUS -4.2		MARS +1.1		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
15 00	144° 39'.5	221° 26'.7	21° 03'.0 S	178° 19'.3	14° 39'.4 S	139° 56'.8	0° 48'.2 N	308° 05'.6	4° 13'.0 S
01	159° 41'.9	236° 26'.1	02'.9	193° 19'.8	38'.7	154° 58'.8	48'.4	323° 08'.1	13'.0
02	174° 44'.4	251° 25'.4	02'.7	208° 20'.4	38'.1	170° 00'.7	48'.6	338° 10'.7	12'.9
03	189° 46'.9	266° 24'.8	02'.6	223° 20'.9	37'.4	185° 02'.7	48'.8	353° 13'.2	12'.9
Tuesday 04	204° 49'.3	281° 24'.2	02'.5	238° 21'.4	36'.8	200° 04'.7	49'.0	8° 15'.7	12'.8
05	219° 51'.8	296° 23'.5	02'.4	253° 22'.0	36'.1	215° 06'.7	49'.2	23° 18'.3	12'.8
06	234° 54'.3	311° 22'.9	02'.3	268° 22'.5	35'.5	230° 08'.6	49'.5	38° 20'.8	12'.8
07	249° 56'.7	326° 22'.2	02'.2	283° 23'.1	34'.8	245° 10'.6	49'.7	53° 23'.4	12'.7
08	264° 59'.2	341° 21'.6	02'.1	298° 23'.6	34'.1	260° 12'.6	49'.9	68° 25'.9	12'.7
09	280° 01'.6	356° 21'.0	02'.0	313° 24'.1	33'.5	275° 14'.5	50'.1	83° 28'.4	12'.6
10	295° 04'.1	11° 20'.3	01'.9	328° 24'.7	32'.8	290° 16'.5	50'.3	98° 31'.0	12'.6
11	310° 06'.6	26° 19'.7	01'.8	343° 25'.2	32'.2	305° 18'.5	50'.6	113° 33'.5	12'.5
12	325° 09'.0	41° 19'.0	21° 01'.6 S	358° 25'.8	14° 31'.5 S	320° 20'.5	0° 50'.8 N	128° 36'.1	4° 12'.5 S
13	340° 11'.5	56° 18'.4	01'.5	13° 26'.3	30'.9	335° 22'.4	51'.0	143° 38'.6	12'.5
14	355° 14'.0	71° 17'.8	01'.4	28° 26'.9	30'.2	350° 24'.4	51'.2	158° 41'.2	12'.4
15	10° 16'.4	86° 17'.1	01'.3	43° 27'.4	29'.5	5° 26'.4	51'.4	173° 43'.7	12'.4
16	25° 18'.9	101° 16'.5	01'.2	58° 27'.9	28'.9	20° 28'.3	51'.7	188° 46'.2	12'.3
17	40° 21'.4	116° 15'.9	01'.1	73° 28'.5	28'.2	35° 30'.3	51'.9	203° 48'.8	12'.3
18	55° 23'.8	131° 15'.2	00'.9	88° 29'.0	27'.6	50° 32'.3	52'.1	218° 51'.3	12'.2
19	70° 26'.3	146° 14'.6	00'.8	103° 29'.6	26'.9	65° 34'.3	52'.3	233° 53'.9	12'.2
20	85° 28'.8	161° 13'.9	00'.7	118° 30'.1	26'.2	80° 36'.2	52'.5	248° 56'.4	12'.2
21	100° 31'.2	176° 13'.3	00'.6	133° 30'.7	25'.6	95° 38'.2	52'.7	263° 58'.9	12'.1
22	115° 33'.7	191° 12'.7	00'.5	148° 31'.2	24'.9	110° 40'.2	53'.0	279° 01'.5	12'.1
23	130° 36'.1	206° 12'.0	00'.3	163° 31'.7	24'.3	125° 42'.1	53'.2	294° 04'.0	12'.0
16 00	145° 38'.6	221° 11'.4	21° 00'.2 S	178° 32'.3	14° 23'.6 S	140° 44'.1	0° 53'.4 N	309° 06'.6	4° 12'.0 S
01	160° 41'.1	236° 10'.7	00'.1	193° 32'.8	22'.9	155° 46'.1	53'.6	324° 09'.1	11'.9
02	175° 43'.5	251° 10'.1	20° 59'.9 S	208° 33'.4	22'.3	170° 48'.0	53'.8	339° 11'.7	11'.9
03	190° 46'.0	266° 09'.4	59'.8	223° 33'.9	21'.6	185° 50'.0	54'.1	354° 14'.2	11'.8
Wednesday 04	205° 48'.5	281° 08'.8	59'.7	238° 34'.5	21'.0	200° 52'.0	54'.3	9° 16'.7	11'.8
05	220° 50'.9	296° 08'.2	59'.6	253° 35'.0	20'.3	215° 54'.0	54'.5	24° 19'.3	11'.8
06	235° 53'.4	311° 07'.5	59'.4	268° 35'.6	19'.6	230° 55'.9	54'.7	39° 21'.8	11'.7
07	250° 55'.9	326° 06'.9	59'.3	283° 36'.1	19'.0	245° 57'.9	54'.9	54° 24'.4	11'.7
08	265° 58'.3	341° 06'.2	59'.2	298° 36'.6	18'.3	260° 59'.9	55'.2	69° 26'.9	11'.6
09	281° 00'.8	356° 05'.6	59'.0	313° 37'.2	17'.6	276° 01'.8	55'.4	84° 29'.5	11'.6
10	296° 03'.2	11° 05'.0	58'.9	328° 37'.7	17'.0	291° 03'.8	55'.6	99° 32'.0	11'.5
11	311° 05'.7	26° 04'.3	58'.7	343° 38'.3	16'.3	306° 05'.8	55'.8	114° 34'.6	11'.5
12	326° 08'.2	41° 03'.7	20° 58'.6 S	358° 38'.8	14° 15'.7 S	321° 07'.7	0° 56'.0 N	129° 37'.1	4° 11'.5 S
13	341° 10'.6	56° 03'.0	58'.5	13° 39'.4	15'.0	336° 09'.7	56'.2	144° 39'.6	11'.4
14	356° 13'.1	71° 02'.4	58'.3	28° 39'.9	14'.3	351° 11'.7	56'.5	159° 42'.2	11'.4
15	11° 15'.6	86° 01'.8	58'.2	43° 40'.5	13'.7	6° 13'.6	56'.7	174° 44'.7	11'.3
16	26° 18'.0	101° 01'.1	58'.0	58° 41'.0	13'.0	21° 15'.6	56'.9	189° 47'.3	11'.3
17	41° 20'.5	116° 00'.5	57'.9	73° 41'.6	12'.3	36° 17'.6	57'.1	204° 49'.8	11'.2
18	56° 23'.0	130° 59'.8	57'.8	88° 42'.1	11'.7	51° 19'.5	57'.3	219° 52'.4	11'.2
19	71° 25'.4	145° 59'.2	57'.6	103° 42'.7	11'.0	66° 21'.5	57'.6	234° 54'.9	11'.1
20	86° 27'.9	160° 58'.5	57'.5	118° 43'.2	10'.3	81° 23'.5	57'.8	249° 57'.5	11'.1
21	101° 30'.4	175° 57'.9	57'.3	133° 43'.7	09'.7	96° 25'.4	58'.0	265° 00'.0	11'.1
22	116° 32'.8	190° 57'.3	57'.2	148° 44'.3	09'.0	111° 27'.4	58'.2	280° 02'.6	11'.0
23	131° 35'.3	205° 56'.6	57'.0	163° 44'.8	08'.3	126° 29'.4	58'.4	295° 05'.1	11'.0
17 00	146° 37'.7	220° 56'.0	20° 56'.9 S	178° 45'.4	14° 07'.7 S	141° 31'.3	0° 58'.7 N	310° 07'.6	4° 10'.9 S
01	161° 40'.2	235° 55'.3	56'.7	193° 45'.9	07'.0	156° 33'.3	58'.9	325° 10'.2	10'.9
02	176° 42'.7	250° 54'.7	56'.6	208° 46'.5	06'.3	171° 35'.3	59'.1	340° 12'.7	10'.8
03	191° 45'.1	265° 54'.0	56'.4	223° 47'.0	05'.7	186° 37'.3	59'.3	355° 15'.3	10'.8
Thursday 04	206° 47'.6	280° 53'.4	56'.3	238° 47'.6	05'.0	201° 39'.2	59'.5	10° 17'.8	10'.7
05	221° 50'.1	295° 52'.7	56'.1	253° 48'.1	04'.3	216° 41'.2	59'.8	25° 20'.4	10'.7
06	236° 52'.5	310° 52'.1	56'.0	268° 48'.7	03'.7	231° 43'.2	1° 00'.0 N	40° 22'.9	10'.6
07	251° 55'.0	325° 51'.5	55'.8	283° 49'.2	03'.0	246° 45'.1	00'.2	55° 25'.5	10'.6
08	266° 57'.5	340° 50'.8	55'.6	298° 49'.8	02'.3	261° 47'.1	00'.4	70° 28'.0	10'.6
09	281° 59'.9	355° 50'.2	55'.5	313° 50'.3	01'.7	276° 49'.0	00'.6	85° 30'.6	10'.5
10	297° 02'.4	10° 49'.5	55'.3	328° 50'.9	01'.0	291° 51'.0	00'.9	100° 33'.1	10'.5
11	312° 04'.9	25° 48'.9	55'.2	343° 51'.4	00'.3	306° 53'.0	01'.1	115° 35'.7	10'.4
12	327° 07'.3	40° 48'.2	20° 55'.0 S	358° 52'.0	13° 59'.6 S	321° 54'.9	1° 01'.3 N	130° 38'.2	4° 10'.4 S
13	342° 09'.8	55° 47'.6	54'.8	13° 52'.5	59'.0	336° 56'.9	01'.5	145° 40'.8	10'.3
14	357° 12'.2	70° 47'.0	54'.7	28° 53'.1	58'.3	351° 58'.9	01'.7	160° 43'.3	10'.3
15	12° 14'.7	85° 46'.3	54'.5	43° 53'.6	57'.6	7° 00'.8	02'.0	175° 45'.9	10'.2
16	27° 17'.2	100° 45'.7	54'.3	58° 54'.2	57'.0	22° 02'.8	02'.2	190° 48'.4	10'.2
17	42° 19'.6	115° 45'.0	54'.2	73° 54'.7	56'.3	37° 04'.8	02'.4	205° 51'.0	10'.1
18	57° 22'.1	130° 44'.4	54'.0	88° 55'.3	55'.6	52° 06'.7	02'.6	220° 53'.5	10'.1
19	72° 24'.6	145° 43'.7	53'.8	103° 55'.8	55'.0	67° 08'.7	02'.8	235° 56'.1	10'.1
20	87° 27'.0	160° 43'.1	53'.7	118° 56'.4	54'.3	82° 10'.7	03'.1	250° 58'.6	10'.0
21	102° 29'.5	175° 42'.4	53'.5	133° 56'.9	53'.6	97° 12'.6	03'.3	266° 01'.2	10'.0
22	117° 32'.0	190° 41'.8	53'.3	148° 57'.5	52'.9	112° 14'.6	03'.5	281° 03'.7	09'.9
23	132° 34'.4	205° 41'.2	53'.1	163° 58'.0	52'.3	127° 16'.6	03'.7	296° 06'.3	09'.9
	M.P. 14:15	v -0'.6	d 0'.1	v 0'.5	d 0'.7	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.8 S
Achernar	335° 28'.2	57° 11'.0 S
Acrux	173° 10'.8	63° 09'.6 S
Adhara	255° 13'.5	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.6	55° 53'.6 N
Alkaid	152° 59'.9	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.4	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.1	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.9 S
Antares	112° 28'.4	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 31'.9	69° 02'.6 S
Avior	234° 18'.2	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.5	52° 42'.4 S
Capella	280° 36'.7	46° 00'.7 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.4	57° 10'.5 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.1	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.2	34° 22'.7 S
Kochab	137° 19'.5	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.4	36° 25'.5 S
Miaplacidus	221° 39'.2	69° 46'.0 S
Mirfak	308° 42'.8	49° 54'.3 N
Nunki	76° 00'.6	26° 16'.9 S
Peacock	53° 22'.3	56° 41'.8 S
Polaris	318° 42'.2	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.1	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.8	60° 52'.7 S
Sabik	102° 14'.6	15° 44'.3 S
Schedar	349° 42'.9	56° 36'.1 N
Shaula	96° 24'.3	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.4	38° 47'.5 N
Zuben'ubi	137° 07'.2	16° 05'.4 S

	SHA	Mer.Pass.
Venus	75° 32'.8	09:16
Mars	32° 53'.7	12:05
Jupiter	355° 05'.5	14:35
Saturn	163° 28'.0	03:23

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 27'.7	12° 52'.2 S	43° 27'.4	6'.4	22° 14'.0 N	5'.8	58'.7
191° 27'.8	51'.3	57° 52'.8	6'.4	08'.2	5'.9	
206° 27'.8	50'.5	72° 18'.2	6'.5	02'.3	6'.1	58'.8
221° 27'.8	49'.6	86° 43'.7	6'.4	21° 56'.2 N	6'.2	
236° 27'.8	48'.8	101° 09'.1	6'.4	50'.0	6'.4	
251° 27'.9	47'.9	115° 34'.5	6'.4	43'.6	6'.6	58'.9
266° 27'.9	47'.1	129° 59'.9	6'.5	37'.0	6'.6	
281° 27'.9	46'.2	144° 25'.4	6'.4	30'.4	6'.9	59'.0
296° 28'.0	45'.3	158° 50'.8	6'.4	23'.5	6'.9	
311° 28'.0	44'.5	173° 16'.2	6'.5	16'.6	7'.1	
326° 28'.0	43'.6	187° 41'.7	6'.5	09'.5	7'.3	59'.1
341° 28'.0	42'.8	202° 07'.2	6'.4	02'.2	7'.4	
356° 28'.1	12° 41'.9 S	216° 32'.6	6'.5	20° 54'.8 N	7'.5	59'.1
11° 28'.1	41'.1	230° 58'.1	6'.5	47'.3	7'.7	59'.2
26° 28'.1	40'.2	245° 23'.6	6'.5	39'.6	7'.8	
41° 28'.2	39'.3	259° 49'.1	6'.5	31'.8	8'.0	59'.3
56° 28'.2	38'.5	274° 14'.6	6'.5	23'.8	8'.1	
71° 28'.2	37'.6	288° 40'.1	6'.6	15'.7	8'.3	
86° 28'.3	36'.8	303° 05'.7	6'.5	07'.4	8'.3	59'.4
101° 28'.3	35'.9	317° 31'.2	6'.6	19° 59'.1 N	8'.6	
116° 28'.3	35'.0	331° 56'.8	6'.6	50'.5	8'.6	59'.5
131° 28'.4	34'.2	346° 22'.4	6'.6	41'.9	8'.8	
146° 28'.4	33'.3	0° 48'.0	6'.7	33'.1	9'.0	
161° 28'.4	32'.5	15° 13'.7	6'.6	24'.1	9'.0	59'.6
176° 28'.5	12° 31'.6 S	29° 39'.3	6'.7	19° 15'.1 N	9'.2	59'.6
191° 28'.5	30'.7	44° 05'.0	6'.7	05'.9	9'.4	
206° 28'.5	29'.9	58° 30'.7	6'.7	18° 56'.5 N	9'.4	59'.7
221° 28'.6	29'.0	72° 56'.4	6'.7	47'.1	9'.6	
236° 28'.6	28'.1	87° 22'.1	6'.8	37'.5	9'.8	
251° 28'.6	27'.3	101° 47'.9	6'.8	27'.7	9'.8	59'.8
266° 28'.7	26'.4	116° 13'.7	6'.8	17'.9	10'.0	
281° 28'.7	25'.6	130° 39'.5	6'.8	07'.9	10'.1	
296° 28'.7	24'.7	145° 05'.3	6'.9	17° 57'.8 N	10'.3	59'.9
311° 28'.8	23'.8	159° 31'.2	6'.9	47'.5	10'.3	
326° 28'.8	23'.0	173° 57'.1	6'.9	37'.2	10'.5	
341° 28'.9	22'.1	188° 23'.0	7'.0	26'.7	10'.6	60'.0
356° 28'.9	12° 21'.2 S	202° 49'.0	7'.0	17° 16'.1 N	10'.7	60'.0
11° 28'.9	20'.4	217° 15'.0	7'.0	05'.4	10'.9	
26° 29'.0	19'.5	231° 41'.0	7'.0	16° 54'.5 N	11'.0	60'.1
41° 29'.0	18'.6	246° 07'.0	7'.1	43'.5	11'.1	
56° 29'.0	17'.8	260° 33'.1	7'.1	32'.4	11'.2	
71° 29'.1	16'.9	274° 59'.2	7'.1	21'.2	11'.3	60'.2
86° 29'.1	16'.0	289° 25'.3	7'.1	09'.9	11'.4	
101° 29'.2	15'.2	303° 51'.4	7'.2	15° 58'.5 N	11'.6	
116° 29'.2	14'.3	318° 17'.6	7'.3	46'.9	11'.7	60'.3
131° 29'.2	13'.4	332° 43'.9	7'.2	35'.2	11'.7	
146° 29'.3	12'.6	347° 10'.1	7'.3	23'.5	11'.9	
161° 29'.3	11'.7	1° 36'.4	7'.3	11'.6	12'.0	60'.4
176° 29'.4	12° 10'.8 S	16° 02'.7	7'.3	14° 59'.6 N	12'.1	60'.4
191° 29'.4	09'.9	30° 29'.0	7'.4	47'.5	12'.2	
206° 29'.5	09'.1	44° 55'.4	7'.4	35'.3	12'.3	
221° 29'.5	08'.2	59° 21'.8	7'.5	23'.0	12'.4	60'.5
236° 29'.5	07'.3	73° 48'.3	7'.5	10'.6	12'.5	
251° 29'.6	06'.5	88° 14'.8	7'.5	13° 58'.1 N	12'.6	
266° 29'.6	05'.6	102° 41'.3	7'.5	45'.5	12'.7	
281° 29'.7	04'.7	117° 07'.8	7'.6	32'.8	12'.8	60'.6
296° 29'.7	03'.8	131° 34'.4	7'.6	20'.0	12'.9	
311° 29'.8	03'.0	146° 01'.0	7'.6	07'.1	13'.0	
326° 29'.8	02'.1	160° 27'.6	7'.7	12° 54'.1 N	13'.1	
341° 29'.8	01'.2	174° 54'.3	7'.7	41'.0	13'.2	60'.7
356° 29'.9	12° 00'.3 S	189° 21'.0	7'.7	12° 27'.8 N	13'.2	60'.7
11° 29'.9	11° 59'.5 S	203° 47'.7	7'.8	14'.6	13'.4	
26° 30'.0	58'.6	218° 14'.5	7'.8	01'.2	13'.4	
41° 30'.0	57'.7	232° 41'.3	7'.8	11° 47'.8 N	13'.5	60'.8
56° 30'.1	56'.8	247° 08'.1	7'.9	34'.3	13'.6	
71° 30'.1	56'.0	261° 35'.0	7'.9	20'.7	13'.7	
86° 30'.2	55'.1	276° 01'.9	7'.9	07'.0	13'.8	
101° 30'.2	54'.2	290° 28'.8	8'.0	10° 53'.2 N	13'.8	
116° 30'.3	53'.3	304° 55'.8	8'.0	39'.4	13'.9	60'.9
131° 30'.3	52'.5	319° 22'.8	8'.0	25'.5	14'.0	
146° 30'.4	51'.6	333° 49'.8	8'.0	11'.5	14'.0	
161° 30'.4	50'.7	348° 16'.8	8'.1	9° 57'.5 N	14'.2	
SD 16'.2	d 0'.9	SD	16'.1	16'.4	16'.5	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 15	Moonrise 16	Moonrise 17
N 72°	06:12	07:31	08:50	-	11:40	14:51
N 70°	06:10	07:22	08:31	-	12:42	15:13
68°	06:09	07:14	08:15	10:47	13:17	15:29
66°	06:08	07:08	08:03	11:39	13:42	15:43
64°	06:06	07:02	07:53	12:11	14:01	15:53
62°	06:05	06:57	07:44	12:34	14:17	16:03
60°	06:04	06:53	07:36	12:53	14:30	16:11
N 58°	06:03	06:49	07:30	13:09	14:41	16:17
56°	06:02	06:45	07:24	13:22	14:50	16:24
54°	06:01	06:42	07:19	13:33	14:59	16:29
52°	06:00	06:39	07:14	13:43	15:07	16:34
50°	05:58	06:36	07:09	13:52	15:13	16:38
45°	05:56	06:30	07:00	14:11	15:28	16:48
N 40°	05:53	06:24	06:52	14:27	15:40	16:56
35°	05:50	06:20	06:45	14:40	15:50	17:02
30°	05:47	06:15	06:39	14:51	15:59	17:08
20°	05:40	06:06	06:29	15:11	16:14	17:18
N 10°	05:33	05:58	06:20	15:27	16:28	17:27
0°	05:25	05:50	06:11	15:43	16:40	17:36
S 10°	05:15	05:40	06:02	15:59	16:52	17:44
20°	05:03	05:29	05:52	16:15	17:05	17:53
30°	04:46	05:16	05:41	16:34	17:20	18:03
35°	04:36	05:08	05:34	16:46	17:29	18:09
40°	04:24	04:58	05:27	16:58	17:39	18:15
45°	04:08	04:47	05:18	17:13	17:50	18:23
S 50°	03:48	04:32	05:08	17:32	18:04	18:32
52°	03:38	04:25	05:03	17:40	18:11	18:36
54°	03:27	04:18	04:57	17:50	18:18	18:40
56°	03:13	04:09	04:51	18:01	18:26	18:45
58°	02:58	03:59	04:44	18:13	18:35	18:51
S 60°	02:38	03:47	04:37	18:27	18:45	18:57
S 62°	02:12	03:34	04:28	18:44	18:57	19:05

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 15	Moonset 16	Moonset 17
N 72°	15:40	16:58	18:19	-	09:30	08:17
N 70°	15:59	17:08	18:20	-	08:26	07:54
68°	16:14	17:15	18:21	08:21	07:50	07:35
66°	16:26	17:22	18:22	07:28	07:24	07:20
64°	16:37	17:27	18:23	06:55	07:04	07:08
62°	16:45	17:32	18:24	06:31	06:48	06:58
60°	16:53	17:37	18:25	06:12	06:34	06:49
N 58°	16:59	17:40	18:26	05:56	06:22	06:41
56°	17:05	17:44	18:27	05:42	06:11	06:34
54°	17:10	17:47	18:28	05:30	06:02	06:27
52°	17:15	17:50	18:30	05:20	05:54	06:21
50°	17:19	17:53	18:31	05:10	05:46	06:16
45°	17:29	17:59	18:33	04:50	05:31	06:05
N 40°	17:37	18:04	18:36	04:34	05:17	05:56
35°	17:43	18:09	18:39	04:20	05:06	05:48
30°	17:49	18:14	18:42	04:08	04:56	05:40
20°	18:00	18:22	18:48	03:48	04:39	05:28
N 10°	18:09	18:30	18:55	03:30	04:24	05:17
0°	18:17	18:39	19:03	03:13	04:10	05:07
S 10°	18:26	18:48	19:13	02:56	03:56	04:56
20°	18:36	18:59	19:25	02:38	03:41	04:45
30°	18:47	19:12	19:41	02:17	03:23	04:32
35°	18:53	19:20	19:51	02:04	03:13	04:24
40°	19:01	19:29	20:04	01:50	03:01	04:16
45°	19:09	19:40	20:19	01:33	02:47	04:06
S 50°	19:20	19:55	20:38	01:12	02:30	03:53
52°	19:24	20:01	20:48	01:02	02:22	03:47
54°	19:30	20:09	20:59	00:50	02:13	03:41
56°	19:36	20:17	21:12	00:38	02:02	03:34
58°	19:42	20:27	21:28	00:22	01:51	03:26
S 60°	19:50	20:38	21:47	00:04	01:37	03:17
S 62°	19:58	20:52	22:11	-	01:21	03:06

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
15	14 09	14 08	12:14	21:57	09:28	12d 89%
16	14 06	14 05	12:14	22:53	10:25	13d 95%
17	14 03	14 01	12:14	23:49	11:21	14d 99%

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2011 February 18, 19, 20 (Fri, Sat, Sun)

GMT	ARIES	VENUS -4.2		MARS +1.1		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
18 00	147° 36'.9	220° 40'.5	20° 53'.0 S	178° 58'.6	13° 51'.6 S	142° 18'.5	1° 03'.9 N	311° 08'.8	4° 09'.8 S
01	162° 39'.3	235° 39'.9	52'.8	193° 59'.2	50'.9	157° 20'.5	04'.2	326° 11'.4	09'.8
02	177° 41'.8	250° 39'.2	52'.6	208° 59'.7	50'.2	172° 22'.5	04'.4	341° 13'.9	09'.7
03	192° 44'.3	265° 38'.6	52'.4	224° 00'.3	49'.6	187° 24'.4	04'.6	356° 16'.5	09'.7
04	207° 46'.7	280° 37'.9	52'.3	239° 00'.8	48'.9	202° 26'.4	04'.8	11° 19'.0	09'.6
05	222° 49'.2	295° 37'.3	52'.1	254° 01'.4	48'.2	217° 28'.4	05'.1	26° 21'.6	09'.6
06	237° 51'.7	310° 36'.6	51'.9	269° 01'.9	47'.6	232° 30'.3	05'.3	41° 24'.1	09'.5
07	252° 54'.1	325° 36'.0	51'.7	284° 02'.5	46'.9	247° 32'.3	05'.5	56° 26'.7	09'.5
08	267° 56'.6	340° 35'.3	51'.5	299° 03'.0	46'.2	262° 34'.2	05'.7	71° 29'.2	09'.4
09	282° 59'.1	355° 34'.7	51'.4	314° 03'.6	45'.5	277° 36'.2	05'.9	86° 31'.8	09'.4
10	298° 01'.5	10° 34'.1	51'.2	329° 04'.1	44'.9	292° 38'.2	06'.2	101° 34'.3	09'.4
11	313° 04'.0	25° 33'.4	51'.0	344° 04'.7	44'.2	307° 40'.1	06'.4	116° 36'.9	09'.3
12	328° 06'.5	40° 32'.8	20° 50'.8 S	359° 05'.2	13° 43'.5 S	322° 42'.1	1° 06'.6 N	131° 39'.4	4° 09'.3 S
13	343° 08'.9	55° 32'.1	50'.6	14° 05'.8	42'.8	337° 44'.1	06'.8	146° 42'.0	09'.2
14	358° 11'.4	70° 31'.5	50'.4	29° 06'.4	42'.2	352° 46'.0	07'.0	161° 44'.5	09'.2
15	13° 13'.8	85° 30'.8	50'.2	44° 06'.9	41'.5	7° 48'.0	07'.3	176° 47'.1	09'.1
16	28° 16'.3	100° 30'.2	50'.1	59° 07'.5	40'.8	22° 50'.0	07'.5	191° 49'.6	09'.1
17	43° 18'.8	115° 29'.5	49'.9	74° 08'.0	40'.1	37° 51'.9	07'.7	206° 52'.2	09'.0
18	58° 21'.2	130° 28'.9	49'.7	89° 08'.6	39'.4	52° 53'.9	07'.9	221° 54'.7	09'.0
19	73° 23'.7	145° 28'.2	49'.5	104° 09'.1	38'.8	67° 55'.8	08'.1	236° 57'.3	08'.9
20	88° 26'.2	160° 27'.6	49'.3	119° 09'.7	38'.1	82° 57'.8	08'.4	251° 59'.8	08'.9
21	103° 28'.6	175° 26'.9	49'.1	134° 10'.2	37'.4	97° 59'.8	08'.6	267° 02'.4	08'.8
22	118° 31'.1	190° 26'.3	48'.9	149° 10'.8	36'.7	113° 01'.7	08'.8	282° 04'.9	08'.8
23	133° 33'.6	205° 25'.6	48'.7	164° 11'.4	36'.1	128° 03'.7	09'.0	297° 07'.5	08'.7
19 00	148° 36'.0	220° 25'.0	20° 48'.5 S	179° 11'.9	13° 35'.4 S	143° 05'.7	1° 09'.3 N	312° 10'.1	4° 08'.7 S
01	163° 38'.5	235° 24'.4	48'.3	194° 12'.5	34'.7	158° 07'.6	09'.5	327° 12'.6	08'.6
02	178° 41'.0	250° 23'.7	48'.1	209° 13'.0	34'.0	173° 09'.6	09'.7	342° 15'.2	08'.6
03	193° 43'.4	265° 23'.1	47'.9	224° 13'.6	33'.3	188° 11'.5	09'.9	357° 17'.7	08'.5
04	208° 45'.9	280° 22'.4	47'.7	239° 14'.1	32'.7	203° 13'.5	10'.1	12° 20'.3	08'.5
05	223° 48'.3	295° 21'.8	47'.5	254° 14'.7	32'.0	218° 15'.5	10'.4	27° 22'.8	08'.5
06	238° 50'.8	310° 21'.1	47'.3	269° 15'.3	31'.3	233° 17'.4	10'.6	42° 25'.4	08'.4
07	253° 53'.3	325° 20'.5	47'.1	284° 15'.8	30'.6	248° 19'.4	10'.8	57° 27'.9	08'.4
08	268° 55'.7	340° 19'.8	46'.9	299° 16'.4	29'.9	263° 21'.3	11'.0	72° 30'.5	08'.3
09	283° 58'.2	355° 19'.2	46'.7	314° 16'.9	29'.3	278° 23'.3	11'.3	87° 33'.0	08'.3
10	299° 00'.7	10° 18'.5	46'.5	329° 17'.5	28'.6	293° 25'.3	11'.5	102° 35'.6	08'.2
11	314° 03'.1	25° 17'.9	46'.3	344° 18'.0	27'.9	308° 27'.2	11'.7	117° 38'.2	08'.2
12	329° 05'.6	40° 17'.2	20° 46'.0 S	359° 18'.6	13° 27'.2 S	323° 29'.2	1° 11'.9 N	132° 40'.7	4° 08'.1 S
13	344° 08'.1	55° 16'.6	45'.8	14° 19'.2	26'.5	338° 31'.2	12'.1	147° 43'.3	08'.1
14	359° 10'.5	70° 15'.9	45'.6	29° 19'.7	25'.9	353° 33'.1	12'.4	162° 45'.8	08'.0
15	14° 13'.0	85° 15'.3	45'.4	44° 20'.3	25'.2	8° 35'.1	12'.6	177° 48'.4	08'.0
16	29° 15'.4	100° 14'.6	45'.2	59° 20'.8	24'.5	23° 37'.0	12'.8	192° 50'.9	07'.9
17	44° 17'.9	115° 14'.0	45'.0	74° 21'.4	23'.8	38° 39'.0	13'.0	207° 53'.5	07'.9
18	59° 20'.4	130° 13'.3	44'.8	89° 22'.0	23'.1	53° 41'.0	13'.2	222° 56'.0	07'.8
19	74° 22'.8	145° 12'.7	44'.5	104° 22'.5	22'.4	68° 42'.9	13'.5	237° 58'.6	07'.8
20	89° 25'.3	160° 12'.1	44'.3	119° 23'.1	21'.8	83° 44'.9	13'.7	253° 01'.2	07'.7
21	104° 27'.8	175° 11'.4	44'.1	134° 23'.6	21'.1	98° 46'.8	13'.9	268° 03'.7	07'.7
22	119° 30'.2	190° 10'.8	43'.9	149° 24'.2	20'.4	113° 48'.8	14'.1	283° 06'.3	07'.6
23	134° 32'.7	205° 10'.1	43'.7	164° 24'.8	19'.7	128° 50'.8	14'.4	298° 08'.8	07'.6
20 00	149° 35'.2	220° 09'.5	20° 43'.4 S	179° 25'.3	13° 19'.0 S	143° 52'.7	1° 14'.6 N	313° 11'.4	4° 07'.5 S
01	164° 37'.6	235° 08'.8	43'.2	194° 25'.9	18'.3	158° 54'.7	14'.8	328° 13'.9	07'.5
02	179° 40'.1	250° 08'.2	43'.0	209° 26'.4	17'.7	173° 56'.6	15'.0	343° 16'.5	07'.4
03	194° 42'.6	265° 07'.5	42'.8	224° 27'.0	17'.0	188° 58'.6	15'.2	358° 19'.1	07'.4
04	209° 45'.0	280° 06'.9	42'.5	239° 27'.6	16'.3	204° 00'.6	15'.5	13° 21'.6	07'.3
05	224° 47'.5	295° 06'.2	42'.3	254° 28'.1	15'.6	219° 02'.5	15'.7	28° 24'.2	07'.3
06	239° 49'.9	310° 05'.6	42'.1	269° 28'.7	14'.9	234° 04'.5	15'.9	43° 26'.7	07'.2
07	254° 52'.4	325° 04'.9	41'.9	284° 29'.3	14'.2	249° 06'.4	16'.1	58° 29'.3	07'.2
08	269° 54'.9	340° 04'.3	41'.6	299° 29'.8	13'.6	264° 08'.4	16'.4	73° 31'.9	07'.1
09	284° 57'.3	355° 03'.6	41'.4	314° 30'.4	12'.9	279° 10'.4	16'.6	88° 34'.4	07'.1
10	299° 59'.8	10° 03'.0	41'.2	329° 30'.9	12'.2	294° 12'.3	16'.8	103° 37'.0	07'.0
11	315° 02'.3	25° 02'.3	40'.9	344° 31'.5	11'.5	309° 14'.3	17'.0	118° 39'.5	07'.0
12	330° 04'.7	40° 01'.7	20° 40'.7 S	359° 32'.1	13° 10'.8 S	324° 16'.2	1° 17'.3 N	133° 42'.1	4° 06'.9 S
13	345° 07'.2	55° 01'.0	40'.5	14° 32'.6	10'.1	339° 18'.2	17'.5	148° 44'.6	06'.9
14	0° 09'.7	70° 00'.4	40'.2	29° 33'.2	09'.4	354° 20'.1	17'.7	163° 47'.2	06'.8
15	15° 12'.1	84° 59'.7	40'.0	44° 33'.8	08'.7	9° 22'.1	17'.9	178° 49'.8	06'.8
16	30° 14'.6	99° 59'.1	39'.8	59° 34'.3	08'.1	24° 24'.1	18'.1	193° 52'.3	06'.7
17	45° 17'.0	114° 58'.4	39'.5	74° 34'.9	07'.4	39° 26'.0	18'.4	208° 54'.9	06'.7
18	60° 19'.5	129° 57'.8	39'.3	89° 35'.4	06'.7	54° 28'.0	18'.6	223° 57'.4	06'.6
19	75° 22'.0	144° 57'.1	39'.0	104° 36'.0	06'.0	69° 29'.9	18'.8	239° 00'.0	06'.6
20	90° 24'.4	159° 56'.5	38'.8	119° 36'.6	05'.3	84° 31'.9	19'.0	254° 02'.6	06'.5
21	105° 26'.9	174° 55'.9	38'.6	134° 37'.1	04'.6	99° 33'.9	19'.3	269° 05'.1	06'.5
22	120° 29'.4	189° 55'.2	38'.3	149° 37'.7	03'.9	114° 35'.8	19'.5	284° 07'.7	06'.4
23	135° 31'.8	204° 54'.6	38'.1	164° 38'.3	03'.2	129° 37'.8	19'.7	299° 10'.2	06'.4
	M.P. 14:03	v -0'.6	d 0'.2	v 0'.6	d 0'.7	v 2'.0	d 0'.2	v 2'.6	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.8 S
Achernar	335° 28'.2	57° 11'.0 S
Acrux	173° 10'.8	63° 09'.6 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.6	55° 53'.6 N
Alkaid	152° 59'.8	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.1	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.3	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 31'.9	69° 02'.6 S
Avior	234° 18'.2	59° 33'.0 S
Bellatrix	278° 33'.6	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.6	52° 42'.4 S
Capella	280° 36'.7	46° 00'.7 N
Deneb	49° 33'.1	45° 19'.2 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.4	57° 10'.5 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.0	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.2	34° 22'.7 S
Kochab	137° 19'.4	74° 06'.2 N
Markab	13° 40'.3	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.0 N
Menkent	148° 09'.4	36° 25'.5 S
Miaplacidus	221° 39'.3	69° 46'.0 S
Mirfak	308° 42'.8	49° 54'.3 N
Nunki	76° 00'.6	26° 16'.9 S
Peacock	53° 22'.3	56° 41'.8 S
Polaris	318° 43'.6	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.1	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.8	60° 52'.7 S
Sabik	102° 14'.5	15° 44'.3 S
Schedar	349° 42'.9	56° 36'.1 N
Shaula	96° 24'.3	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.4	38° 47'.4 N
Zuben'ubi	137° 07'.2	16° 05'.4 S

	SHA	Mer.Pass.
Venus	71° 49'.0	09:19
Mars	30° 35'.9	12:03
Jupiter	354° 29'.6	14:26
Saturn	163° 34'.0	03:11

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 30'.5	11° 49'.8 S	2° 43'.9	8'.1	9° 43'.3 N	14'.2	60'.9
191° 30'.5	49'.0	17° 11'.0	8'.1	29'.1	14'.2	61'.0
206° 30'.6	48'.1	31° 38'.1	8'.2	14'.9	14'.3	
221° 30'.6	47'.2	46° 05'.3	8'.2	00'.6	14'.4	
236° 30'.7	46'.3	60° 32'.5	8'.2	8° 46'.2 N	14'.5	
251° 30'.7	45'.4	74° 59'.7	8'.3	31'.7	14'.5	
266° 30'.8	44'.6	89° 27'.0	8'.2	17'.2	14'.6	
281° 30'.8	43'.7	103° 54'.2	8'.3	02'.6	14'.6	
296° 30'.9	42'.8	118° 21'.5	8'.4	7° 48'.0 N	14'.7	61'.1
311° 30'.9	41'.9	132° 48'.9	8'.3	33'.3	14'.7	
326° 31'.0	41'.0	147° 16'.2	8'.4	18'.6	14'.8	
341° 31'.0	40'.1	161° 43'.6	8'.4	03'.8	14'.8	
356° 31'.1	11° 39'.3 S	176° 11'.0	8'.4	6° 49'.0 N	14'.9	61'.1
11° 31'.1	38'.4	190° 38'.4	8'.5	34'.1	14'.9	
26° 31'.2	37'.5	205° 05'.9	8'.4	19'.2	15'.0	
41° 31'.2	36'.6	219° 33'.3	8'.5	04'.2	15'.0	
56° 31'.3	35'.7	234° 00'.8	8'.5	5° 49'.2 N	15'.0	
71° 31'.3	34'.9	248° 28'.3	8'.6	34'.2	15'.1	
86° 31'.4	34'.0	262° 55'.9	8'.5	19'.1	15'.1	61'.2
101° 31'.4	33'.1	277° 23'.4	8'.6	04'.0	15'.2	
116° 31'.5	32'.2	291° 51'.0	8'.6	4° 48'.8 N	15'.1	
131° 31'.5	31'.3	306° 18'.6	8'.6	33'.7	15'.3	
146° 31'.6	30'.4	320° 46'.2	8'.6	18'.4	15'.2	
161° 31'.7	29'.5	335° 13'.8	8'.7	03'.2	15'.3	
176° 31'.7	11° 28'.7 S	349° 41'.5	8'.6	3° 47'.9 N	15'.3	61'.2
191° 31'.8	27'.8	4° 09'.1	8'.7	32'.6	15'.3	
206° 31'.8	26'.9	18° 36'.8	8'.7	17'.3	15'.3	
221° 31'.9	26'.0	33° 04'.5	8'.7	02'.0	15'.4	
236° 31'.9	25'.1	47° 32'.2	8'.7	2° 46'.6 N	15'.3	
251° 32'.0	24'.2	61° 59'.9	8'.8	31'.3	15'.4	
266° 32'.1	23'.3	76° 27'.7	8'.7	15'.9	15'.4	
281° 32'.1	22'.5	90° 55'.4	8'.8	00'.5	15'.4	
296° 32'.2	21'.6	105° 23'.2	8'.8	1° 45'.1 N	15'.5	
311° 32'.2	20'.7	119° 51'.0	8'.7	29'.6	15'.4	
326° 32'.3	19'.8	134° 18'.7	8'.8	14'.2	15'.4	
341° 32'.3	18'.9	148° 46'.5	8'.8	0° 58'.8 N	15'.5	
356° 32'.4	11° 18'.0 S	163° 14'.3	8'.8	0° 43'.3 N	15'.4	61'.2
11° 32'.5	17'.1	177° 42'.1	8'.8	27'.9	15'.5	
26° 32'.5	16'.2	192° 09'.9	8'.9	12'.4	15'.4	
41° 32'.6	15'.3	206° 37'.8	8'.8	0° 03'.0 S	15'.4	
56° 32'.6	14'.4	221° 05'.6	8'.8	18'.4	15'.5	
71° 32'.7	13'.6	235° 33'.4	8'.9	33'.9	15'.4	
86° 32'.8	12'.7	250° 01'.3	8'.8	49'.3	15'.4	
101° 32'.8	11'.8	264° 29'.1	8'.8	1° 04'.7 S	15'.4	
116° 32'.9	10'.9	278° 56'.9	8'.9	20'.1	15'.4	
131° 33'.0	10'.0	293° 24'.8	8'.8	35'.5	15'.4	
146° 33'.0	09'.1	307° 52'.6	8'.9	50'.9	15'.4	61'.1
161° 33'.1	08'.2	322° 20'.5	8'.8	2° 06'.3 S	15'.3	
176° 33'.1	11° 07'.3 S	336° 48'.3	8'.9	2° 21'.6 S	15'.3	61'.1
191° 33'.2	06'.4	351° 16'.2	8'.8	36'.9	15'.3	
206° 33'.3	05'.5	5° 44'.0	8'.9	52'.2	15'.3	
221° 33'.3	04'.6	20° 11'.9	8'.8	3° 07'.5 S	15'.3	
236° 33'.4	03'.7	34° 39'.7	8'.8	22'.8	15'.2	
251° 33'.5	02'.8	49° 07'.5	8'.9	38'.0	15'.2	
266° 33'.5	01'.9	63° 35'.4	8'.8	53'.2	15'.2	
281° 33'.6	01'.1	78° 03'.2	8'.8	4° 08'.4 S	15'.1	
296° 33'.7	00'.2	92° 31'.0	8'.8	23'.5	15'.1	61'.0
311° 33'.7	10° 59'.3 S	106° 58'.8	8'.8	38'.6	15'.1	
326° 33'.8	58'.4	121° 26'.6	8'.8	53'.7	15'.0	
341° 33'.8	57'.5	135° 54'.4	8'.8	5° 08'.7 S	15'.0	
356° 33'.9	10° 56'.6 S	150° 22'.2	8'.8	5° 23'.7 S	14'.9	61'.0
11° 34'.0	55'.7	164° 50'.0	8'.8	38'.6	14'.9	
26° 34'.0	54'.8	179° 17'.8	8'.7	53'.5	14'.9	
41° 34'.1	53'.9	193° 45'.5	8'.8	6° 08'.4 S	14'.8	60'.9
56° 34'.2	53'.0	208° 13'.3	8'.7	23'.2	14'.7	
71° 34'.3	52'.1	222° 41'.0	8'.7	37'.9	14'.8	
86° 34'.3	51'.2	237° 08'.7	8'.7	52'.7	14'.6	
101° 34'.4	50'.3	251° 36'.4	8'.7	7° 07'.3 S	14'.6	
116° 34'.5	49'.4	266° 04'.1	8'.7	21'.9	14'.6	
131° 34'.5	48'.5	280° 31'.8	8'.7	36'.5	14'.5	60'.8
146° 34'.6	47'.6	294° 59'.5	8'.6	51'.0	14'.4	
161° 34'.7	46'.7	309° 27'.1	8'.7	8° 05'.4 S	14'.4	
SD 16'.2	d 0'.9	SD	16'.6	16'.7	16'.6	

MOON						
GHA	v	Dec	d	HP
2° 43'.9	8'.1	9° 43'.3 N	14'.2	60'.9
17° 11'.0	8'.1	29'.1	14'.2	61'.0
31° 38'.1	8'.2	14'.9	14'.3	
46° 05'.3	8'.2	00'.6	14'.4	
60° 32'.5	8'.2	8° 46'.2 N	14'.5	
74° 59'.7	8'.3	31'.7	14'.5	
89° 27'.0	8'.2	17'.2	14'.6	
103° 54'.2	8'.3	02'.6	14'.6	
118° 21'.5	8'.4	7° 48'.0 N	14'.7	61'.1
132° 48'.9	8'.3	33'.3	14'.7	
147° 16'.2	8'.4	18'.6	14'.8	
161° 43'.6	8'.4	03'.8	14'.8	
176° 11'.0	8'.4	6° 49'.0 N	14'.9	61'.1
190° 38'.4	8'.5	34'.1	14'.9	
205° 05'.9	8'.4	19'.2	15'.0	
219° 33'.3	8'.5	04'.2	15'.0	
234° 00'.8	8'.5	5° 49'.2 N	15'.0	
248° 28'.3	8'.6	34'.2	15'.1	
262° 55'.9	8'.5	19'.1	15'.1	61'.2
277° 23'.4	8'.6	04'.0	15'.2	
291° 51'.0	8'.6	4° 48'.8 N	15'.1	
306° 18'.6	8'.6	33'.7	15'.3	
320° 46'.2	8'.6	18'.4	15'.2	
335° 13'.8	8'.7	03'.2	15'.3	
349° 41'.5	8'.6	3° 47'.9 N	15'.3	61'.2
4° 09'.1	8'.7	32'.6	15'.3	
18° 36'.8	8'.7	17'.3	15'.3	
33° 04'.5	8'.7	02'.0	15'.4	
47° 32'.2	8'.7	2° 46'.6 N	15'.3	
61° 59'.9	8'.8	31'.3	15'.4	
76° 27'.7	8'.7	15'.9	15'.4	
90° 55'.4	8'.8	00'.5	15'.4	
105° 23'.2	8'.8	1° 45'.1 N	15'.5	
119° 51'.0	8'.7	29'.6	15'.4	
134° 18'.7	8'.8	14'.2	15'.4	
148° 46'.5	8'.8	0° 58'.8 N	15'.5	
163° 14'.3	8'.8	0° 43'.3 N	15'.4	61'.2
177° 42'.1	8'.8	27'.9	15'.5	
192° 09'.9	8'.9	12'.4	15'.4	
206° 37'.8	8'.8	0° 03'.0 S	15'.4	
221° 05'.6	8'.8	18'.4	15'.5	
235° 33'.4	8'.9	33'.9	15'.4	
250° 01'.3	8'.8	49'.3	15'.4	
264° 29'.1	8'.8	1° 04'.7 S	15'.4	
278° 56'.9	8'.9	20'.1	15'.4	
293° 24'.8	8'.8	35'.5	15'.4	
307° 52'.6	8'.9	50'.9	15'.4	61'.1
322° 20'.5	8'.8	2° 06'.3 S	15'.3	
336° 48'.3	8'.9	2° 21'.6 S	15'.3	61'.1
351° 16'.2	8'.8	36'.9	15'.3	
5° 44'.0	8'.9	52'.2	15'.3	
20° 11'.9	8'.8	3° 07'.5 S	15'.3	
34° 39'.7	8'.8	22'.8	15'.2	
49° 07'.5	8'.9	38'.0	15'.2	
63° 35'.4	8'.8	53'.2	15'.2	
78° 03'.2	8'.8	4° 08'.4 S	15'.1	
92° 31'.0	8'.8	23'.5	15'.1	61'.0
106° 58'.8	8'.8	38'.6	15'.1	
121° 26'.6	8'.8	53'.7	15'.0	
135° 54'.4	8'.8	5° 08'.7 S	15'.0	
150° 22'.2	8'.8	5° 23'.7 S	14'.9	61'.0
164° 50'.0	8'.8	38'.6	14'.9	
179° 17'.8	8'.7	53'.5	14'.9	
193° 45'.5	8'.8	6° 08'.4 S	14'.8	60'.9
208° 13'.3	8'.7	23'.2	14'.7	
222° 41'.0	8'.7	37'.9	14'.8	
237° 08'.7	8'.7	52'.7	14'.6	
251° 36'.4	8'.7	7° 07'.3 S	14'.6	
266° 04'.1	8'.7	21'.9	14'.6	
280° 31'.8	8'.7	36'.5	14'.5	60'.8
294° 59'.5	8'.6	51'.0	14'.4	
309° 27'.1	8'.7	8° 05'.4 S	14'.4	
SD	16'.6	16'.7	16'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 18	Moonrise 19	Moonrise 20
N 72°	05:59	07:17	08:33	17:20	19:41	22:03
N 70°	05:59	07:10	08:16	17:28	19:39	21:50
68°	05:58	07:03	08:03	17:35	19:38	21:40
66°	05:58	06:58	07:52	17:40	19:36	21:32
64°	05:58	06:53	07:43	17:45	19:35	21:25
62°	05:57	06:49	07:35	17:49	19:34	21:19
60°	05:57	06:45	07:28	17:52	19:33	21:14
N 58°	05:56	06:42	07:22	17:55	19:32	21:09
56°	05:55	06:39	07:17	17:58	19:32	21:05
54°	05:55	06:36	07:12	18:00	19:31	21:02
52°	05:54	06:33	07:08	18:02	19:30	20:58
50°	05:53	06:31	07:04	18:04	19:30	20:55
45°	05:51	06:25	06:55	18:08	19:29	20:49
N 40°	05:49	06:21	06:48	18:12	19:28	20:44
35°	05:47	06:16	06:42	18:15	19:27	20:39
30°	05:44	06:12	06:37	18:18	19:27	20:35
20°	05:39	06:05	06:27	18:22	19:25	20:28
N 10°	05:32	05:57	06:19	18:26	19:24	20:23
0°	05:25	05:49	06:10	18:30	19:24	20:17
S 10°	05:16	05:41	06:02	18:34	19:23	20:12
20°	05:04	05:31	05:53	18:38	19:22	20:06
30°	04:49	05:18	05:43	18:43	19:21	19:59
35°	04:40	05:11	05:37	18:45	19:20	19:56
40°	04:28	05:02	05:30	18:48	19:20	19:52
45°	04:13	04:51	05:22	18:52	19:19	19:47
S 50°	03:55	04:38	05:13	18:56	19:18	19:41

2011 February 21, 22, 23 (Mon, Tue, Wed)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
21 Monday 00	150° 34'.3	219° 53'.9	20° 37'.8 S	179° 38'.8	13° 02'.6 S	144° 39'.7	1° 19'.9 N	314° 12'.8	4° 06'.3 S
01	165° 36'.8	234° 53'.3	37'.6	194° 39'.4	01'.9	159° 41'.7	20'.2	329° 15'.4	06'.3
02	180° 39'.2	249° 52'.6	37'.3	209° 40'.0	01'.2	174° 43'.6	20'.4	344° 17'.9	06'.2
03	195° 41'.7	264° 52'.0	37'.1	224° 40'.5	00'.5	189° 45'.6	20'.6	359° 20'.5	06'.2
04	210° 44'.2	279° 51'.3	36'.8	239° 41'.1	12° 59'.8 S	204° 47'.6	20'.8	14° 23'.1	06'.1
05	225° 46'.6	294° 50'.7	36'.6	254° 41'.7	59'.1	219° 49'.5	21'.0	29° 25'.6	06'.1
06	240° 49'.1	309° 50'.0	36'.3	269° 42'.2	58'.4	234° 51'.5	21'.3	44° 28'.2	06'.0
07	255° 51'.5	324° 49'.4	36'.1	284° 42'.8	57'.7	249° 53'.4	21'.5	59° 30'.7	06'.0
08	270° 54'.0	339° 48'.7	35'.8	299° 43'.4	57'.0	264° 55'.4	21'.7	74° 33'.3	05'.9
09	285° 56'.5	354° 48'.1	35'.6	314° 43'.9	56'.3	279° 57'.3	21'.9	89° 35'.9	05'.9
10	300° 58'.9	9° 47'.4	35'.3	329° 44'.5	55'.6	294° 59'.3	22'.2	104° 38'.4	05'.8
11	316° 01'.4	24° 46'.8	35'.0	344° 45'.1	55'.0	310° 01'.3	22'.4	119° 41'.0	05'.8
12	331° 03'.9	39° 46'.1	20° 34'.8 S	359° 45'.6	12° 54'.3 S	325° 03'.2	1° 22'.6 N	134° 43'.6	4° 05'.7 S
13	346° 06'.3	54° 45'.5	34'.5	14° 46'.2	53'.6	340° 05'.2	22'.8	149° 46'.1	05'.7
14	1° 08'.8	69° 44'.8	34'.3	29° 46'.8	52'.9	355° 07'.1	23'.1	164° 48'.7	05'.6
15	16° 11'.3	84° 44'.2	34'.0	44° 47'.3	52'.2	10° 09'.1	23'.3	179° 51'.2	05'.6
16	31° 13'.7	99° 43'.5	33'.7	59° 47'.9	51'.5	25° 11'.0	23'.5	194° 53'.8	05'.5
17	46° 16'.2	114° 42'.9	33'.5	74° 48'.5	50'.8	40° 13'.0	23'.7	209° 56'.4	05'.5
18	61° 18'.6	129° 42'.2	33'.2	89° 49'.0	50'.1	55° 14'.9	24'.0	224° 58'.9	05'.4
19	76° 21'.1	144° 41'.6	32'.9	104° 49'.6	49'.4	70° 16'.9	24'.2	240° 01'.5	05'.4
20	91° 23'.6	159° 40'.9	32'.7	119° 50'.2	48'.7	85° 18'.9	24'.4	255° 04'.1	05'.3
21	106° 26'.0	174° 40'.3	32'.4	134° 50'.7	48'.0	100° 20'.8	24'.6	270° 06'.6	05'.3
22	121° 28'.5	189° 39'.6	32'.1	149° 51'.3	47'.3	115° 22'.8	24'.8	285° 09'.2	05'.2
23	136° 31'.0	204° 39'.0	31'.9	164° 51'.9	46'.6	130° 24'.7	25'.1	300° 11'.7	05'.2
22 Tuesday 00	151° 33'.4	219° 38'.3	20° 31'.6 S	179° 52'.4	12° 45'.9 S	145° 26'.7	1° 25'.3 N	315° 14'.3	4° 05'.1 S
01	166° 35'.9	234° 37'.7	31'.3	194° 53'.0	45'.2	160° 28'.6	25'.5	330° 16'.9	05'.1
02	181° 38'.4	249° 37'.0	31'.1	209° 53'.6	44'.5	175° 30'.6	25'.7	345° 19'.4	05'.0
03	196° 40'.8	264° 36'.4	30'.8	224° 54'.2	43'.9	190° 32'.5	26'.0	0° 22'.0	05'.0
04	211° 43'.3	279° 35'.7	30'.5	239° 54'.7	43'.2	205° 34'.5	26'.2	15° 24'.6	04'.9
05	226° 45'.8	294° 35'.1	30'.2	254° 55'.3	42'.5	220° 36'.5	26'.4	30° 27'.1	04'.9
06	241° 48'.2	309° 34'.5	30'.0	269° 55'.9	41'.8	235° 38'.4	26'.6	45° 29'.7	04'.8
07	256° 50'.7	324° 33'.8	29'.7	284° 56'.4	41'.1	250° 40'.4	26'.9	60° 32'.3	04'.8
08	271° 53'.1	339° 33'.2	29'.4	299° 57'.0	40'.4	265° 42'.3	27'.1	75° 34'.8	04'.7
09	286° 55'.6	354° 32'.5	29'.1	314° 57'.6	39'.7	280° 44'.3	27'.3	90° 37'.4	04'.6
10	301° 58'.1	9° 31'.9	28'.9	329° 58'.1	39'.0	295° 46'.2	27'.5	105° 40'.0	04'.6
11	317° 00'.5	24° 31'.2	28'.6	344° 58'.7	38'.3	310° 48'.2	27'.8	120° 42'.5	04'.5
12	332° 03'.0	39° 30'.6	20° 28'.3 S	359° 59'.3	12° 37'.6 S	325° 50'.1	1° 28'.0 N	135° 45'.1	4° 04'.5 S
13	347° 05'.5	54° 29'.9	28'.0	14° 59'.9	36'.9	340° 52'.1	28'.2	150° 47'.7	04'.4
14	2° 07'.9	69° 29'.3	27'.7	30° 00'.4	36'.2	355° 54'.0	28'.4	165° 50'.2	04'.4
15	17° 10'.4	84° 28'.6	27'.4	45° 01'.0	35'.5	10° 56'.0	28'.7	180° 52'.8	04'.3
16	32° 12'.9	99° 28'.0	27'.1	60° 01'.6	34'.8	25° 57'.9	28'.9	195° 55'.4	04'.3
17	47° 15'.3	114° 27'.3	26'.9	75° 02'.2	34'.1	40° 59'.9	29'.1	210° 57'.9	04'.2
18	62° 17'.8	129° 26'.7	26'.6	90° 02'.7	33'.4	56° 01'.9	29'.3	226° 00'.5	04'.2
19	77° 20'.3	144° 26'.0	26'.3	105° 03'.3	32'.7	71° 03'.8	29'.6	241° 03'.1	04'.1
20	92° 22'.7	159° 25'.4	26'.0	120° 03'.9	32'.0	86° 05'.8	29'.8	256° 05'.6	04'.1
21	107° 25'.2	174° 24'.7	25'.7	135° 04'.4	31'.3	101° 07'.7	30'.0	271° 08'.2	04'.0
22	122° 27'.6	189° 24'.1	25'.4	150° 05'.0	30'.6	116° 09'.7	30'.2	286° 10'.8	04'.0
23	137° 30'.1	204° 23'.4	25'.1	165° 05'.6	29'.9	131° 11'.6	30'.5	301° 13'.3	03'.9
23 Wednesday 00	152° 32'.6	219° 22'.8	20° 24'.8 S	180° 06'.2	12° 29'.2 S	146° 13'.6	1° 30'.7 N	316° 15'.9	4° 03'.9 S
01	167° 35'.0	234° 22'.1	24'.5	195° 06'.7	28'.5	161° 15'.5	30'.9	331° 18'.5	03'.8
02	182° 37'.5	249° 21'.5	24'.2	210° 07'.3	27'.8	176° 17'.5	31'.1	346° 21'.0	03'.8
03	197° 40'.0	264° 20'.8	23'.9	225° 07'.9	27'.1	191° 19'.4	31'.4	1° 23'.6	03'.7
04	212° 42'.4	279° 20'.2	23'.6	240° 08'.5	26'.4	206° 21'.4	31'.6	16° 26'.2	03'.6
05	227° 44'.9	294° 19'.5	23'.3	255° 09'.0	25'.7	221° 23'.3	31'.8	31° 28'.7	03'.6
06	242° 47'.4	309° 18'.9	23'.0	270° 09'.6	25'.0	236° 25'.3	32'.0	46° 31'.3	03'.5
07	257° 49'.8	324° 18'.2	22'.7	285° 10'.2	24'.3	251° 27'.2	32'.3	61° 33'.9	03'.5
08	272° 52'.3	339° 17'.6	22'.4	300° 10'.7	23'.6	266° 29'.2	32'.5	76° 36'.4	03'.4
09	287° 54'.7	354° 17'.0	22'.1	315° 11'.3	22'.9	281° 31'.1	32'.7	91° 39'.0	03'.4
10	302° 57'.2	9° 16'.3	21'.8	330° 11'.9	22'.2	296° 33'.1	32'.9	106° 41'.6	03'.3
11	317° 59'.7	24° 15'.7	21'.5	345° 12'.5	21'.5	311° 35'.1	33'.2	121° 44'.2	03'.3
12	333° 02'.1	39° 15'.0	20° 21'.2 S	0° 13'.0	12° 20'.8 S	326° 37'.0	1° 33'.4 N	136° 46'.7	4° 03'.2 S
13	348° 04'.6	54° 14'.4	20'.9	15° 13'.6	20'.1	341° 39'.0	33'.6	151° 49'.3	03'.2
14	3° 07'.1	69° 13'.7	20'.6	30° 14'.2	19'.4	356° 40'.9	33'.8	166° 51'.9	03'.1
15	18° 09'.5	84° 13'.1	20'.3	45° 14'.8	18'.7	11° 42'.9	34'.1	181° 54'.4	03'.1
16	33° 12'.0	99° 12'.4	20'.0	60° 15'.4	18'.0	26° 44'.8	34'.3	196° 57'.0	03'.0
17	48° 14'.5	114° 11'.8	19'.7	75° 15'.9	17'.3	41° 46'.8	34'.5	211° 59'.6	03'.0
18	63° 16'.9	129° 11'.1	19'.4	90° 16'.5	16'.6	56° 48'.7	34'.7	227° 02'.1	02'.9
19	78° 19'.4	144° 10'.5	19'.0	105° 17'.1	15'.9	71° 50'.7	35'.0	242° 04'.7	02'.8
20	93° 21'.9	159° 09'.8	18'.7	120° 17'.7	15'.2	86° 52'.6	35'.2	257° 07'.3	02'.8
21	108° 24'.3	174° 09'.2	18'.4	135° 18'.2	14'.5	101° 54'.6	35'.4	272° 09'.9	02'.7
22	123° 26'.8	189° 08'.5	18'.1	150° 18'.8	13'.8	116° 56'.5	35'.6	287° 12'.4	02'.7
23	138° 29'.2	204° 07'.9	17'.8	165° 19'.4	13'.1	131° 58'.5	35'.9	302° 15'.0	02'.6
	M.P. 13:51	v -0'.6	d 0'.3	v 0'.6	d 0'.7	v 2'.0	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.8 S
Achernar	335° 28'.2	57° 11'.0 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.6	55° 53'.6 N
Alkaid	152° 59'.8	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.1	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.3	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.8	69° 02'.6 S
Avior	234° 18'.2	59° 33'.0 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.6	52° 42'.4 S
Capella	280° 36'.7	46° 00'.7 N
Deneb	49° 33'.1	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.6	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.0 N
Enif	33° 49'.1	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.4	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.0	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.2	34° 22'.6 S
Kochab	137° 19'.4	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.4	36° 25'.5 S
Miaplacidus	221° 39'.3	69° 46'.0 S
Mirfak	308° 42'.8	49° 54'.2 N
Nunki	76° 00'.6	26° 16'.9 S
Peacock	53° 22'.3	56° 41'.8 S
Polaris	318° 44'.9	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.1	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.8	60° 52'.7 S
Sabik	102° 14'.5	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.1 N
Shaula	96° 24'.3	37° 06'.6 S
Sirius	258° 34'.9	16° 44'.1 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.3	38° 47'.4 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	68° 04'.9	09:22
Mars	28° 19'.0	12:00
Jupiter	353° 53'.2	14:16
Saturn	163° 40'.9	02:59

SUN				
GHA	Dec	GHA	v	Dec	d	HP
176° 34'.7	10° 45'.8 S	323° 54'.8	8'.6	8° 19'.8 S	14'.3	60'.8
191° 34'.8	44'.9	338° 22'.4	8'.6	34'.1	14'.2	
206° 34'.9	44'.0	352° 50'.0	8'.6	48'.3	14'.2	60'.7
221° 34'.9	43'.1	7° 17'.6	8'.5	9° 02'.5 S	14'.2	
236° 35'.0	42'.2	21° 45'.1	8'.6	16'.7	14'.0	
251° 35'.1	41'.3	36° 12'.7	8'.5	30'.7	14'.0	
266° 35'.2	40'.4	50° 40'.2	8'.5	44'.7	13'.9	60'.6
281° 35'.2	39'.5	65° 07'.7	8'.5	58'.6	13'.8	
296° 35'.3	38'.6	79° 35'.2	8'.4	10° 12'.4 S	13'.8	
311° 35'.4	37'.7	94° 02'.6	8'.5	26'.2	13'.7	
326° 35'.4	36'.8	108° 30'.1	8'.4	39'.9	13'.6	60'.5
341° 35'.5	35'.9	122° 57'.5	8'.4	53'.5	13'.5	
356° 35'.6	10° 35'.0 S	137° 24'.9	8'.4	11° 07'.0 S	13'.5	60'.5
11° 35'.7	34'.1	151° 52'.3	8'.3	20'.5	13'.4	
26° 35'.7	33'.2	166° 19'.6	8'.4	33'.9	13'.3	60'.4
41° 35'.8	32'.2	180° 47'.0	8'.3	47'.2	13'.2	
56° 35'.9	31'.3	195° 14'.3	8'.2	12° 00'.4 S	13'.1	
71° 36'.0	30'.4	209° 41'.5	8'.3	13'.5	13'.0	
86° 36'.0	29'.5	224° 08'.8	8'.2	26'.5	12'.9	60'.3
101° 36'.1	28'.6	238° 36'.0	8'.2	39'.4	12'.9	
116° 36'.2	27'.7	253° 03'.2	8'.2	52'.3	12'.8	
131° 36'.3	26'.8	267° 30'.4	8'.2	13° 05'.1 S	12'.6	
146° 36'.3	25'.9	281° 57'.6	8'.1	17'.7	12'.6	60'.2
161° 36'.4	25'.0	296° 24'.7	8'.1	30'.3	12'.5	
176° 36'.5	10° 24'.1 S	310° 51'.8	8'.1	13° 42'.8 S	12'.4	60'.2
191° 36'.6	23'.2	325° 18'.9	8'.1	55'.2	12'.2	60'.1
206° 36'.6	22'.3	339° 46'.0	8'.0	14° 07'.4 S	12'.2	
221° 36'.7	21'.4	354° 13'.0	8'.0	19'.6	12'.1	
236° 36'.8	20'.5	8° 40'.0	8'.0	31'.7	12'.0	
251° 36'.9	19'.6	23° 07'.0	7'.9	43'.7	11'.9	60'.0
266° 36'.9	18'.6	37° 33'.9	7'.9	55'.6	11'.7	
281° 37'.0	17'.7	52° 00'.8	7'.9	15° 07'.3 S	11'.7	
296° 37'.1	16'.8	66° 27'.7	7'.9	19'.0	11'.6	59'.9
311° 37'.2	15'.9	80° 54'.6	7'.8	30'.6	11'.4	
326° 37'.3	15'.0	95° 21'.4	7'.8	42'.0	11'.4	
341° 37'.3	14'.1	109° 48'.2	7'.8	53'.4	11'.2	59'.8
356° 37'.4	10° 13'.2 S	124° 15'.0	7'.8	16° 04'.6 S	11'.1	59'.8
11° 37'.5	12'.3	138° 41'.8	7'.7	15'.7	11'.0	
26° 37'.6	11'.4	153° 08'.5	7'.7	26'.7	10'.9	59'.7
41° 37'.7	10'.5	167° 35'.2	7'.7	37'.6	10'.8	
56° 37'.7	09'.5	182° 01'.9	7'.6	48'.4	10'.7	
71° 37'.8	08'.6	196° 28'.5	7'.7	59'.1	10'.5	
86° 37'.9	07'.7	210° 55'.2	7'.6	17° 09'.6 S	10'.5	59'.6
101° 38'.0	06'.8	225° 21'.8	7'.5	20'.1	10'.3	
116° 38'.1	05'.9	239° 48'.3	7'.6	30'.4	10'.2	
131° 38'.1	05'.0	254° 14'.9	7'.5	40'.6	10'.0	59'.5
146° 38'.2	04'.1	268° 41'.4	7'.5	50'.6	10'.0	
161° 38'.3	03'.1	283° 07'.9	7'.5	18° 00'.6 S	9'.8	
176° 38'.4	10° 02'.2 S	297° 34'.4	7'.4	18° 10'.4 S	9'.7	59'.4
191° 38'.5	01'.3	312° 00'.8	7'.5	20'.1	9'.6	
206° 38'.6	00'.4	326° 27'.3	7'.4	29'.7	9'.4	
221° 38'.6	9° 59'.5 S	340° 53'.7	7'.3	39'.1	9'.4	59'.3
236° 38'.7	58'.6	355° 20'.0	7'.4	48'.5	9'.2	
251° 38'.8	57'.7	9° 46'.4	7'.3	57'.7	9'.0	
266° 38'.9	56'.7	24° 12'.7	7'.3	19° 06'.7 S	9'.0	59'.2
281° 39'.0	55'.8	38° 39'.0	7'.3	15'.7	8'.8	
296° 39'.1	54'.9	53° 05'.3	7'.3	24'.5	8'.7	59'.1
311° 39'.1	54'.0	67° 31'.6	7'.2	33'.2	8'.5	
326° 39'.2	53'.1	81° 57'.8	7'.3	41'.7	8'.5	
341° 39'.3	52'.2	96° 24'.1	7'.2	50'.2	8'.3	59'.0
356° 39'.4	9° 51'.2 S	110° 50'.3	7'.2	19° 58'.5 S	8'.1	59'.0
11° 39'.5	50'.3	125° 16'.5	7'.1	20° 06'.6 S	8'.0	
26° 39'.6	49'.4	139° 42'.6	7'.2	14'.6	7'.9	58'.9
41° 39'.7	48'.5	154° 08'.8	7'.1	22'.5	7'.8	
56° 39'.7	47'.6	168° 34'.9	7'.1	30'.3	7'.6	
71° 39'.8	46'.7	183° 01'.0	7'.2	37'.9	7'.5	58'.8
86° 39'.9	45'.7	197° 27'.2	7'.0	45'.4	7'.3	
101° 40'.0	44'.8	211° 53'.2	7'.1	52'.7	7'.2	
116° 40'.1	43'.9	226° 19'.3	7'.1	59'.9	7'.1	58'.7
131° 40'.2	43'.0	240° 45'.4	7'.0	21° 07'.0 S	6'.9	
146° 40'.3	42'.1	255° 11'.4	7'.1	13'.9	6'.8	
161° 40'.4	41'.1	269° 37'.5	7'.0	20'.7	6'.7	58'.6
SD 16'.2	d 0'.9	SD 16'.5		16'.3	16'.1	

MOON				
GHA	v	Dec	d	HP
50° 40'.2	8'.5	44'.7	13'.9	60'.6
65° 07'.7	8'.5	58'.6	13'.8	
79° 35'.2	8'.4	10° 12'.4 S	13'.8	
94° 02'.6	8'.5	26'.2	13'.7	
108° 30'.1	8'.4	39'.9	13'.6	60'.5
122° 57'.5	8'.4	53'.5	13'.5	
137° 24'.9	8'.4	11° 07'.0 S	13'.5	60'.5
151° 52'.3	8'.3	20'.5	13'.4	
166° 19'.6	8'.4	33'.9	13'.3	60'.4
180° 47'.0	8'.3	47'.2	13'.2	
195° 14'.3	8'.2	12° 00'.4 S	13'.1	
209° 41'.5	8'.3	13'.5	13'.0	
224° 08'.8	8'.2	26'.5	12'.9	60'.3
238° 36'.0	8'.2	39'.4	12'.9	
253° 03'.2	8'.2	52'.3	12'.8	
267° 30'.4	8'.2	13° 05'.1 S	12'.6	
281° 57'.6	8'.1	17'.7	12'.6	60'.2
296° 24'.7	8'.1	30'.3	12'.5	
310° 51'.8	8'.1	13° 42'.8 S	12'.4	60'.2
325° 18'.9	8'.1	55'.2	12'.2	60'.1
339° 46'.0	8'.0	14° 07'.4 S	12'.2	
354° 13'.0	8'.0	19'.6	12'.1	
8° 40'.0	8'.0	31'.7	12'.0	
23° 07'.0	7'.9	43'.7	11'.9	60'.0
37° 33'.9	7'.9	55'.6	11'.7	
52° 00'.8	7'.9	15° 07'.3 S	11'.7	
66° 27'.7	7'.9	19'.0	11'.6	59'.9
80° 54'.6	7'.8	30'.6	11'.4	
95° 21'.4	7'.8	42'.0	11'.4	
109° 48'.2	7'.8	53'.4	11'.2	59'.8
124° 15'.0	7'.8	16° 04'.6 S	11'.1	59'.8
138° 41'.8	7'.7	15'.7	11'.0	
153° 08'.5	7'.7	26'.7	10'.9	59'.7
167° 35'.2	7'.7	37'.6	10'.8	
182° 01'.9	7'.6	48'.4	10'.7	
196° 28'.5	7'.7	59'.1	10'.5	
210° 55'.2	7'.6	17° 09'.6 S	10'.5	59'.6
225° 21'.8	7'.5	20'.1	10'.3	
239° 48'.3	7'.6	30'.4	10'.2	
254° 14'.9	7'.5	40'.6	10'.0	59'.5
268° 41'.4	7'.5	50'.6	10'.0	
283° 07'.9	7'.5	18° 00'.6 S	9'.8	
297° 34'.4	7'.4	18° 10'.4 S	9'.7	59'.4
312° 00'.8	7'.5	20'.1	9'.6	
326° 27'.3	7'.4	29'.7	9'.4	
340° 53'.7	7'.3	39'.1	9'.4	59'.3
355° 20'.0	7'.4	48'.5	9'.2	
9° 46'.4	7'.3	57'.7	9'.0	
24° 12'.7	7'.3	19° 06'.7 S	9'.0	59'.2
38° 39'.0	7'.3	15'.7	8'.8	
53° 05'.3	7'.3	24'.5	8'.7	59'.1
67° 31'.6	7'.2	33'.2	8'.5	
81° 57'.8	7'.3	41'.7	8'.5	
96° 24'.1	7'.2	50'.2	8'.3	59'.0
110° 50'.3	7'.2	19° 58'.5 S	8'.1	59'.0
125° 16'.5	7'.1	20° 06'.6 S	8'.0	
139° 42'.6	7'.2	14'.6	7'.9	58'.9
154° 08'.8	7'.1	22'.5	7'.8	
168° 34'.9	7'.1	30'.3	7'.6	
183° 01'.0	7'.2	37'.9	7'.5	58'.8
197° 27'.2	7'.0	45'.4	7'.3	
211° 53'.2	7'.1	52'.7	7'.2	
226° 19'.3	7'.1	59'.9	7'.1	58'.7
240° 45'.4	7'.0	21° 07'.0 S	6'.9	
255° 11'.4	7'.1	13'.9	6'.8	
269° 37'.5	7'.0	20'.7	6'.7	58'.6
SD 16'.5		16'.3	16'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 21	Moonrise 22	Moonrise 23
N 72°	05:45	07:03	08:16	-	00:39	-
N 70°	05:46	06:57	08:02	-	00:08	02:53
68°	05:47	06:52	07:50	23:46	-	02:01
66°	05:48	06:47	07:41	23:29	-	01:29
64°	05:49	06:43	07:33	23:15	-	01:06
62°	05:49	06:40	07:26	23:04	-	00:47
60°	05:49	06:37	07:20	22:54	-	00:32
N 58°	05:49	06:34	07:14	22:45	-	00:19
56°	05:49	06:32	07:10	22:38	-	00:08
54°	05:48	06:29	07:06	22:31	23:58	25:20
52°	05:48	06:27	07:02	22:25	23:50	25:09
50°	05:48	06:25	06:58	22:20	23:42	24:59
45°	05:47	06:21	06:51	22:08	23:26	24:39
N 40°	05:45	06:17	06:44	21:59	23:12	24:23
35°	05:44	06:13	06:39	21:51	23:01	24:09
30°	05:42	06:09	06:34	21:44	22:51	23:57
20°	05:37	06:03	06:25	21:31	22:34	23:36
N 10°	05:31	05:56	06:17	21:21	22:20	23:19
0°	05:25	05:49	06:10	21:11	22:06	23:02
S 10°	05:16	05:41	06:03	21:01	21:53	22:46
20°	05:06	05:32	05:55	20:51	21:38	22:28
30°	04:52	05:21	05:45	20:39	21:22	22:08
35°	04:43	05:14	05:40	20:33	21:13	21:57
40°	04:32	05:06	05:34	20:25	21:02	21:43
45°	04:18	04:56	05:27	20:16	20:49	21:28
S 50°	04:01	04:44	05:18	20:06	20:34	21:09
52°	03:53	04:38	05:14	20:01	20:27	21:00
54°	03:43	04:31	05:09	19:56	20:19	20:50
56°	03:32	04:24	05:05	19:50	20:11	20:38

2011 February 24, 25, 26 (Thur, Fri, Sat)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
24 Thursday 00	153° 31'.7	219° 07'.2	20° 17'.5 S	180° 20'.0	12° 12'.3 S	147° 00'.4	1° 36'.1 N	317° 17'.6	4° 02'.6 S
01	168° 34'.2	234° 06'.6	17'.1	195° 20'.5	11'.6	162° 02'.4	36'.3	332° 20'.1	02'.5
02	183° 36'.6	249° 05'.9	16'.8	210° 21'.1	10'.9	177° 04'.3	36'.5	347° 22'.7	02'.5
03	198° 39'.1	264° 05'.3	16'.5	225° 21'.7	10'.2	192° 06'.3	36'.8	2° 25'.3	02'.4
04	213° 41'.6	279° 04'.7	16'.2	240° 22'.3	09'.5	207° 08'.2	37'.0	17° 27'.8	02'.4
05	228° 44'.0	294° 04'.0	15'.9	255° 22'.9	08'.8	222° 10'.2	37'.2	32° 30'.4	02'.3
06	243° 46'.5	309° 03'.4	15'.5	270° 23'.4	08'.1	237° 12'.1	37'.4	47° 33'.0	02'.2
07	258° 49'.0	324° 02'.7	15'.2	285° 24'.0	07'.4	252° 14'.1	37'.7	62° 35'.6	02'.2
08	273° 51'.4	339° 02'.1	14'.9	300° 24'.6	06'.7	267° 16'.0	37'.9	77° 38'.1	02'.1
09	288° 53'.9	354° 01'.4	14'.6	315° 25'.2	06'.0	282° 18'.0	38'.1	92° 40'.7	02'.1
10	303° 56'.4	9° 00'.8	14'.2	330° 25'.7	05'.3	297° 19'.9	38'.3	107° 43'.3	02'.0
11	318° 58'.8	24° 00'.1	13'.9	345° 26'.3	04'.6	312° 21'.9	38'.6	122° 45'.9	02'.0
12	334° 01'.3	38° 59'.5	20° 13'.6 S	0° 26'.9	12° 03'.9 S	327° 23'.8	1° 38'.8 N	137° 48'.4	4° 01'.9 S
13	349° 03'.7	53° 58'.8	13'.2	15° 27'.5	03'.2	342° 25'.8	39'.0	152° 51'.0	01'.9
14	4° 06'.2	68° 58'.2	12'.9	30° 28'.1	02'.5	357° 27'.7	39'.2	167° 53'.6	01'.8
15	19° 08'.7	83° 57'.5	12'.6	45° 28'.6	01'.7	12° 29'.7	39'.5	182° 56'.1	01'.8
16	34° 11'.1	98° 56'.9	12'.2	60° 29'.2	01'.0	27° 31'.6	39'.7	197° 58'.7	01'.7
17	49° 13'.6	113° 56'.3	11'.9	75° 29'.8	00'.3	42° 33'.6	39'.9	213° 01'.3	01'.6
18	64° 16'.1	128° 55'.6	11'.6	90° 30'.4	11° 59'.6 S	57° 35'.5	40'.1	228° 03'.9	01'.6
19	79° 18'.5	143° 55'.0	11'.2	105° 31'.0	58'.9	72° 37'.5	40'.4	243° 06'.4	01'.5
20	94° 21'.0	158° 54'.3	10'.9	120° 31'.5	58'.2	87° 39'.4	40'.6	258° 09'.0	01'.5
21	109° 23'.5	173° 53'.7	10'.6	135° 32'.1	57'.5	102° 41'.4	40'.8	273° 11'.6	01'.4
22	124° 25'.9	188° 53'.0	10'.2	150° 32'.7	56'.8	117° 43'.3	41'.1	288° 14'.2	01'.4
23	139° 28'.4	203° 52'.4	09'.9	165° 33'.3	56'.1	132° 45'.3	41'.3	303° 16'.7	01'.3
25 Friday 00	154° 30'.9	218° 51'.7	20° 09'.5 S	180° 33'.9	11° 55'.4 S	147° 47'.2	1° 41'.5 N	318° 19'.3	4° 01'.3 S
01	169° 33'.3	233° 51'.1	09'.2	195° 34'.4	54'.7	162° 49'.2	41'.7	333° 21'.9	01'.2
02	184° 35'.8	248° 50'.4	08'.8	210° 35'.0	54'.0	177° 51'.1	42'.0	348° 24'.5	01'.2
03	199° 38'.2	263° 49'.8	08'.5	225° 35'.6	53'.2	192° 53'.1	42'.2	3° 27'.0	01'.1
04	214° 40'.7	278° 49'.2	08'.2	240° 36'.2	52'.5	207° 55'.0	42'.4	18° 29'.6	01'.0
05	229° 43'.2	293° 48'.5	07'.8	255° 36'.8	51'.8	222° 56'.9	42'.6	33° 32'.2	01'.0
06	244° 45'.6	308° 47'.9	07'.5	270° 37'.4	51'.1	237° 58'.9	42'.9	48° 34'.8	00'.9
07	259° 48'.1	323° 47'.2	07'.1	285° 37'.9	50'.4	253° 00'.8	43'.1	63° 37'.3	00'.9
08	274° 50'.6	338° 46'.6	06'.8	300° 38'.5	49'.7	268° 02'.8	43'.3	78° 39'.9	00'.8
09	289° 53'.0	353° 45'.9	06'.4	315° 39'.1	49'.0	283° 04'.7	43'.5	93° 42'.5	00'.8
10	304° 55'.5	8° 45'.3	06'.1	330° 39'.7	48'.3	298° 06'.7	43'.8	108° 45'.1	00'.7
11	319° 58'.0	23° 44'.6	05'.7	345° 40'.3	47'.6	313° 08'.6	44'.0	123° 47'.6	00'.6
12	335° 00'.4	38° 44'.0	20° 05'.4 S	0° 40'.8	11° 46'.8 S	328° 10'.6	1° 44'.2 N	138° 50'.2	4° 00'.6 S
13	350° 02'.9	53° 43'.3	05'.0	15° 41'.4	46'.1	343° 12'.5	44'.4	153° 52'.8	00'.5
14	5° 05'.3	68° 42'.7	04'.6	30° 42'.0	45'.4	358° 14'.5	44'.7	168° 55'.4	00'.5
15	20° 07'.8	83° 42'.1	04'.3	45° 42'.6	44'.7	13° 16'.4	44'.9	183° 57'.9	00'.4
16	35° 10'.3	98° 41'.4	03'.9	60° 43'.2	44'.0	28° 18'.4	45'.1	199° 00'.5	00'.4
17	50° 12'.7	113° 40'.8	03'.6	75° 43'.8	43'.3	43° 20'.3	45'.4	214° 03'.1	00'.3
18	65° 15'.2	128° 40'.1	03'.2	90° 44'.4	42'.6	58° 22'.3	45'.6	229° 05'.7	00'.3
19	80° 17'.7	143° 39'.5	02'.9	105° 44'.9	41'.8	73° 24'.2	45'.8	244° 08'.2	00'.2
20	95° 20'.1	158° 38'.8	02'.5	120° 45'.5	41'.1	88° 26'.2	46'.0	259° 10'.8	00'.1
21	110° 22'.6	173° 38'.2	02'.1	135° 46'.1	40'.4	103° 28'.1	46'.3	274° 13'.4	00'.1
22	125° 25'.1	188° 37'.6	01'.8	150° 46'.7	39'.7	118° 30'.0	46'.5	289° 16'.0	00'.0
23	140° 27'.5	203° 36'.9	01'.4	165° 47'.3	39'.0	133° 32'.0	46'.7	304° 18'.6	00'.0
26 Saturday 00	155° 30'.0	218° 36'.3	20° 01'.0 S	180° 47'.9	11° 38'.3 S	148° 33'.9	1° 46'.9 N	319° 21'.1	3° 59'.9 S
01	170° 32'.5	233° 35'.6	00'.7	195° 48'.4	37'.6	163° 35'.9	47'.2	334° 23'.7	59'.9
02	185° 34'.9	248° 35'.0	00'.3	210° 49'.0	36'.8	178° 37'.8	47'.4	349° 26'.3	59'.8
03	200° 37'.4	263° 34'.3	19° 59'.9 S	225° 49'.6	36'.1	193° 39'.8	47'.6	4° 28'.9	59'.7
04	215° 39'.8	278° 33'.7	59'.6	240° 50'.2	35'.4	208° 41'.7	47'.9	19° 31'.4	59'.7
05	230° 42'.3	293° 33'.0	59'.2	255° 50'.8	34'.7	223° 43'.7	48'.1	34° 34'.0	59'.6
06	245° 44'.8	308° 32'.4	58'.8	270° 51'.4	34'.0	238° 45'.6	48'.3	49° 36'.6	59'.6
07	260° 47'.2	323° 31'.8	58'.4	285° 52'.0	33'.3	253° 47'.6	48'.5	64° 39'.2	59'.5
08	275° 49'.7	338° 31'.1	58'.1	300° 52'.5	32'.6	268° 49'.5	48'.8	79° 41'.8	59'.5
09	290° 52'.2	353° 30'.5	57'.7	315° 53'.1	31'.8	283° 51'.5	49'.0	94° 44'.3	59'.4
10	305° 54'.6	8° 29'.8	57'.3	330° 53'.7	31'.1	298° 53'.4	49'.2	109° 46'.9	59'.4
11	320° 57'.1	23° 29'.2	56'.9	345° 54'.3	30'.4	313° 55'.3	49'.4	124° 49'.5	59'.3
12	335° 59'.6	38° 28'.6	19° 56'.6 S	0° 54'.9	11° 29'.7 S	328° 57'.3	1° 49'.7 N	139° 52'.1	3° 59'.2 S
13	351° 02'.0	53° 27'.9	56'.2	15° 55'.5	29'.0	343° 59'.2	49'.9	154° 54'.7	59'.2
14	6° 04'.5	68° 27'.3	55'.8	30° 56'.1	28'.3	359° 01'.2	50'.1	169° 57'.2	59'.1
15	21° 07'.0	83° 26'.6	55'.4	45° 56'.7	27'.5	14° 03'.1	50'.4	184° 59'.8	59'.1
16	36° 09'.4	98° 26'.0	55'.1	60° 57'.2	26'.8	29° 05'.1	50'.6	200° 02'.4	59'.0
17	51° 11'.9	113° 25'.3	54'.7	75° 57'.8	26'.1	44° 07'.0	50'.8	215° 05'.0	58'.9
18	66° 14'.3	128° 24'.7	54'.3	90° 58'.4	25'.4	59° 09'.0	51'.0	230° 07'.6	58'.9
19	81° 16'.8	143° 24'.1	53'.9	105° 59'.0	24'.7	74° 10'.9	51'.3	245° 10'.1	58'.8
20	96° 19'.3	158° 23'.4	53'.5	120° 59'.6	24'.0	89° 12'.9	51'.5	260° 12'.7	58'.8
21	111° 21'.7	173° 22'.8	53'.1	136° 00'.2	23'.2	104° 14'.8	51'.7	275° 15'.3	58'.7
22	126° 24'.2	188° 22'.1	52'.7	151° 00'.8	22'.5	119° 16'.7	51'.9	290° 17'.9	58'.7
23	141° 26'.7	203° 21'.5	52'.4	166° 01'.4	21'.8	134° 18'.7	52'.2	305° 20'.5	58'.6
	M.P. 13:40	v -0'.6	d 0'.4	v 0'.6	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.8 S
Achernar	335° 28'.2	57° 11'.0 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.6	55° 53'.6 N
Alkaid	152° 59'.8	49° 15'.1 N
Alnair	27° 46'.2	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.8 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.1	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.3	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.7	69° 02'.6 S
Avior	234° 18'.2	59° 33'.0 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.6	52° 42'.4 S
Capella	280° 36'.8	46° 00'.7 N
Deneb	49° 33'.1	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.6	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.0 N
Enif	33° 49'.0	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.0	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.2	34° 22'.6 S
Kochab	137° 19'.3	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.3	36° 25'.5 S
Miaplacidus	221° 39'.3	69° 46'.0 S
Mirfak	308° 42'.9	49° 54'.2 N
Nunki	76° 00'.5	26° 16'.9 S
Peacock	53° 22'.2	56° 41'.8 S
Polaris	318° 46'.0	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.1	12° 33'.0 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.7	60° 52'.7 S
Sabik	102° 14'.5	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.1 N
Shaula	96° 24'.3	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.1 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.3	38° 47'.4 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	64° 20'.9	09:25
Mars	26° 03'.0	11:57
Jupiter	353° 16'.4	14:07
Saturn	163° 48'.5	02:46

SUN					
GHA	Dec	GHA	v	Dec	d	HP
176° 40'.4	9° 40'.2 S	284° 03'.5	7'.0	21° 27'.4 S	6'.5	58'.6
191° 40'.5	39'.3	298° 29'.5	7'.0	33'.9	6'.4	
206° 40'.6	38'.4	312° 55'.5	7'.0	40'.3	6'.2	58'.5
221° 40'.7	37'.5	327° 21'.5	7'.0	46'.5	6'.1	
236° 40'.8	36'.5	341° 47'.5	7'.0	52'.6	6'.0	
251° 40'.9	35'.6	356° 13'.5	7'.0	58'.6	5'.8	58'.4
266° 41'.0	34'.7	10° 39'.5	7'.0	22° 04'.4 S	5'.6	
281° 41'.1	33'.8	25° 05'.5	6'.9	10'.0	5'.6	58'.3
296° 41'.2	32'.9	39° 31'.4	7'.0	15'.6	5'.3	
311° 41'.3	31'.9	53° 57'.4	7'.0	20'.9	5'.3	
326° 41'.3	31'.0	68° 23'.4	7'.0	26'.2	5'.1	58'.2
341° 41'.4	30'.1	82° 49'.4	6'.9	31'.3	4'.9	
356° 41'.5	9° 29'.2 S	97° 15'.3	7'.0	22° 36'.2 S	4'.8	58'.2
11° 41'.6	28'.2	111° 41'.3	7'.0	41'.0	4'.7	58'.1
26° 41'.7	27'.3	126° 07'.3	6'.9	45'.7	4'.5	
41° 41'.8	26'.4	140° 33'.2	7'.0	50'.2	4'.4	
56° 41'.9	25'.5	154° 59'.2	7'.0	54'.6	4'.2	58'.0
71° 42'.0	24'.5	169° 25'.2	7'.0	58'.8	4'.1	
86° 42'.1	23'.6	183° 51'.2	7'.0	23° 02'.9 S	4'.0	
101° 42'.2	22'.7	198° 17'.2	7'.0	06'.9	3'.8	57'.9
116° 42'.3	21'.8	212° 43'.2	7'.0	10'.7	3'.6	
131° 42'.4	20'.8	227° 09'.2	7'.0	14'.3	3'.6	
146° 42'.5	19'.9	241° 35'.2	7'.1	17'.9	3'.3	57'.8
161° 42'.6	19'.0	256° 01'.3	7'.0	21'.2	3'.3	
176° 42'.6	9° 18'.1 S	270° 27'.3	7'.1	23° 24'.5 S	3'.0	57'.8
191° 42'.7	17'.1	284° 53'.4	7'.1	27'.5	3'.0	57'.7
206° 42'.8	16'.2	299° 19'.5	7'.0	30'.5	2'.8	
221° 42'.9	15'.3	313° 45'.5	7'.2	33'.3	2'.6	
236° 43'.0	14'.4	328° 11'.7	7'.1	35'.9	2'.5	57'.6
251° 43'.1	13'.4	342° 37'.8	7'.1	38'.4	2'.4	
266° 43'.2	12'.5	357° 03'.9	7'.2	40'.8	2'.2	
281° 43'.3	11'.6	11° 30'.1	7'.2	43'.0	2'.1	57'.5
296° 43'.4	10'.6	25° 56'.3	7'.2	45'.1	1'.9	
311° 43'.5	09'.7	40° 22'.5	7'.3	47'.0	1'.8	
326° 43'.6	08'.8	54° 48'.8	7'.2	48'.8	1'.6	57'.4
341° 43'.7	07'.9	69° 15'.0	7'.3	50'.4	1'.5	
356° 43'.8	9° 06'.9 S	83° 41'.3	7'.3	23° 51'.9 S	1'.4	57'.4
11° 43'.9	06'.0	98° 07'.6	7'.4	53'.3	1'.2	57'.3
26° 44'.0	05'.1	112° 34'.0	7'.4	54'.5	1'.1	
41° 44'.1	04'.1	127° 00'.4	7'.4	55'.6	0'.9	
56° 44'.2	03'.2	141° 26'.8	7'.4	56'.5	0'.8	57'.2
71° 44'.3	02'.3	155° 53'.2	7'.5	57'.3	0'.7	
86° 44'.4	01'.3	170° 19'.7	7'.5	58'.0	0'.5	
101° 44'.5	00'.4	184° 46'.2	7'.5	58'.5	0'.4	57'.1
116° 44'.6	8° 59'.5 S	199° 12'.7	7'.6	58'.9	0'.2	
131° 44'.7	58'.6	213° 39'.3	7'.6	59'.1	0'.1	
146° 44'.8	57'.6	228° 05'.9	7'.7	59'.2	0'.0	57'.0
161° 44'.9	56'.7	242° 32'.6	7'.7	59'.2	0'.2	
176° 45'.0	8° 55'.8 S	256° 59'.3	7'.7	23° 59'.0 S	0'.4	57'.0
191° 45'.1	54'.8	271° 26'.0	7'.8	58'.6	0'.4	56'.9
206° 45'.2	53'.9	285° 52'.8	7'.8	58'.2	0'.6	
221° 45'.3	53'.0	300° 19'.6	7'.8	57'.6	0'.7	
236° 45'.4	52'.0	314° 46'.4	7'.9	56'.9	0'.9	56'.8
251° 45'.5	51'.1	329° 13'.3	8'.0	56'.0	1'.0	
266° 45'.6	50'.2	343° 40'.3	8'.0	55'.0	1'.1	
281° 45'.7	49'.2	358° 07'.3	8'.0	53'.9	1'.3	
296° 45'.8	48'.3	12° 34'.3	8'.1	52'.6	1'.4	56'.7
311° 45'.9	47'.4	27° 01'.4	8'.1	51'.2	1'.5	
326° 46'.0	46'.4	41° 28'.5	8'.2	49'.7	1'.7	
341° 46'.1	45'.5	55° 55'.7	8'.3	48'.0	1'.8	56'.6
356° 46'.2	8° 44'.6 S	70° 23'.0	8'.3	23° 46'.2 S	1'.9	56'.6
11° 46'.3	43'.6	84° 50'.3	8'.3	44'.3	2'.1	
26° 46'.4	42'.7	99° 17'.6	8'.4	42'.2	2'.2	56'.5
41° 46'.5	41'.8	113° 45'.0	8'.5	40'.0	2'.3	
56° 46'.6	40'.8	128° 12'.5	8'.5	37'.7	2'.5	
71° 46'.7	39'.9	142° 40'.0	8'.5	35'.2	2'.5	
86° 46'.8	38'.9	157° 07'.5	8'.6	32'.7	2'.7	56'.4
101° 46'.9	38'.0	171° 35'.1	8'.7	30'.0	2'.9	
116° 47'.1	37'.1	186° 02'.8	8'.7	27'.1	2'.9	
131° 47'.2	36'.1	200° 30'.5	8'.8	24'.2	3'.1	56'.3
146° 47'.3	35'.2	214° 58'.3	8'.9	21'.1	3'.2	
161° 47'.4	34'.3	229° 26'.2	8'.9	17'.9	3'.3	
SD 16'.2	d 0'.9	SD	15'.8	15'.6	15'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26
N 72°	05:31	06:49	08:00	-	-	-
N 70°	05:34	06:44	07:48	-	-	-
68°	05:36	06:40	07:38	-	-	-
66°	05:38	06:37	07:29	03:32	05:39	-
64°	05:39	06:34	07:22	02:52	04:26	05:29
62°	05:40	06:31	07:16	02:25	03:50	04:51
60°	05:41	06:29	07:11	02:04	03:24	04:25
N 58°	05:41	06:27	07:07	01:47	03:04	04:04
56°	05:42	06:25	07:02	01:33	02:47	03:46
54°	05:42	06:23	06:59	01:20	02:32	03:32
52°	05:42	06:21	06:55	01:09	02:20	03:19
50°	05:42	06:20	06:52	00:59	02:09	03:08
45°	05:42	06:16	06:46	00:39	01:46	02:45
N 40°	05:41	06:13	06:40	00:23	01:28	02:26
35°	05:40	06:10	06:35	00:09	01:12	02:10
30°	05:39	06:07	06:31	-	00:59	01:56
20°	05:35	06:01	06:23	-	00:36	01:33
N 10°	05:30	05:55	06:16	-	00:17	01:13
0°	05:24	05:49	06:10	23:59	-	00:55
S 10°	05:17	05:42	06:03	23:41	-	00:36
20°	05:07	05:34	05:56	23:21	-	00:16
30°	04:54	05:23	05:48	22:59	23:53	24:49
35°	04:46	05:17	05:43	22:46	23:39	24:36
40°	04:36	05:09	05:37	22:31	23:24	24:21
45°	04:23	05:00	05:31	22:13	23:05	24:04
S 50°	04:07	04:49	05:23	21:51	22:42	23:41
52°	04:00	04:44	05:20	21:40	22:31	23:31
54°	03:51	04:38	05:16	21:29	22:18	23:19
56°	03:40	04:31	05:11	21:15	22:04	23:05
58°	03:29	04:24	05:06	20:59	21:47	22:49
S 60°	03:14	04:15	05:01	20:40	21:26	22:29
S 62°	02:57	04:05	04:54	20:17	21:00	22:05

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 24	Moonset 25	Moonset 26
N 72°	16:28	17:39	18:58	-	-	-
N 70°	16:40	17:44	18:54	-	-	-
68°	16:50	17:48	18:52	-	-	-
66°	16:58	17:51	18:50	06:51	06:42	-
64°	17:05	17:54	18:49	07:31	07:55	08:48
62°	17:11	17:56	18:48	07:59	08:32	09:26
60°	17:16	17:59	18:47	08:20	08:58	09:53
N 58°	17:21	18:01	18:46	08:38	09:18	10:13
56°	17:25	18:02	18:46	08:52	09:35	10:30
54°	17:28	18:04	18:45	09:05	09:50	10:45
52°	17:32	18:06	18:45	09:16	10:02	10:58
50°	17:35	18:07	18:45	09:26	10:13	11:09
45°	17:41	18:11	18:45	09:48	10:36	11:32
N 40°	17:47	18:14	18:46	10:05	10:55	11:51
35°	17:52	18:17	18:47	10:19	11:11	12:06
30°	17:56	18:20	18:48	10:32	11:24	12:20
20°	18:03	18:26	18:51	10:53	11:47	12:43
N 10°	18:10	18:31	18:56	11:12	12:07	13:02
0°	18:16	18:37	19:02	11:29	12:26	13:21
S 10°	18:23	18:44	19:09	11:47	12:44	13:39
20°	18:30	18:52	19:18	12:05	13:04	13:59
30°	18:38	19:02	19:31	12:27	13:27	14:22
35°	18:43	19:09	19:39	12:40	13:41	14:35
40°	18:48	19:16	19:49	12:54	13:56	14:50
45°	18:54	19:25	20:02	13:12	14:15	15:08
S 50°	19:02	19:36	20:17	13:33	14:38	15:31
52°	19:05	19:41	20:25	13:44	14:49	15:42
54°	19:09	19:47	20:34	13:55	15:01	15:54
56°	19:14	19:53	20:44	14:08	15:16	16:08
58°	19:18	20:01	20:55	14:24	15:33	16:24
S 60°	19:24	20:09	21:09	14:42	15:53	16:44
S 62°	19:30	20:19	21:26	15:06	16:19	17:08

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
24	13 18	13 14	12:13	05:16	17:44	21d 55%
25	13 10	13 05	12:13	06:12	18:40	22d 45%
26	13 00	12 55	12:13	07:08	19:35	23d 34%

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2011 Feb 27, 28, Mar. 1 (Sun, Mon, Tue)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
27 Sunday 00	156° 29'.1	218° 20'.9	19° 52'.0 S	181° 01'.9	11° 21'.1 S	149° 20'.6	1° 52'.4 N	320° 23'.0	3° 58'.5 S
01	171° 31'.6	233° 20'.2	51'.6	196° 02'.5	20'.4	164° 22'.6	52'.6	335° 25'.6	58'.5
02	186° 34'.1	248° 19'.6	51'.2	211° 03'.1	19'.6	179° 24'.5	52'.9	350° 28'.2	58'.4
03	201° 36'.5	263° 18'.9	50'.8	226° 03'.7	18'.9	194° 26'.5	53'.1	5° 30'.8	58'.4
04	216° 39'.0	278° 18'.3	50'.4	241° 04'.3	18'.2	209° 28'.4	53'.3	20° 33'.4	58'.3
05	231° 41'.5	293° 17'.7	50'.0	256° 04'.9	17'.5	224° 30'.3	53'.5	35° 35'.9	58'.3
06	246° 43'.9	308° 17'.0	49'.6	271° 05'.5	16'.8	239° 32'.3	53'.8	50° 38'.5	58'.2
07	261° 46'.4	323° 16'.4	49'.2	286° 06'.1	16'.0	254° 34'.2	54'.0	65° 41'.1	58'.1
08	276° 48'.8	338° 15'.7	48'.8	301° 06'.7	15'.3	269° 36'.2	54'.2	80° 43'.7	58'.1
09	291° 51'.3	353° 15'.1	48'.4	316° 07'.3	14'.6	284° 38'.1	54'.4	95° 46'.3	58'.0
10	306° 53'.8	8° 14'.5	48'.0	331° 07'.8	13'.9	299° 40'.1	54'.7	110° 48'.9	58'.0
11	321° 56'.2	23° 13'.8	47'.6	346° 08'.4	13'.2	314° 42'.0	54'.9	125° 51'.4	57'.9
12	336° 58'.7	38° 13'.2	19° 47'.2 S	1° 09'.0	11° 12'.4 S	329° 44'.0	1° 55'.1 N	140° 54'.0	3° 57'.9 S
13	352° 01'.2	53° 12'.5	46'.8	16° 09'.6	11'.7	344° 45'.9	55'.4	155° 56'.6	57'.8
14	7° 03'.6	68° 11'.9	46'.4	31° 10'.2	11'.0	359° 47'.8	55'.6	170° 59'.2	57'.7
15	22° 06'.1	83° 11'.3	46'.0	46° 10'.8	10'.3	14° 49'.8	55'.8	186° 01'.8	57'.7
16	37° 08'.6	98° 10'.6	45'.6	61° 11'.4	09'.5	29° 51'.7	56'.0	201° 04'.4	57'.6
17	52° 11'.0	113° 10'.0	45'.2	76° 12'.0	08'.8	44° 53'.7	56'.3	216° 06'.9	57'.6
18	67° 13'.5	128° 09'.3	44'.8	91° 12'.6	08'.1	59° 55'.6	56'.5	231° 09'.5	57'.5
19	82° 15'.9	143° 08'.7	44'.4	106° 13'.2	07'.4	74° 57'.6	56'.7	246° 12'.1	57'.4
20	97° 18'.4	158° 08'.1	44'.0	121° 13'.8	06'.7	89° 59'.5	57'.0	261° 14'.7	57'.4
21	112° 20'.9	173° 07'.4	43'.6	136° 14'.3	05'.9	105° 01'.4	57'.2	276° 17'.3	57'.3
22	127° 23'.3	188° 06'.8	43'.2	151° 14'.9	05'.2	120° 03'.4	57'.4	291° 19'.9	57'.3
23	142° 25'.8	203° 06'.1	42'.7	166° 15'.5	04'.5	135° 05'.3	57'.6	306° 22'.4	57'.2
28 Monday 00	157° 28'.3	218° 05'.5	19° 42'.3 S	181° 16'.1	11° 03'.8 S	150° 07'.3	1° 57'.9 N	321° 25'.0	3° 57'.1 S
01	172° 30'.7	233° 04'.9	41'.9	196° 16'.7	03'.0	165° 09'.2	58'.1	336° 27'.6	57'.1
02	187° 33'.2	248° 04'.2	41'.5	211° 17'.3	02'.3	180° 11'.2	58'.3	351° 30'.2	57'.0
03	202° 35'.7	263° 03'.6	41'.1	226° 17'.9	01'.6	195° 13'.1	58'.6	6° 32'.8	57'.0
04	217° 38'.1	278° 03'.0	40'.7	241° 18'.5	00'.9	210° 15'.0	58'.8	21° 35'.4	56'.9
05	232° 40'.6	293° 02'.3	40'.3	256° 19'.1	00'.1	225° 17'.0	59'.0	36° 37'.9	56'.9
06	247° 43'.1	308° 01'.7	39'.8	271° 19'.7	10° 59'.4 S	240° 18'.9	59'.2	51° 40'.5	56'.8
07	262° 45'.5	323° 01'.1	39'.4	286° 20'.3	58'.7	255° 20'.9	59'.5	66° 43'.1	56'.7
08	277° 48'.0	338° 00'.4	39'.0	301° 20'.9	58'.0	270° 22'.8	59'.7	81° 45'.7	56'.7
09	292° 50'.4	352° 59'.8	38'.6	316° 21'.5	57'.2	285° 24'.7	59'.9	96° 48'.3	56'.6
10	307° 52'.9	7° 59'.1	38'.2	331° 22'.1	56'.5	300° 26'.7	2° 00'.2 N	111° 50'.9	56'.6
11	322° 55'.4	22° 58'.5	37'.7	346° 22'.7	55'.8	315° 28'.6	00'.4	126° 53'.5	56'.5
12	337° 57'.8	37° 57'.9	19° 37'.3 S	1° 23'.2	10° 55'.1 S	330° 30'.6	2° 00'.6 N	141° 56'.0	3° 56'.4 S
13	353° 00'.3	52° 57'.2	36'.9	16° 23'.8	54'.3	345° 32'.5	00'.8	156° 58'.6	56'.4
14	8° 02'.8	67° 56'.6	36'.5	31° 24'.4	53'.6	0° 34'.5	01'.1	172° 01'.2	56'.3
15	23° 05'.2	82° 56'.0	36'.0	46° 25'.0	52'.9	15° 36'.4	01'.3	187° 03'.8	56'.3
16	38° 07'.7	97° 55'.3	35'.6	61° 25'.6	52'.2	30° 38'.3	01'.5	202° 06'.4	56'.2
17	53° 10'.2	112° 54'.7	35'.2	76° 26'.2	51'.4	45° 40'.3	01'.8	217° 09'.0	56'.1
18	68° 12'.6	127° 54'.1	34'.7	91° 26'.8	50'.7	60° 42'.2	02'.0	232° 11'.6	56'.1
19	83° 15'.1	142° 53'.4	34'.3	106° 27'.4	50'.0	75° 44'.2	02'.2	247° 14'.1	56'.0
20	98° 17'.6	157° 52'.8	33'.9	121° 28'.0	49'.3	90° 46'.1	02'.4	262° 16'.7	56'.0
21	113° 20'.0	172° 52'.2	33'.4	136° 28'.6	48'.5	105° 48'.0	02'.7	277° 19'.3	55'.9
22	128° 22'.5	187° 51'.5	33'.0	151° 29'.2	47'.8	120° 50'.0	02'.9	292° 21'.9	55'.8
23	143° 24'.9	202° 50'.9	32'.6	166° 29'.8	47'.1	135° 51'.9	03'.1	307° 24'.5	55'.8
1 Tuesday 00	158° 27'.4	217° 50'.2	19° 32'.1 S	181° 30'.4	10° 46'.4 S	150° 53'.9	2° 03'.4 N	322° 27'.1	3° 55'.7 S
01	173° 29'.9	232° 49'.6	31'.7	196° 31'.0	45'.6	165° 55'.8	03'.6	337° 29'.7	55'.7
02	188° 32'.3	247° 49'.0	31'.3	211° 31'.6	44'.9	180° 57'.7	03'.8	352° 32'.2	55'.6
03	203° 34'.8	262° 48'.3	30'.8	226° 32'.2	44'.2	195° 59'.7	04'.0	7° 34'.8	55'.5
04	218° 37'.3	277° 47'.7	30'.4	241° 32'.8	43'.4	211° 01'.6	04'.3	22° 37'.4	55'.5
05	233° 39'.7	292° 47'.1	30'.0	256° 33'.4	42'.7	226° 03'.6	04'.5	37° 40'.0	55'.4
06	248° 42'.2	307° 46'.4	29'.5	271° 34'.0	42'.0	241° 05'.5	04'.7	52° 42'.6	55'.4
07	263° 44'.7	322° 45'.8	29'.1	286° 34'.6	41'.3	256° 07'.4	05'.0	67° 45'.2	55'.3
08	278° 47'.1	337° 45'.2	28'.6	301° 35'.2	40'.5	271° 09'.4	05'.2	82° 47'.8	55'.2
09	293° 49'.6	352° 44'.5	28'.2	316° 35'.8	39'.8	286° 11'.3	05'.4	97° 50'.4	55'.2
10	308° 52'.1	7° 43'.9	27'.7	331° 36'.4	39'.1	301° 13'.3	05'.6	112° 53'.0	55'.1
11	323° 54'.5	22° 43'.3	27'.3	346° 37'.0	38'.3	316° 15'.2	05'.9	127° 55'.5	55'.1
12	338° 57'.0	37° 42'.7	19° 26'.8 S	1° 37'.6	10° 37'.6 S	331° 17'.1	2° 06'.1 N	142° 58'.1	3° 55'.0 S
13	353° 59'.4	52° 42'.0	26'.4	16° 38'.2	36'.9	346° 19'.1	06'.3	158° 00'.7	54'.9
14	9° 01'.9	67° 41'.4	25'.9	31° 38'.8	36'.1	1° 21'.0	06'.6	173° 03'.3	54'.9
15	24° 04'.4	82° 40'.8	25'.5	46° 39'.4	35'.4	16° 23'.0	06'.8	188° 05'.9	54'.8
16	39° 06'.8	97° 40'.1	25'.0	61° 40'.0	34'.7	31° 24'.9	07'.0	203° 08'.5	54'.8
17	54° 09'.3	112° 39'.5	24'.6	76° 40'.6	34'.0	46° 26'.8	07'.2	218° 11'.1	54'.7
18	69° 11'.8	127° 38'.9	24'.1	91° 41'.2	33'.2	61° 28'.8	07'.5	233° 13'.7	54'.6
19	84° 14'.2	142° 38'.2	23'.7	106° 41'.8	32'.5	76° 30'.7	07'.7	248° 16'.3	54'.6
20	99° 16'.7	157° 37'.6	23'.2	121° 42'.4	31'.8	91° 32'.6	07'.9	263° 18'.8	54'.5
21	114° 19'.2	172° 37'.0	22'.8	136° 43'.0	31'.0	106° 34'.6	08'.2	278° 21'.4	54'.5
22	129° 21'.6	187° 36'.3	22'.3	151° 43'.6	30'.3	121° 36'.5	08'.4	293° 24'.0	54'.4
23	144° 24'.1	202° 35'.7	21'.9	166° 44'.2	29'.6	136° 38'.5	08'.6	308° 26'.6	54'.3
	M.P. 13:28	v -0'.6	d 0'.4	v 0'.6	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.8 S
Achernar	335° 28'.3	57° 11'.0 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.5	55° 53'.6 N
Alkaid	152° 59'.8	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.4 S
Alnilam	275° 47'.9	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.2 N
Altair	62° 10'.1	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.3	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.7	69° 02'.6 S
Avior	234° 18'.2	59° 33'.0 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.6	52° 42'.4 S
Capella	280° 36'.8	46° 00'.7 N
Deneb	49° 33'.0	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.6	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.0 N
Enif	33° 49'.0	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 49'.9	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.1	34° 22'.6 S
Kochab	137° 19'.3	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.3	36° 25'.5 S
Miaplacidus	221° 39'.3	69° 46'.0 S
Mirfak	308° 42'.9	49° 54'.2 N
Nunki	76° 00'.5	26° 16'.9 S
Peacock	53° 22'.2	56° 41'.8 S
Polaris	318° 47'.1	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.0	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.5	8° 11'.5 S
Rigil Kent	139° 53'.7	60° 52'.7 S
Sabik	102° 14'.5	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.1 N
Shaula	96° 24'.2	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.1 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.3	38° 47'.4 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	60° 37'.2	09:28
Mars	23° 47'.9	11:54
Jupiter	352° 39'.0	13:58
Saturn	163° 56'.7	02:34

SUN

GHA	Dec
176° 47'.5	8° 33'.3 S
191° 47'.6	32'.4
206° 47'.7	31'.4
221° 47'.8	30'.5
236° 47'.9	29'.6
251° 48'.0	28'.6
266° 48'.1	27'.7
281° 48'.2	26'.8
296° 48'.3	25'.8
311° 48'.4	24'.9
326° 48'.5	23'.9
341° 48'.7	23'.0
356° 48'.8	8° 22'.1 S
11° 48'.9	21'.1
26° 49'.0	20'.2
41° 49'.1	19'.2
56° 49'.2	18'.3
71° 49'.3	17'.4
86° 49'.4	16'.4
101° 49'.5	15'.5
116° 49'.6	14'.5
131° 49'.8	13'.6
146° 49'.9	12'.6
161° 50'.0	11'.7
176° 50'.1	8° 10'.8 S
191° 50'.2	09'.8
206° 50'.3	08'.9
221° 50'.4	07'.9
236° 50'.5	07'.0
251° 50'.7	06'.0
266° 50'.8	05'.1
281° 50'.9	04'.2
296° 51'.0	03'.2
311° 51'.1	02'.3
326° 51'.2	01'.3
341° 51'.3	00'.4
356° 51'.4	7° 59'.4 S
11° 51'.6	58'.5
26° 51'.7	57'.5
41° 51'.8	56'.6
56° 51'.9	55'.6
71° 52'.0	54'.7
86° 52'.1	53'.8
101° 52'.3	52'.8
116° 52'.4	51'.9
131° 52'.5	50'.9
146° 52'.6	50'.0
161° 52'.7	49'.0
176° 52'.8	7° 48'.1 S
191° 53'.0	47'.1
206° 53'.1	46'.2
221° 53'.2	45'.2
236° 53'.3	44'.3
251° 53'.4	43'.3
266° 53'.5	42'.4
281° 53'.7	41'.4
296° 53'.8	40'.5
311° 53'.9	39'.5
326° 54'.0	38'.6
341° 54'.1	37'.6
356° 54'.3	7° 36'.7 S
11° 54'.4	35'.7
26° 54'.5	34'.8
41° 54'.6	33'.8
56° 54'.7	32'.9
71° 54'.9	31'.9
86° 55'.0	31'.0
101° 55'.1	30'.0
116° 55'.2	29'.1
131° 55'.3	28'.1
146° 55'.5	27'.2
161° 55'.6	26'.2
SD 16'.1	d 0'.9

MOON

GHA	v	Dec	d	HP
243° 54'.1	9'.0	23° 14'.6 S	3'.5	56'.3
258° 22'.1	9'.0	11'.1	3'.5	56'.2
272° 50'.1	9'.1	07'.6	3'.7	
287° 18'.2	9'.1	03'.9	3'.8	
301° 46'.3	9'.3	00'.1	4'.0	
316° 14'.6	9'.3	22° 56'.1 S	4'.0	56'.1
330° 42'.9	9'.3	52'.1	4'.2	
345° 11'.2	9'.4	47'.9	4'.3	
359° 39'.6	9'.5	43'.6	4'.4	
14° 08'.1	9'.5	39'.2	4'.5	56'.0
28° 36'.6	9'.6	34'.7	4'.6	
43° 05'.2	9'.7	30'.1	4'.8	
57° 33'.9	9'.8	22° 25'.3 S	4'.8	55'.9
72° 02'.7	9'.8	20'.5	5'.0	
86° 31'.5	9'.8	15'.5	5'.1	
101° 00'.3	10'.0	10'.4	5'.2	
115° 29'.3	10'.0	05'.2	5'.2	55'.8
129° 58'.3	10'.1	22° 00'.0 S	5'.5	
144° 27'.4	10'.1	54'.5	5'.5	
158° 56'.5	10'.3	49'.0	5'.6	
173° 25'.8	10'.3	43'.4	5'.7	
187° 55'.1	10'.3	37'.7	5'.8	55'.7
202° 24'.4	10'.5	31'.9	6'.0	
216° 53'.9	10'.5	25'.9	6'.0	
231° 23'.4	10'.5	21° 19'.9 S	6'.1	55'.7
245° 52'.9	10'.7	13'.8	6'.3	55'.6
260° 22'.6	10'.7	07'.5	6'.3	
274° 52'.3	10'.8	01'.2	6'.5	
289° 22'.1	10'.8	20° 54'.7 S	6'.5	
303° 51'.9	10'.9	48'.2	6'.6	55'.5
318° 21'.8	11'.0	41'.6	6'.8	
332° 51'.8	11'.1	34'.8	6'.8	
347° 21'.9	11'.1	28'.0	6'.9	
1° 52'.0	11'.3	21'.1	7'.0	
16° 22'.3	11'.2	14'.1	7'.1	55'.4
30° 52'.5	11'.4	07'.0	7'.2	
45° 22'.9	11'.4	19° 59'.8 S	7'.3	55'.4
59° 53'.3	11'.5	52'.5	7'.4	
74° 23'.8	11'.6	45'.1	7'.5	55'.3
88° 54'.4	11'.6	37'.6	7'.5	
103° 25'.0	11'.7	30'.1	7'.7	
117° 55'.7	11'.8	22'.4	7'.7	
132° 26'.5	11'.8	14'.7	7'.8	
146° 57'.3	11'.9	06'.9	7'.9	55'.2
161° 28'.2	12'.0	18° 59'.0 S	8'.0	
175° 59'.2	12'.1	51'.0	8'.1	
190° 30'.3	12'.1	42'.9	8'.1	
205° 01'.4	12'.2	34'.8	8'.3	
219° 32'.6	12'.3	18° 26'.5 S	8'.3	55'.1
234° 03'.9	12'.3	18'.2	8'.4	
248° 35'.2	12'.4	09'.8	8'.4	
263° 06'.6	12'.5	01'.4	8'.6	
277° 38'.1	12'.5	17° 52'.8 S	8'.6	
292° 09'.6	12'.6	44'.2	8'.7	
306° 41'.2	12'.7	35'.5	8'.8	55'.0
321° 12'.9	12'.7	26'.7	8'.8	
335° 44'.6	12'.8	17'.9	8'.9	
350° 16'.4	12'.9	09'.0	9'.0	
4° 48'.3	12'.9	00'.0	9'.1	
19° 20'.2	13'.0	16° 50'.9 S	9'.1	54'.9
33° 52'.2	13'.1	16° 41'.8 S	9'.2	54'.9
48° 24'.3	13'.1	32'.6	9'.2	
62° 56'.4	13'.2	23'.4	9'.4	
77° 28'.6	13'.3	14'.0	9'.4	
92° 00'.9	13'.3	04'.6	9'.4	
106° 33'.2	13'.4	15° 55'.2 S	9'.6	54'.8
121° 05'.6	13'.5	45'.6	9'.5	
135° 38'.1	13'.5	36'.1	9'.7	
150° 10'.6	13'.6	26'.4	9'.7	
164° 43'.2	13'.6	16'.7	9'.8	
179° 15'.8	13'.7	06'.9	9'.8	
193° 48'.5	13'.7	14° 57'.1 S	9'.9	54'.7
SD 15'.2		15'.1	15'.0	

Twilight / Sunrise / Moonrise

Lat	Nautical	Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 1
N 72°	05:17	06:34	07:44	-	-	08:33
N 70°	05:21	06:31	07:34	-	-	07:35
68°	05:24	06:29	07:25	-	07:25	07:01
66°	05:27	06:26	07:18	06:46	06:41	06:36
64°	05:29	06:24	07:12	05:59	06:11	06:17
62°	05:31	06:22	07:07	05:28	05:49	06:01
60°	05:33	06:21	07:03	05:05	05:31	05:47
N 58°	05:34	06:19	06:59	04:46	05:16	05:36
56°	05:35	06:18	06:55	04:31	05:03	05:26
54°	05:35	06:16	06:52	04:17	04:51	05:17
52°	05:36	06:15	06:49	04:06	04:41	05:09
50°	05:36	06:14	06:46	03:55	04:32	05:02
45°	05:37	06:11	06:40	03:33	04:13	04:46
N 40°	05:37	06:08	06:36	03:16	03:58	04:34
35°	05:37	06:06	06:31	03:01	03:45	04:23
30°	05:36	06:03	06:28	02:48	03:33	04:13
20°	05:33	05:59	06:21	02:26	03:14	03:57
N 10°	05:29	05:54	06:15	02:07	02:56	03:42
0°	05:24	05:48	06:09	01:49	02:40	03:29
S 10°	05:17	05:42	06:03	01:31	02:24	03:15
20°	05:09	05:35	05:57	01:12	02:07	03:01
30°	04:57	05:26	05:50	00:49	01:47	02:44
35°	04:49	05:20	05:46	00:36	01:35	02:34
40°	04:40	05:13	05:41	00:21	01:22	02:23
45°	04:28	05:05	05:35	00:04	01:06	02:10
S 50°	04:14	04:55	05:28	-	00:46	01:54
52°	04:06	04:50	05:25	-	00:37	01:46
54°	03:58	04:44	05:22	-	00:27	01:38
56°	03:49	04:38	05:18	-	00:15	01:29
58°	03:38	04:31	05:13	-	00:01	01:18
S 60°	03:25	04:24	05:09	23:45	-	01:05
S 62°	03:10	04:14	05:03	23:25	-	00:50

Twilight / Sunset / Moonset

Lat	Sunset	Civil	Nautical	Moonset 27	Moonset 28	Moonset 1
N 72°	16:43	17:53	19:11	-	-	11:04
N 70°	16:53	17:56	19:07	-	-	12:00
68°	17:02	17:58	19:03	-	10:31	12:34
66°	17:08	18:01	19:00	09:23	11:14	12:57
64°	17:14	18:03	18:57	10:10	11:43	13:16
62°	17:19	18:04	18:56	10:40	12:05	13:31
60°	17:24	18:06	18:54	11:03	12:22	13:44
N 58°	17:28	18:07	18:53	11:21	12:37	13:55
56°	17:31	18:09	18:52	11:37	12:49	14:04
54°	17:34	18:10	18:51	11:50	13:00	14:13
52°	17:37	18:11	18:50	12:01	13:10	14:20
50°	17:40	18:12	18:50	12:12	13:18	14:27
45°	17:45	18:15	18:49	12:33	13:37	14:41
N 40°	17:50	18:17	18:49	12:50	13:51	14:53
35°	17:54	18:20	18:49	13:04	14:04	15:03
30°	17:58	18:22	18:50	13:17	14:15	15:11
20°	18:05	18:27	18:52	13:38	14:33	15:26
N 10°	18:10	18:32	18:56	13:57	14:49	15:39
0°	18:16	18:37	19:01	14:14	15:04	15:51
S 10°	18:22	18:43	19:07	14:31	15:19	16:03
20°	18:28	18:50	19:16	14:49	15:35	16:16
30°	18:35	18:59	19:28	15:10	15:53	16:31
35°	18:39	19:05	19:35	15:22	16:03	16:39
40°	18:44	19:11	19:44	15:36	16:15	16:48
45°	18:49	19:19	19:56	15:53	16:29	16:59
S 50°	18:56	19:29	20:10	16:13	16:46	17:13
52°	18:59	19:34	20:17	16:23	16:54	17:19
54°	19:02	19:39	20:25	16:34	17:03	17:26
56°	19:06	19:45	20:34	16:46	17:13	17:33
58°	19:10	19:52	20:45	17:00	17:25	17:42
S 60°	19:15	20:00	20:57	17:17	17:38	17:52
S 62°	19:20	20:08	21:12	17:37	17:53	18:03

SUN / MOON

Day	Eqn. of Time 00h	Eqn. of Time 12h	Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
27	12 50	12 45	12:13	08:01	20:27	24d 25%
28	12 40	12 34	12:13	08:52	21:17	25d 17%
1	12 29	12 23	12:12	09:40	22:03	26d 10%

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2011 March 2, 3, 4 (Wed, Thur, Fri)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
2 00	159° 26'.5	217° 35'.1	19° 21'.4 S	181° 44'.8	10° 28'.8 S	151° 40'.4	2° 08'.9 N	323° 29'.2	3° 54'.3 S
01	174° 29'.0	232° 34'.4	20'.9	196° 45'.4	28'.1	166° 42'.3	09'.1	338° 31'.8	54'.2
02	189° 31'.5	247° 33'.8	20'.5	211° 46'.0	27'.4	181° 44'.3	09'.3	353° 34'.4	54'.1
03	204° 33'.9	262° 33'.2	20'.0	226° 46'.6	26'.6	196° 46'.2	09'.5	8° 37'.0	54'.1
04	219° 36'.4	277° 32'.6	19'.6	241° 47'.2	25'.9	211° 48'.2	09'.8	23° 39'.6	54'.0
05	234° 38'.9	292° 31'.9	19'.1	256° 47'.8	25'.2	226° 50'.1	10'.0	38° 42'.2	54'.0
06	249° 41'.3	307° 31'.3	18'.6	271° 48'.4	24'.4	241° 52'.0	10'.2	53° 44'.7	53'.9
07	264° 43'.8	322° 30'.7	18'.2	286° 49'.0	23'.7	256° 54'.0	10'.5	68° 47'.3	53'.8
08	279° 46'.3	337° 30'.0	17'.7	301° 49'.6	23'.0	271° 55'.9	10'.7	83° 49'.9	53'.8
09	294° 48'.7	352° 29'.4	17'.2	316° 50'.2	22'.2	286° 57'.8	10'.9	98° 52'.5	53'.7
10	309° 51'.2	7° 28'.8	16'.8	331° 50'.8	21'.5	301° 59'.8	11'.1	113° 55'.1	53'.7
11	324° 53'.7	22° 28'.2	16'.3	346° 51'.4	20'.8	317° 01'.7	11'.4	128° 57'.7	53'.6
12	339° 56'.1	37° 27'.5	19° 15'.8 S	1° 52'.0	10° 20'.0 S	332° 03'.7	2° 11'.6 N	144° 00'.3	3° 53'.5 S
13	354° 58'.6	52° 26'.9	15'.3	16° 52'.6	19'.3	347° 05'.6	11'.8	159° 02'.9	53'.5
14	10° 01'.0	67° 26'.3	14'.9	31° 53'.2	18'.6	2° 07'.5	12'.1	174° 05'.5	53'.4
15	25° 03'.5	82° 25'.6	14'.4	46° 53'.8	17'.8	17° 09'.5	12'.3	189° 08'.1	53'.3
16	40° 06'.0	97° 25'.0	13'.9	61° 54'.4	17'.1	32° 11'.4	12'.5	204° 10'.7	53'.3
17	55° 08'.4	112° 24'.4	13'.5	76° 55'.0	16'.4	47° 13'.3	12'.8	219° 13'.3	53'.2
18	70° 10'.9	127° 23'.8	13'.0	91° 55'.6	15'.6	62° 15'.3	13'.0	234° 15'.8	53'.2
19	85° 13'.4	142° 23'.1	12'.5	106° 56'.2	14'.9	77° 17'.2	13'.2	249° 18'.4	53'.1
20	100° 15'.8	157° 22'.5	12'.0	121° 56'.8	14'.2	92° 19'.2	13'.4	264° 21'.0	53'.0
21	115° 18'.3	172° 21'.9	11'.5	136° 57'.4	13'.4	107° 21'.1	13'.7	279° 23'.6	53'.0
22	130° 20'.8	187° 21'.3	11'.1	151° 58'.0	12'.7	122° 23'.0	13'.9	294° 26'.2	52'.9
23	145° 23'.2	202° 20'.6	10'.6	166° 58'.6	12'.0	137° 25'.0	14'.1	309° 28'.8	52'.9
3 00	160° 25'.7	217° 20'.0	19° 10'.1 S	181° 59'.2	10° 11'.2 S	152° 26'.9	2° 14'.4 N	324° 31'.4	3° 52'.8 S
01	175° 28'.1	232° 19'.4	09'.6	196° 59'.8	10'.5	167° 28'.8	14'.6	339° 34'.0	52'.7
02	190° 30'.6	247° 18'.8	09'.1	212° 00'.4	09'.8	182° 30'.8	14'.8	354° 36'.6	52'.7
03	205° 33'.1	262° 18'.1	08'.7	227° 01'.0	09'.0	197° 32'.7	15'.1	9° 39'.2	52'.6
04	220° 35'.5	277° 17'.5	08'.2	242° 01'.6	08'.3	212° 34'.6	15'.3	24° 41'.8	52'.5
05	235° 38'.0	292° 16'.9	07'.7	257° 02'.2	07'.5	227° 36'.6	15'.5	39° 44'.4	52'.5
06	250° 40'.5	307° 16'.3	07'.2	272° 02'.8	06'.8	242° 38'.5	15'.7	54° 47'.0	52'.4
07	265° 42'.9	322° 15'.6	06'.7	287° 03'.4	06'.1	257° 40'.5	16'.0	69° 49'.6	52'.4
08	280° 45'.4	337° 15'.0	06'.2	302° 04'.0	05'.3	272° 42'.4	16'.2	84° 52'.2	52'.3
09	295° 47'.9	352° 14'.4	05'.7	317° 04'.6	04'.6	287° 44'.3	16'.4	99° 54'.7	52'.2
10	310° 50'.3	7° 13'.8	05'.2	332° 05'.2	03'.9	302° 46'.3	16'.7	114° 57'.3	52'.2
11	325° 52'.8	22° 13'.1	04'.7	347° 05'.9	03'.1	317° 48'.2	16'.9	129° 59'.9	52'.1
12	340° 55'.3	37° 12'.5	19° 04'.3 S	2° 06'.5	10° 02'.4 S	332° 50'.1	2° 17'.1 N	145° 02'.5	3° 52'.0 S
13	355° 57'.7	52° 11'.9	03'.8	17° 07'.1	01'.6	347° 52'.1	17'.4	160° 05'.1	52'.0
14	11° 00'.2	67° 11'.3	03'.3	32° 07'.7	00'.9	2° 54'.0	17'.6	175° 07'.7	51'.9
15	26° 02'.6	82° 10'.6	02'.8	47° 08'.3	00'.2	17° 55'.9	17'.8	190° 10'.3	51'.9
16	41° 05'.1	97° 10'.0	02'.3	62° 08'.9	9° 59'.4 S	32° 57'.9	18'.0	205° 12'.9	51'.8
17	56° 07'.6	112° 09'.4	01'.8	77° 09'.5	58'.7	47° 59'.8	18'.3	220° 15'.5	51'.7
18	71° 10'.0	127° 08'.8	01'.3	92° 10'.1	58'.0	63° 01'.7	18'.5	235° 18'.1	51'.7
19	86° 12'.5	142° 08'.2	00'.8	107° 10'.7	57'.2	78° 03'.7	18'.7	250° 20'.7	51'.6
20	101° 15'.0	157° 07'.5	00'.3	122° 11'.3	56'.5	93° 05'.6	19'.0	265° 23'.3	51'.5
21	116° 17'.4	172° 06'.9	18° 59'.8 S	137° 11'.9	55'.7	108° 07'.5	19'.2	280° 25'.9	51'.5
22	131° 19'.9	187° 06'.3	59'.3	152° 12'.5	55'.0	123° 09'.5	19'.4	295° 28'.5	51'.4
23	146° 22'.4	202° 05'.7	58'.8	167° 13'.1	54'.3	138° 11'.4	19'.7	310° 31'.1	51'.4
4 00	161° 24'.8	217° 05'.0	18° 58'.3 S	182° 13'.7	9° 53'.5 S	153° 13'.4	2° 19'.9 N	325° 33'.7	3° 51'.3 S
01	176° 27'.3	232° 04'.4	57'.8	197° 14'.3	52'.8	168° 15'.3	20'.1	340° 36'.3	51'.2
02	191° 29'.8	247° 03'.8	57'.3	212° 15'.0	52'.0	183° 17'.2	20'.3	355° 38'.9	51'.2
03	206° 32'.2	262° 03'.2	56'.7	227° 15'.6	51'.3	198° 19'.2	20'.6	10° 41'.5	51'.1
04	221° 34'.7	277° 02'.6	56'.2	242° 16'.2	50'.6	213° 21'.1	20'.8	25° 44'.1	51'.0
05	236° 37'.1	292° 01'.9	55'.7	257° 16'.8	49'.8	228° 23'.0	21'.0	40° 46'.7	51'.0
06	251° 39'.6	307° 01'.3	55'.2	272° 17'.4	49'.1	243° 25'.0	21'.3	55° 49'.2	50'.9
07	266° 42'.1	322° 00'.7	54'.7	287° 18'.0	48'.3	258° 26'.9	21'.5	70° 51'.8	50'.8
08	281° 44'.5	337° 00'.1	54'.2	302° 18'.6	47'.6	273° 28'.8	21'.7	85° 54'.4	50'.8
09	296° 47'.0	351° 59'.5	53'.7	317° 19'.2	46'.9	288° 30'.8	22'.0	100° 57'.0	50'.7
10	311° 49'.5	6° 58'.8	53'.2	332° 19'.8	46'.1	303° 32'.7	22'.2	115° 59'.6	50'.7
11	326° 51'.9	21° 58'.2	52'.7	347° 20'.4	45'.4	318° 34'.6	22'.4	131° 02'.2	50'.6
12	341° 54'.4	36° 57'.6	18° 52'.1 S	2° 21'.0	9° 44'.6 S	333° 36'.6	2° 22'.7 N	146° 04'.8	3° 50'.5 S
13	356° 56'.9	51° 57'.0	51'.6	17° 21'.6	43'.9	348° 38'.5	22'.9	161° 07'.4	50'.5
14	11° 59'.3	66° 56'.4	51'.1	32° 22'.3	43'.2	3° 40'.4	23'.1	176° 10'.0	50'.4
15	27° 01'.8	81° 55'.8	50'.6	47° 22'.9	42'.4	18° 42'.4	23'.3	191° 12'.6	50'.3
16	42° 04'.2	96° 55'.1	50'.1	62° 23'.5	41'.7	33° 44'.3	23'.6	206° 15'.2	50'.3
17	57° 06'.7	111° 54'.5	49'.5	77° 24'.1	40'.9	48° 46'.2	23'.8	221° 17'.8	50'.2
18	72° 09'.2	126° 53'.9	49'.0	92° 24'.7	40'.2	63° 48'.2	24'.0	236° 20'.4	50'.1
19	87° 11'.6	141° 53'.3	48'.5	107° 25'.3	39'.4	78° 50'.1	24'.3	251° 23'.0	50'.1
20	102° 14'.1	156° 52'.7	48'.0	122° 25'.9	38'.7	93° 52'.0	24'.5	266° 25'.6	50'.0
21	117° 16'.6	171° 52'.1	47'.5	137° 26'.5	38'.0	108° 54'.0	24'.7	281° 28'.2	50'.0
22	132° 19'.0	186° 51'.4	46'.9	152° 27'.1	37'.2	123° 55'.9	25'.0	296° 30'.8	49'.9
23	147° 21'.5	201° 50'.8	46'.4	167° 27'.8	36'.5	138° 57'.8	25'.2	311° 33'.4	49'.8
	M.P. 13:16	v -0'.6	d 0'.5	v 0'.6	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.8 S
Achernar	335° 28'.3	57° 11'.0 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.5	55° 53'.6 N
Alkaid	152° 59'.7	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 47'.9	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.2 N
Altair	62° 10'.1	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.2	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.6	69° 02'.6 S
Avior	234° 18'.2	59° 33'.0 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 02'.9	7° 24'.4 N
Canopus	263° 56'.7	52° 42'.4 S
Capella	280° 36'.8	46° 00'.7 N
Deneb	49° 33'.0	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.6	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.0 N
Enif	33° 49'.0	9° 55'.6 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 49'.9	60° 25'.5 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.1	34° 22'.6 S
Kochab	137° 19'.2	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.3	36° 25'.5 S
Miaplacidus	221° 39'.3	69° 46'.0 S
Mirfak	308° 42'.9	49° 54'.2 N
Nunki	76° 00'.5	26° 16'.9 S
Peacock	53° 22'.2	56° 41'.8 S
Polaris	318° 48'.4	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.0	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.6	8° 11'.5 S
Rigil Kent	139° 53'.7	60° 52'.7 S
Sabik	102° 14'.4	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.1 N
Shaula	96° 24'.2	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.1 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 28'.9 S
Vega	80° 40'.3	38° 47'.4 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	56° 54'.3	09:31
Mars	21° 33'.5	11:52
Jupiter	352° 01'.2	13:48
Saturn	164° 05'.7	02:22

SUN						
GHA	Dec	GHA	v	Dec	d	HP
176° 55'.7	7° 25'.3 S	208° 21'.2	13'.8	14° 47'.2 S	10'.0	54'.7
191° 55'.8	24'.3	222° 54'.0	13'.9	37'.2	10'.0	
206° 56'.0	23'.4	237° 26'.9	14'.0	27'.2	10'.0	
221° 56'.1	22'.4	251° 59'.9	13'.9	17'.2	10'.2	
236° 56'.2	21'.5	266° 32'.8	14'.1	07'.0	10'.1	
251° 56'.3	20'.5	281° 05'.9	14'.1	13° 56'.9 S	10'.3	
266° 56'.4	19'.6	295° 39'.0	14'.1	46'.6	10'.2	54'.6
281° 56'.6	18'.6	310° 12'.1	14'.3	36'.4	10'.4	
296° 56'.7	17'.6	324° 45'.4	14'.2	26'.0	10'.4	
311° 56'.8	16'.7	339° 18'.6	14'.4	15'.6	10'.4	
326° 56'.9	15'.7	353° 52'.0	14'.3	05'.2	10'.5	
341° 57'.1	14'.8	8° 25'.3	14'.5	12° 54'.7 S	10'.5	
356° 57'.2	7° 13'.8 S	22° 58'.8	14'.4	12° 44'.2 S	10'.6	54'.6
11° 57'.3	12'.9	37° 32'.2	14'.6	33'.6	10'.6	54'.5
26° 57'.4	11'.9	52° 05'.8	14'.6	23'.0	10'.7	
41° 57'.6	11'.0	66° 39'.4	14'.6	12'.3	10'.7	
56° 57'.7	10'.0	81° 13'.0	14'.7	01'.6	10'.8	
71° 57'.8	09'.1	95° 46'.7	14'.7	11° 50'.8 S	10'.8	
86° 57'.9	08'.1	110° 20'.4	14'.8	40'.0	10'.8	
101° 58'.1	07'.1	124° 54'.2	14'.8	29'.2	10'.9	
116° 58'.2	06'.2	139° 28'.0	14'.9	18'.3	11'.0	
131° 58'.3	05'.2	154° 01'.9	14'.9	07'.3	10'.9	54'.4
146° 58'.5	04'.3	168° 35'.8	15'.0	10° 56'.4 S	11'.0	
161° 58'.6	03'.3	183° 09'.8	15'.0	45'.4	11'.1	
176° 58'.7	7° 02'.4 S	197° 43'.8	15'.1	10° 34'.3 S	11'.1	54'.4
191° 58'.8	01'.4	212° 17'.9	15'.1	23'.2	11'.1	
206° 59'.0	00'.5	226° 52'.0	15'.1	12'.1	11'.2	
221° 59'.1	6° 59'.5 S	241° 26'.1	15'.2	00'.9	11'.2	
236° 59'.2	58'.5	256° 00'.3	15'.3	9° 49'.7 S	11'.2	
251° 59'.3	57'.6	270° 34'.6	15'.2	38'.5	11'.3	
266° 59'.5	56'.6	285° 08'.8	15'.3	27'.2	11'.3	54'.3
281° 59'.6	55'.7	299° 43'.1	15'.4	15'.9	11'.3	
296° 59'.7	54'.7	314° 17'.5	15'.4	04'.6	11'.4	
311° 59'.9	53'.7	328° 51'.9	15'.4	8° 53'.2 S	11'.4	
327° 00'.0	52'.8	343° 26'.3	15'.5	41'.8	11'.4	
342° 00'.1	51'.8	358° 00'.8	15'.5	30'.4	11'.4	
357° 00'.2	6° 50'.9 S	12° 35'.3	15'.5	8° 19'.0 S	11'.5	54'.3
12° 00'.4	49'.9	27° 09'.8	15'.6	07'.5	11'.5	
27° 00'.5	49'.0	41° 44'.4	15'.6	7° 56'.0 S	11'.6	
42° 00'.6	48'.0	56° 19'.0	15'.7	44'.4	11'.5	54'.2
57° 00'.8	47'.0	70° 53'.7	15'.7	32'.9	11'.6	
72° 00'.9	46'.1	85° 28'.4	15'.7	21'.3	11'.6	
87° 01'.0	45'.1	100° 03'.1	15'.7	09'.7	11'.7	
102° 01'.2	44'.2	114° 37'.8	15'.8	6° 58'.0 S	11'.6	
117° 01'.3	43'.2	129° 12'.6	15'.8	46'.4	11'.7	
132° 01'.4	42'.2	143° 47'.4	15'.8	34'.7	11'.7	
147° 01'.6	41'.3	158° 22'.2	15'.9	23'.0	11'.7	
162° 01'.7	40'.3	172° 57'.1	15'.9	11'.3	11'.8	
177° 01'.8	6° 39'.4 S	187° 32'.0	15'.9	5° 59'.5 S	11'.7	54'.2
192° 02'.0	38'.4	202° 06'.9	15'.9	47'.8	11'.8	
207° 02'.1	37'.4	216° 41'.8	16'.0	36'.0	11'.8	
222° 02'.2	36'.5	231° 16'.8	16'.0	24'.2	11'.8	54'.1
237° 02'.4	35'.5	245° 51'.8	16'.0	12'.4	11'.9	
252° 02'.5	34'.6	260° 26'.8	16'.1	00'.5	11'.8	
267° 02'.6	33'.6	275° 01'.9	16'.0	4° 48'.7 S	11'.9	
282° 02'.8	32'.6	289° 36'.9	16'.1	36'.8	11'.9	
297° 02'.9	31'.7	304° 12'.0	16'.1	24'.9	11'.8	
312° 03'.0	30'.7	318° 47'.1	16'.2	13'.1	11'.9	
327° 03'.2	29'.7	333° 22'.3	16'.1	01'.2	12'.0	
342° 03'.3	28'.8	347° 57'.4	16'.2	3° 49'.2 S	11'.9	
357° 03'.4	6° 27'.8 S	2° 32'.6	16'.2	3° 37'.3 S	11'.9	54'.1
12° 03'.6	26'.9	17° 07'.8	16'.2	25'.4	12'.0	
27° 03'.7	25'.9	31° 43'.0	16'.2	13'.4	11'.9	
42° 03'.8	24'.9	46° 18'.2	16'.2	01'.5	12'.0	
57° 04'.0	24'.0	60° 53'.4	16'.3	2° 49'.5 S	12'.0	
72° 04'.1	23'.0	75° 28'.7	16'.2	37'.5	11'.9	54'.0
87° 04'.2	22'.0	90° 03'.9	16'.3	25'.6	12'.0	
102° 04'.4	21'.1	104° 39'.2	16'.3	13'.6	12'.0	
117° 04'.5	20'.1	119° 14'.5	16'.3	01'.6	12'.0	
132° 04'.6	19'.2	133° 49'.8	16'.3	1° 49'.6 S	12'.0	
147° 04'.8	18'.2	148° 25'.1	16'.3	37'.6	12'.0	
162° 04'.9	17'.2	163° 00'.4	16'.4	25'.6	12'.0	
SD 16'.1	d 1'.0	SD	14'.9	14'.8	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 2	Moonrise 3	Moonrise 4
N 72°	05:02	06:20	07:28	07:33	07:03	06:41
N 70°	05:08	06:18	07:20	07:07	06:49	06:34
68°	05:12	06:17	07:13	06:48	06:38	06:29
66°	05:16	06:15	07:07	06:32	06:28	06:24
64°	05:19	06:14	07:02	06:19	06:20	06:20
62°	05:22	06:13	06:58	06:08	06:13	06:17
60°	05:24	06:12	06:54	05:59	06:07	06:14
N 58°	05:26	06:11	06:50	05:51	06:02	06:12
56°	05:27	06:10	06:47	05:43	05:57	06:09
54°	05:29	06:09	06:45	05:37	05:53	06:07
52°	05:30	06:09	06:42	05:31	05:49	06:05
50°	05:30	06:08	06:40	05:25	05:46	06:04
45°	05:32	06:06	06:35	05:14	05:38	06:00
N 40°	05:33	06:04	06:31	05:04	05:32	05:56
35°	05:33	06:02	06:27	04:56	05:26	05:54
30°	05:33	06:00	06:24	04:49	05:21	05:51
20°	05:31	05:57	06:19	04:36	05:13	05:47
N 10°	05:28	05:52	06:14	04:25	05:05	05:43
0°	05:24	05:48	06:09	04:15	04:58	05:40
S 10°	05:18	05:43	06:04	04:04	04:51	05:36
20°	05:10	05:36	05:58	03:53	04:43	05:32
30°	04:59	05:28	05:52	03:40	04:35	05:28
35°	04:52	05:23	05:48	03:33	04:30	05:26
40°	04:44	05:17	05:44	03:24	04:24	05:23
45°	04:33	05:09	05:39	03:14	04:17	05:19
S 50°	04:20	05:00	05:33	03:02	04:09	05:15
52°	04:13	04:56	05:31	02:56	04:06	05:14
54°	04:05	04:51	05:28	02:50	04:02	05:12
56°	03:57	04:45	05:24	02:43	03:57	05:09
58°	03:47	04:39	05:21	02:35	03:52	05:07
S 60°	03:36	04:32	05:16	02:26	03:46	05:04
S 62°	03:22	04:24	05:12	02:16	03:40	05:01

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 2	Moonset 3	Moonset 4
N 72°	16:58	18:07	19:25	13:38	15:37	17:26
N 70°	17:06	18:08	19:19	14:02	15:49	17:30
68°	17:13	18:09	19:14	14:20	15:59	17:33
66°	17:19	18:10	19:10	14:34	16:07	17:36
64°	17:24	18:11	19:06	14:46	16:13	17:38
62°	17:28	18:12	19:04	14:56	16:19	17:40
60°	17:31	18:13	19:01	15:05	16:24	17:41
N 58°	17:35	18:14	18:59	15:12	16:28	17:43
56°	17:38	18:15	18:58	15:19	16:32	17:44
54°	17:40	18:16	18:57	15:25	16:35	17:45
52°	17:43	18:16	18:55	15:30	16:38	17:46
50°	17:45	18:17	18:55	15:35	16:41	17:47
45°	17:50	18:19	18:53	15:45	16:47	17:49
N 40°	17:54	18:21	18:52	15:53	16:52	17:51
35°	17:57	18:22	18:52	16:00	16:57	17:52
30°	18:00	18:24	18:52	16:07	17:01	17:53
20°	18:06	18:28	18:53	16:18	17:07	17:56
N 10°	18:11	18:32	18:56	16:27	17:13	17:58
0°	18:15	18:36	19:00	16:36	17:18	17:59
S 10°	18:20	18:41	19:06	16:45	17:24	18:01
20°	18:25	18:48	19:14	16:54	17:29	18:03
30°	18:31	18:56	19:24	17:04	17:36	18:05
35°	18:35	19:01	19:31	17:10	17:39	18:06
40°	18:39	19:07	19:39	17:17	17:43	18:08
45°	18:44	19:14	19:50	17:25	17:48	18:09
S 50°	18:50	19:23	20:03	17:35	17:54	18:11
52°	18:52	19:27	20:09	17:39	17:56	18:12
54°	18:55	19:32	20:17	17:44	17:59	18:13
56°	18:58	19:37	20:25	17:49	18:02	18:14
58°	19:02	19:43	20:35	17:55	18:06	18:15
S 60°	19:06	19:50	20:46	18:02	18:09	18:16
S 62°	19:11	19:58	20:59	18:09	18:14	18:17

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
2	12 17	12 11	12:12	10:25	22:47	27d 5%
3	12 05	11 59	12:12	11:08	23:29	28d 2%
4	11 53	11 47	12:12	11:50	24:10	29d 0%

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2011 March 5, 6, 7 (Sat, Sun, Mon)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
5 00	162° 24'.0	216° 50'.2	18° 45'.9 S	182° 28'.4	9° 35'.7 S	153° 59'.8	2° 25'.4 N	326° 36'.0	3° 49'.8 S
01	177° 26'.4	231° 49'.6	45'.4	197° 29'.0	35'.0	169° 01'.7	25'.7	341° 38'.6	49'.7
02	192° 28'.9	246° 49'.0	44'.8	212° 29'.6	34'.2	184° 03'.6	25'.9	356° 41'.2	49'.6
03	207° 31'.4	261° 48'.4	44'.3	227° 30'.2	33'.5	199° 05'.6	26'.1	11° 43'.8	49'.6
04	222° 33'.8	276° 47'.7	43'.8	242° 30'.8	32'.8	214° 07'.5	26'.3	26° 46'.4	49'.5
05	237° 36'.3	291° 47'.1	43'.2	257° 31'.4	32'.0	229° 09'.4	26'.6	41° 49'.0	49'.4
06	252° 38'.7	306° 46'.5	42'.7	272° 32'.0	31'.3	244° 11'.4	26'.8	56° 51'.6	49'.4
07	267° 41'.2	321° 45'.9	42'.2	287° 32'.6	30'.5	259° 13'.3	27'.0	71° 54'.2	49'.3
08	282° 43'.7	336° 45'.3	41'.6	302° 33'.3	29'.8	274° 15'.2	27'.3	86° 56'.8	49'.2
09	297° 46'.1	351° 44'.7	41'.1	317° 33'.9	29'.0	289° 17'.2	27'.5	101° 59'.4	49'.2
10	312° 48'.6	6° 44'.1	40'.6	332° 34'.5	28'.3	304° 19'.1	27'.7	117° 02'.0	49'.1
11	327° 51'.1	21° 43'.4	40'.0	347° 35'.1	27'.5	319° 21'.0	28'.0	132° 04'.6	49'.1
12	342° 53'.5	36° 42'.8	18° 39'.5 S	2° 35'.7	9° 26'.8 S	334° 23'.0	2° 28'.2 N	147° 07'.2	3° 49'.0 S
13	357° 56'.0	51° 42'.2	39'.0	17° 36'.3	26'.1	349° 24'.9	28'.4	162° 09'.8	48'.9
14	12° 58'.5	66° 41'.6	38'.4	32° 36'.9	25'.3	4° 26'.8	28'.7	177° 12'.4	48'.9
15	28° 00'.9	81° 41'.0	37'.9	47° 37'.5	24'.6	19° 28'.7	28'.9	192° 15'.0	48'.8
16	43° 03'.4	96° 40'.4	37'.3	62° 38'.2	23'.8	34° 30'.7	29'.1	207° 17'.6	48'.7
17	58° 05'.8	111° 39'.8	36'.8	77° 38'.8	23'.1	49° 32'.6	29'.4	222° 20'.2	48'.7
18	73° 08'.3	126° 39'.2	36'.2	92° 39'.4	22'.3	64° 34'.5	29'.6	237° 22'.8	48'.6
19	88° 10'.8	141° 38'.5	35'.7	107° 40'.0	21'.6	79° 36'.5	29'.8	252° 25'.4	48'.5
20	103° 13'.2	156° 37'.9	35'.2	122° 40'.6	20'.8	94° 38'.4	30'.0	267° 28'.0	48'.5
21	118° 15'.7	171° 37'.3	34'.6	137° 41'.2	20'.1	109° 40'.3	30'.3	282° 30'.6	48'.4
22	133° 18'.2	186° 36'.7	34'.1	152° 41'.8	19'.3	124° 42'.3	30'.5	297° 33'.2	48'.3
23	148° 20'.6	201° 36'.1	33'.5	167° 42'.5	18'.6	139° 44'.2	30'.7	312° 35'.8	48'.3
6 00	163° 23'.1	216° 35'.5	18° 33'.0 S	182° 43'.1	9° 17'.9 S	154° 46'.1	2° 31'.0 N	327° 38'.4	3° 48'.2 S
01	178° 25'.6	231° 34'.9	32'.4	197° 43'.7	17'.1	169° 48'.1	31'.2	342° 41'.0	48'.1
02	193° 28'.0	246° 34'.3	31'.9	212° 44'.3	16'.4	184° 50'.0	31'.4	357° 43'.6	48'.1
03	208° 30'.5	261° 33'.7	31'.3	227° 44'.9	15'.6	199° 51'.9	31'.7	12° 46'.2	48'.0
04	223° 33'.0	276° 33'.1	30'.8	242° 45'.5	14'.9	214° 53'.9	31'.9	27° 48'.8	48'.0
05	238° 35'.4	291° 32'.4	30'.2	257° 46'.1	14'.1	229° 55'.8	32'.1	42° 51'.4	47'.9
06	253° 37'.9	306° 31'.8	29'.7	272° 46'.8	13'.4	244° 57'.7	32'.4	57° 54'.0	47'.8
07	268° 40'.3	321° 31'.2	29'.1	287° 47'.4	12'.6	259° 59'.7	32'.6	72° 56'.6	47'.8
08	283° 42'.8	336° 30'.6	28'.5	302° 48'.0	11'.9	275° 01'.6	32'.8	87° 59'.2	47'.7
09	298° 45'.3	351° 30'.0	28'.0	317° 48'.6	11'.1	290° 03'.5	33'.1	103° 01'.8	47'.6
10	313° 47'.7	6° 29'.4	27'.4	332° 49'.2	10'.4	305° 05'.4	33'.3	118° 04'.4	47'.6
11	328° 50'.2	21° 28'.8	26'.9	347° 49'.8	09'.6	320° 07'.4	33'.5	133° 07'.0	47'.5
12	343° 52'.7	36° 28'.2	18° 26'.3 S	2° 50'.5	9° 08'.9 S	335° 09'.3	2° 33'.7 N	148° 09'.6	3° 47'.4 S
13	358° 55'.1	51° 27'.6	25'.7	17° 51'.1	08'.1	350° 11'.2	34'.0	163° 12'.2	47'.4
14	13° 57'.6	66° 27'.0	25'.2	32° 51'.7	07'.4	5° 13'.2	34'.2	178° 14'.8	47'.3
15	29° 00'.1	81° 26'.4	24'.6	47° 52'.3	06'.6	20° 15'.1	34'.4	193° 17'.4	47'.2
16	44° 02'.5	96° 25'.8	24'.1	62° 52'.9	05'.9	35° 17'.0	34'.7	208° 20'.1	47'.2
17	59° 05'.0	111° 25'.2	23'.5	77° 53'.5	05'.1	50° 19'.0	34'.9	223° 22'.7	47'.1
18	74° 07'.4	126° 24'.6	22'.9	92° 54'.2	04'.4	65° 20'.9	35'.1	238° 25'.3	47'.0
19	89° 09'.9	141° 23'.9	22'.4	107° 54'.8	03'.6	80° 22'.8	35'.4	253° 27'.9	47'.0
20	104° 12'.4	156° 23'.3	21'.8	122° 55'.4	02'.9	95° 24'.7	35'.6	268° 30'.5	46'.9
21	119° 14'.8	171° 22'.7	21'.2	137° 56'.0	02'.1	110° 26'.7	35'.8	283° 33'.1	46'.8
22	134° 17'.3	186° 22'.1	20'.7	152° 56'.6	01'.4	125° 28'.6	36'.1	298° 35'.7	46'.8
23	149° 19'.8	201° 21'.5	20'.1	167° 57'.2	00'.6	140° 30'.5	36'.3	313° 38'.3	46'.7
7 00	164° 22'.2	216° 20'.9	18° 19'.5 S	182° 57'.9	8° 59'.9 S	155° 32'.5	2° 36'.5 N	328° 40'.9	3° 46'.6 S
01	179° 24'.7	231° 20'.3	18'.9	197° 58'.5	59'.1	170° 34'.4	36'.8	343° 43'.5	46'.6
02	194° 27'.2	246° 19'.7	18'.4	212° 59'.1	58'.4	185° 36'.3	37'.0	358° 46'.1	46'.5
03	209° 29'.6	261° 19'.1	17'.8	227° 59'.7	57'.6	200° 38'.3	37'.2	13° 48'.7	46'.4
04	224° 32'.1	276° 18'.5	17'.2	243° 00'.3	56'.9	215° 40'.2	37'.5	28° 51'.3	46'.4
05	239° 34'.6	291° 17'.9	16'.7	258° 01'.0	56'.1	230° 42'.1	37'.7	43° 53'.9	46'.3
06	254° 37'.0	306° 17'.3	16'.1	273° 01'.6	55'.4	245° 44'.0	37'.9	58° 56'.5	46'.2
07	269° 39'.5	321° 16'.7	15'.5	288° 02'.2	54'.6	260° 46'.0	38'.2	73° 59'.1	46'.2
08	284° 41'.9	336° 16'.1	14'.9	303° 02'.8	53'.9	275° 47'.9	38'.4	89° 01'.7	46'.1
09	299° 44'.4	351° 15'.5	14'.3	318° 03'.4	53'.1	290° 49'.8	38'.6	104° 04'.3	46'.0
10	314° 46'.9	6° 14'.9	13'.8	333° 04'.0	52'.4	305° 51'.8	38'.8	119° 06'.9	46'.0
11	329° 49'.3	21° 14'.3	13'.2	348° 04'.7	51'.6	320° 53'.7	39'.1	134° 09'.5	45'.9
12	344° 51'.8	36° 13'.7	18° 12'.6 S	3° 05'.3	8° 50'.9 S	335° 55'.6	2° 39'.3 N	149° 12'.1	3° 45'.8 S
13	359° 54'.3	51° 13'.1	12'.0	18° 05'.9	50'.1	350° 57'.5	39'.5	164° 14'.7	45'.8
14	14° 56'.7	66° 12'.5	11'.4	33° 06'.5	49'.4	5° 59'.5	39'.8	179° 17'.4	45'.7
15	29° 59'.2	81° 11'.9	10'.9	48° 07'.1	48'.6	21° 01'.4	40'.0	194° 20'.0	45'.6
16	45° 01'.7	96° 11'.3	10'.3	63° 07'.8	47'.9	36° 03'.3	40'.2	209° 22'.6	45'.6
17	60° 04'.1	111° 10'.7	09'.7	78° 08'.4	47'.1	51° 05'.3	40'.5	224° 25'.2	45'.5
18	75° 06'.6	126° 10'.1	09'.1	93° 09'.0	46'.4	66° 07'.2	40'.7	239° 27'.8	45'.4
19	90° 09'.0	141° 09'.5	08'.5	108° 09'.6	45'.6	81° 09'.1	40'.9	254° 30'.4	45'.4
20	105° 11'.5	156° 08'.9	07'.9	123° 10'.3	44'.9	96° 11'.0	41'.2	269° 33'.0	45'.3
21	120° 14'.0	171° 08'.3	07'.3	138° 10'.9	44'.1	111° 13'.0	41'.4	284° 35'.6	45'.2
22	135° 16'.4	186° 07'.7	06'.7	153° 11'.5	43'.4	126° 14'.9	41'.6	299° 38'.2	45'.2
23	150° 18'.9	201° 07'.1	06'.1	168° 12'.1	42'.6	141° 16'.8	41'.9	314° 40'.8	45'.1
	M.P. 13:04	v -0'.6	d 0'.6	v 0'.6	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.8 S
Achernar	335° 28'.3	57° 11'.0 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.5	55° 53'.6 N
Alkaid	152° 59'.7	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.2 N
Altair	62° 10'.0	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.2	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.6	69° 02'.6 S
Avior	234° 18'.3	59° 33'.0 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.7	52° 42'.4 S
Capella	280° 36'.8	46° 00'.7 N
Deneb	49° 33'.0	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.2 N
Elnath	278° 14'.6	28° 37'.0 N
Eltanin	90° 47'.0	51° 28'.9 N
Enif	33° 49'.0	9° 55'.5 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 49'.9	60° 25'.6 S
Hamal	328° 02'.8	23° 31'.0 N
Kaus Aust.	83° 46'.1	34° 22'.6 S
Kochab	137° 19'.1	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.3	36° 25'.5 S
Miaplacidus	221° 39'.4	69° 46'.1 S
Mirfak	308° 42'.9	49° 54'.2 N
Nunki	76° 00'.5	26° 16'.9 S
Peacock	53° 22'.2	56° 41'.7 S
Polaris	318° 49'.7	89° 19'.1 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.0	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.6	8° 11'.5 S
Rigil Kent	139° 53'.6	60° 52'.7 S
Sabik	102° 14'.4	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.1 N
Shaula	96° 24'.2	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.2 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 29'.0 S
Vega	80° 40'.2	38° 47'.4 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	53° 12'.4	09:34
Mars	19° 20'.0	11:49
Jupiter	351° 23'.0	13:39
Saturn	164° 15'.3	02:09

SUN										
GHA	Dec	GHA	v	Dec	d	HP
177° 05'.1	6° 16'.3 S	177° 35'.8	16'.3	1° 13'.6 S	12'.0	54'.0
192° 05'.2	15'.3	192° 11'.1	16'.4	01'.6	12'.0	
207° 05'.3	14'.3	206° 46'.5	16'.3	0° 49'.6 S	12'.0	
222° 05'.5	13'.4	221° 21'.8	16'.4	37'.6	12'.0	
237° 05'.6	12'.4	235° 57'.2	16'.4	25'.6	12'.0	
252° 05'.7	11'.4	250° 32'.6	16'.3	13'.6	12'.1	
267° 05'.9	10'.5	265° 07'.9	16'.4	01'.5	12'.0	
282° 06'.0	09'.5	279° 43'.3	16'.4	0° 10'.5 N	12'.0	
297° 06'.2	08'.5	294° 18'.7	16'.4	22'.5	12'.0	
312° 06'.3	07'.6	308° 54'.1	16'.4	34'.5	11'.9	
327° 06'.4	06'.6	323° 29'.5	16'.4	46'.4	12'.0	
342° 06'.6	05'.6	338° 04'.9	16'.4	58'.4	12'.0	
357° 06'.7	6° 04'.7 S	352° 40'.3	16'.4	1° 10'.4 N	12'.0	54'.0
12° 06'.8	03'.7	7° 15'.7	16'.3	22'.4	12'.0	
27° 07'.0	02'.7	21° 51'.0	16'.4	34'.4	11'.9	
42° 07'.1	01'.8	36° 26'.4	16'.4	46'.3	12'.0	
57° 07'.3	00'.8	51° 01'.8	16'.4	58'.3	11'.9	
72° 07'.4	5° 59'.8 S	65° 37'.2	16'.4	2° 10'.2 N	11'.9	53'.9
87° 07'.5	58'.9	80° 12'.6	16'.3	22'.1	12'.0	
102° 07'.7	57'.9	94° 47'.9	16'.4	34'.1	11'.9	
117° 07'.8	56'.9	109° 23'.3	16'.4	46'.0	11'.9	
132° 08'.0	56'.0	123° 58'.7	16'.3	57'.9	11'.9	
147° 08'.1	55'.0	138° 34'.0	16'.4	3° 09'.8 N	11'.8	
162° 08'.2	54'.0	153° 09'.4	16'.3	21'.6	11'.9	
177° 08'.4	5° 53'.1 S	167° 44'.7	16'.3	3° 33'.5 N	11'.8	53'.9
192° 08'.5	52'.1	182° 20'.0	16'.3	45'.3	11'.9	
207° 08'.7	51'.1	196° 55'.3	16'.3	57'.2	11'.8	
222° 08'.8	50'.2	211° 30'.6	16'.3	4° 09'.0 N	11'.8	
237° 09'.0	49'.2	226° 05'.9	16'.3	20'.8	11'.8	
252° 09'.1	48'.2	240° 41'.2	16'.3	32'.6	11'.7	
267° 09'.2	47'.3	255° 16'.5	16'.2	44'.3	11'.8	
282° 09'.4	46'.3	269° 51'.7	16'.3	56'.1	11'.7	
297° 09'.5	45'.3	284° 27'.0	16'.2	5° 07'.8 N	11'.7	
312° 09'.7	44'.4	299° 02'.2	16'.2	19'.5	11'.7	
327° 09'.8	43'.4	313° 37'.4	16'.2	31'.2	11'.6	
342° 10'.0	42'.4	328° 12'.6	16'.2	42'.8	11'.7	
357° 10'.1	5° 41'.4 S	342° 47'.8	16'.1	5° 54'.5 N	11'.6	53'.9
12° 10'.2	40'.5	357° 22'.9	16'.2	6° 06'.1 N	11'.6	
27° 10'.4	39'.5	11° 58'.1	16'.1	17'.7	11'.5	
42° 10'.5	38'.5	26° 33'.2	16'.1	29'.2	11'.6	
57° 10'.7	37'.6	41° 08'.3	16'.0	40'.8	11'.5	
72° 10'.8	36'.6	55° 43'.3	16'.1	52'.3	11'.5	
87° 11'.0	35'.6	70° 18'.4	16'.0	7° 03'.8 N	11'.4	
102° 11'.1	34'.7	84° 53'.4	16'.0	15'.2	11'.5	
117° 11'.3	33'.7	99° 28'.4	16'.0	26'.7	11'.4	
132° 11'.4	32'.7	114° 03'.4	15'.9	38'.1	11'.4	
147° 11'.5	31'.7	128° 38'.3	16'.0	49'.5	11'.3	
162° 11'.7	30'.8	143° 13'.3	15'.9	8° 00'.8 N	11'.3	
177° 11'.8	5° 29'.8 S	157° 48'.2	15'.8	8° 12'.1 N	11'.3	54'.0
192° 12'.0	28'.8	172° 23'.0	15'.9	23'.4	11'.3	
207° 12'.1	27'.9	186° 57'.9	15'.8	34'.7	11'.2	
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237° 12'.4	25'.9	216° 07'.5	15'.8	57'.1	11'.1	
252° 12'.6	24'.9	230° 42'.3	15'.7	9° 08'.2 N	11'.2	
267° 12'.7	24'.0	245° 17'.0	15'.7	19'.4	11'.0	
282° 12'.9	23'.0	259° 51'.7	15'.6	30'.4	11'.1	
297° 13'.0	22'.0	274° 26'.3	15'.7	41'.5	11'.0	
312° 13'.2	21'.1	289° 01'.0	15'.6	52'.5	11'.0	
327° 13'.3	20'.1	303° 35'.6	15'.5	10° 03'.5 N	10'.9	
342° 13'.5	19'.1	318° 10'.1	15'.6	14'.4	10'.9	
357° 13'.6	5° 18'.1 S	332° 44'.7	15'.4	10° 25'.3 N	10'.9	54'.0
12° 13'.7	17'.2	347° 19'.1	15'.5	36'.2	10'.8	
27° 13'.9	16'.2	1° 53'.6	15'.4	47'.0	10'.7	
42° 14'.0	15'.2	16° 28'.0	15'.4	57'.7	10'.8	
57° 14'.2	14'.3	31° 02'.4	15'.3	11° 08'.5 N	10'.7	
72° 14'.3	13'.3	45° 36'.7	15'.3	19'.2	10'.6	
87° 14'.5	12'.3	60° 11'.0	15'.3	29'.8	10'.6	
102° 14'.6	11'.3	74° 45'.3	15'.2	40'.4	10'.6	
117° 14'.8	10'.4	89° 19'.5	15'.2	51'.0	10'.5	
132° 14'.9	09'.4	103° 53'.7	15'.2	12° 01'.5 N	10'.5	54'.1
147° 15'.1	08'.4	118° 27'.9	15'.1	12'.0	10'.4	
162° 15'.2	07'.4	133° 02'.0	15'.0	22'.4	10'.4	
SD 16'.1	d 1'.0	SD	14'.7		14'.7	14'.7

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 5	Moonrise 6	Moonrise 7
N 72°	04:46	06:05	07:13	06:21	06:01	05:39
N 70°	04:54	06:05	07:06	06:21	06:07	05:53
68°	05:00	06:05	07:00	06:21	06:12	06:04
66°	05:05	06:04	06:55	06:21	06:17	06:13
64°	05:09	06:04	06:51	06:20	06:21	06:21
62°	05:13	06:04	06:48	06:20	06:24	06:28
60°	05:15	06:03	06:45	06:20	06:27	06:34
N 58°	05:18	06:03	06:42	06:20	06:29	06:39
56°	05:20	06:03	06:40	06:20	06:32	06:44
54°	05:22	06:02	06:38	06:20	06:34	06:48
52°	05:23	06:02	06:36	06:20	06:35	06:52
50°	05:24	06:02	06:34	06:20	06:37	06:55
45°	05:27	06:01	06:30	06:20	06:41	07:03
N 40°	05:28	05:59	06:26	06:20	06:44	07:09
35°	05:29	05:58	06:24	06:20	06:47	07:14
30°	05:29	05:57	06:21	06:20	06:49	07:19
20°	05:29	05:54	06:16	06:20	06:54	07:28
N 10°	05:27	05:51	06:12	06:20	06:57	07:35
0°	05:23	05:47	06:08	06:20	07:01	07:42
S 10°	05:18	05:43	06:04	06:20	07:05	07:49
20°	05:11	05:37	05:59	06:20	07:08	07:57
30°	05:02	05:30	05:54	06:21	07:13	08:05
35°	04:55	05:25	05:51	06:21	07:15	08:11
40°	04:47	05:20	05:47	06:21	07:18	08:16
45°	04:38	05:13	05:43	06:21	07:22	08:23
S 50°	04:25	05:05	05:38	06:21	07:26	08:31
52°	04:19	05:01	05:36	06:21	07:28	08:35
54°	04:13	04:57	05:34	06:21	07:30	08:39
56°	04:05	04:52	05:31	06:21	07:32	08:44
58°	03:56	04:47	05:28	06:21	07:35	08:49
S 60°	03:45	04:40	05:24	06:21	07:38	08:55
S 62°	03:33	04:33	05:20	06:21	07:41	09:01

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 5	Moonset 6	Moonset 7
N 72°	17:12	18:20	19:40	19:12	21:00	22:56
N 70°	17:19	18:20	19:31	19:09	20:48	22:33
68°	17:24	18:20	19:25	19:06	20:39	22:15
66°	17:29	18:20	19:20	19:03	20:31	22:01
64°	17:33	18:20	19:15	19:01	20:25	21:50
62°	17:36	18:20	19:12	18:59	20:19	21:40
60°	17:39	18:21	19:09	18:58	20:14	21:32
N 58°	17:42	18:21	19:06	18:56	20:10	21:25
56°	17:44	18:21	19:04	18:55	20:06	21:18
54°	17:46	18:21	19:02	18:54	20:03	21:13
52°	17:48	18:22	19:01	18:53	20:00	21:07
50°	17:50	18:22	18:59	18:52	19:57	21:03
45°	17:54	18:23	18:57	18:50	19:51	20:53
N 40°	17:57	18:24	18:55	18:49	19:46	20:45
35°	18:00	18:25	18:54	18:47	19:42	20:37
30°	18:02	18:26	18:54	18:46	19:38	20:31
20°	18:07	18:29	18:54	18:44	19:32	20:21
N 10°	18:11	18:32	18:56	18:42	19:26	20:11
0°	18:15	18:35	18:59	18:40	19:21	20:02
S 10°	18:19	18:40	19:04	18:38	19:15	19:54
20°	18:23	18:45	19:11	18:36	19:10	19:44
30°	18:28	18:52	19:21	18:34	19:03	19:34
35°	18:31	18:57	19:27	18:33	19:00	19:28
40°	18:34	19:02	19:34	18:31	18:55	19:21
45°	18:38	19:08	19:44	18:30	18:51	19:13
S 50°	18:43	19:16	19:56	18:28	18:45	19:03
52°	18:46	19:20	20:02	18:27	18:42	18:59
54°	18:48	19:24	20:08	18:26	18:39	18:54
56°	18:51	19:29	20:16	18:25	18:36	18:49
58°	18:54	19:34	20:25	18:23	18:33	18:43
S 60°	18:57	19:40	20:35	18:22	18:29	18:36
S 62°	19:01	19:47	20:47	18:21	18:24	18:29

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
5	11 40	11 33	12:12	12:30	00:10	1d 1%
6	11 27	11 20	12:11	13:11	00:50	2d 3%
7	11 13	11 06	12:11	13:52	01:31	3d 6%

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2011 March 8, 9, 10 (Tue, Wed, Thur)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
8 00	165° 21'.4	216° 06'.5	18° 05'.6 S	183° 12'.7	8° 41'.8 S	156° 18'.8	2° 42'.1 N	329° 43'.4	3° 45'.0 S
01	180° 23'.8	231° 05'.9	05'.0	198° 13'.4	41'.1	171° 20'.7	42'.3	344° 46'.0	45'.0
02	195° 26'.3	246° 05'.3	04'.4	213° 14'.0	40'.3	186° 22'.6	42'.6	359° 48'.6	44'.9
03	210° 28'.8	261° 04'.7	03'.8	228° 14'.6	39'.6	201° 24'.5	42'.8	14° 51'.2	44'.8
04	225° 31'.2	276° 04'.1	03'.2	243° 15'.2	38'.8	216° 26'.5	43'.0	29° 53'.8	44'.8
05	240° 33'.7	291° 03'.5	02'.6	258° 15'.8	38'.1	231° 28'.4	43'.3	44° 56'.4	44'.7
06	255° 36'.2	306° 02'.9	02'.0	273° 16'.5	37'.3	246° 30'.3	43'.5	59° 59'.1	44'.6
07	270° 38'.6	321° 02'.3	01'.4	288° 17'.1	36'.6	261° 32'.3	43'.7	75° 01'.7	44'.6
08	285° 41'.1	336° 01'.7	00'.8	303° 17'.7	35'.8	276° 34'.2	44'.0	90° 04'.3	44'.5
09	300° 43'.5	351° 01'.1	00'.2	318° 18'.3	35'.1	291° 36'.1	44'.2	105° 06'.9	44'.4
10	315° 46'.0	6° 00'.5	17° 59'.6 S	333° 19'.0	34'.3	306° 38'.0	44'.4	120° 09'.5	44'.4
11	330° 48'.5	20° 59'.9	59'.0	348° 19'.6	33'.6	321° 40'.0	44'.7	135° 12'.1	44'.3
12	345° 50'.9	35° 59'.3	17° 58'.4 S	3° 20'.2	8° 32'.8 S	336° 41'.9	2° 44'.9 N	150° 14'.7	3° 44'.2 S
13	0° 53'.4	50° 58'.7	57'.8	18° 20'.8	32'.0	351° 43'.8	45'.1	165° 17'.3	44'.2
14	15° 55'.9	65° 58'.1	57'.2	33° 21'.5	31'.3	6° 45'.7	45'.3	180° 19'.9	44'.1
15	30° 58'.3	80° 57'.6	56'.6	48° 22'.1	30'.5	21° 47'.7	45'.6	195° 22'.5	44'.0
16	46° 00'.8	95° 57'.0	56'.0	63° 22'.7	29'.8	36° 49'.6	45'.8	210° 25'.1	44'.0
17	61° 03'.3	110° 56'.4	55'.4	78° 23'.3	29'.0	51° 51'.5	46'.0	225° 27'.7	43'.9
18	76° 05'.7	125° 55'.8	54'.7	93° 23'.9	28'.3	66° 53'.5	46'.3	240° 30'.4	43'.8
19	91° 08'.2	140° 55'.2	54'.1	108° 24'.6	27'.5	81° 55'.4	46'.5	255° 33'.0	43'.8
20	106° 10'.7	155° 54'.6	53'.5	123° 25'.2	26'.8	96° 57'.3	46'.7	270° 35'.6	43'.7
21	121° 13'.1	170° 54'.0	52'.9	138° 25'.8	26'.0	111° 59'.2	47'.0	285° 38'.2	43'.6
22	136° 15'.6	185° 53'.4	52'.3	153° 26'.4	25'.2	127° 01'.2	47'.2	300° 40'.8	43'.6
23	151° 18'.0	200° 52'.8	51'.7	168° 27'.1	24'.5	142° 03'.1	47'.4	315° 43'.4	43'.5
9 00	166° 20'.5	215° 52'.2	17° 51'.1 S	183° 27'.7	8° 23'.7 S	157° 05'.0	2° 47'.7 N	330° 46'.0	3° 43'.4 S
01	181° 23'.0	230° 51'.6	50'.5	198° 28'.3	23'.0	172° 06'.9	47'.9	345° 48'.6	43'.4
02	196° 25'.4	245° 51'.0	49'.8	213° 28'.9	22'.2	187° 08'.9	48'.1	0° 51'.2	43'.3
03	211° 27'.9	260° 50'.4	49'.2	228° 29'.6	21'.5	202° 10'.8	48'.4	15° 53'.8	43'.2
04	226° 30'.4	275° 49'.9	48'.6	243° 30'.2	20'.7	217° 12'.7	48'.6	30° 56'.4	43'.2
05	241° 32'.8	290° 49'.3	48'.0	258° 30'.8	19'.9	232° 14'.6	48'.8	45° 59'.1	43'.1
06	256° 35'.3	305° 48'.7	47'.4	273° 31'.4	19'.2	247° 16'.6	49'.1	61° 01'.7	43'.0
07	271° 37'.8	320° 48'.1	46'.8	288° 32'.1	18'.4	262° 18'.5	49'.3	76° 04'.3	43'.0
08	286° 40'.2	335° 47'.5	46'.1	303° 32'.7	17'.7	277° 20'.4	49'.5	91° 06'.9	42'.9
09	301° 42'.7	350° 46'.9	45'.5	318° 33'.3	16'.9	292° 22'.3	49'.8	106° 09'.5	42'.8
10	316° 45'.1	5° 46'.3	44'.9	333° 33'.9	16'.2	307° 24'.3	50'.0	121° 12'.1	42'.8
11	331° 47'.6	20° 45'.7	44'.3	348° 34'.6	15'.4	322° 26'.2	50'.2	136° 14'.7	42'.7
12	346° 50'.1	35° 45'.1	17° 43'.6 S	3° 35'.2	8° 14'.6 S	337° 28'.1	2° 50'.5 N	151° 17'.3	3° 42'.6 S
13	1° 52'.5	50° 44'.5	43'.0	18° 35'.8	13'.9	352° 30'.1	50'.7	166° 19'.9	42'.6
14	16° 55'.0	65° 44'.0	42'.4	33° 36'.5	13'.1	7° 32'.0	50'.9	181° 22'.5	42'.5
15	31° 57'.5	80° 43'.4	41'.8	48° 37'.1	12'.4	22° 33'.9	51'.2	196° 25'.2	42'.4
16	46° 59'.9	95° 42'.8	41'.1	63° 37'.7	11'.6	37° 35'.8	51'.4	211° 27'.8	42'.3
17	62° 02'.4	110° 42'.2	40'.5	78° 38'.3	10'.9	52° 37'.8	51'.6	226° 30'.4	42'.3
18	77° 04'.9	125° 41'.6	39'.9	93° 39'.0	10'.1	67° 39'.7	51'.9	241° 33'.0	42'.2
19	92° 07'.3	140° 41'.0	39'.3	108° 39'.6	09'.3	82° 41'.6	52'.1	256° 35'.6	42'.1
20	107° 09'.8	155° 40'.4	38'.6	123° 40'.2	08'.6	97° 43'.5	52'.3	271° 38'.2	42'.1
21	122° 12'.3	170° 39'.9	38'.0	138° 40'.8	07'.8	112° 45'.5	52'.6	286° 40'.8	42'.0
22	137° 14'.7	185° 39'.3	37'.4	153° 41'.5	07'.1	127° 47'.4	52'.8	301° 43'.4	41'.9
23	152° 17'.2	200° 38'.7	36'.7	168° 42'.1	06'.3	142° 49'.3	53'.0	316° 46'.0	41'.9
10 00	167° 19'.6	215° 38'.1	17° 36'.1 S	183° 42'.7	8° 05'.5 S	157° 51'.2	2° 53'.3 N	331° 48'.7	3° 41'.8 S
01	182° 22'.1	230° 37'.5	35'.5	198° 43'.4	04'.8	172° 53'.2	53'.5	346° 51'.3	41'.7
02	197° 24'.6	245° 36'.9	34'.8	213° 44'.0	04'.0	187° 55'.1	53'.7	1° 53'.9	41'.7
03	212° 27'.0	260° 36'.3	34'.2	228° 44'.6	03'.3	202° 57'.0	54'.0	16° 56'.5	41'.6
04	227° 29'.5	275° 35'.8	33'.5	243° 45'.2	02'.5	217° 58'.9	54'.2	31° 59'.1	41'.5
05	242° 32'.0	290° 35'.2	32'.9	258° 45'.9	01'.7	233° 00'.9	54'.4	47° 01'.7	41'.5
06	257° 34'.4	305° 34'.6	32'.3	273° 46'.5	01'.0	248° 02'.8	54'.7	62° 04'.3	41'.4
07	272° 36'.9	320° 34'.0	31'.6	288° 47'.1	00'.2	263° 04'.7	54'.9	77° 06'.9	41'.3
08	287° 39'.4	335° 33'.4	31'.0	303° 47'.8	7° 59'.5 S	278° 06'.6	55'.1	92° 09'.5	41'.3
09	302° 41'.8	350° 32'.8	30'.3	318° 48'.4	58'.7	293° 08'.6	55'.4	107° 12'.2	41'.2
10	317° 44'.3	5° 32'.3	29'.7	333° 49'.0	57'.9	308° 10'.5	55'.6	122° 14'.8	41'.1
11	332° 46'.8	20° 31'.7	29'.1	348° 49'.6	57'.2	323° 12'.4	55'.8	137° 17'.4	41'.0
12	347° 49'.2	35° 31'.1	17° 28'.4 S	3° 50'.3	7° 56'.4 S	338° 14'.3	2° 56'.1 N	152° 20'.0	3° 41'.0 S
13	2° 51'.7	50° 30'.5	27'.8	18° 50'.9	55'.7	353° 16'.3	56'.3	167° 22'.6	40'.9
14	17° 54'.1	65° 29'.9	27'.1	33° 51'.5	54'.9	8° 18'.2	56'.5	182° 25'.2	40'.8
15	32° 56'.6	80° 29'.4	26'.5	48° 52'.2	54'.1	23° 20'.1	56'.8	197° 27'.8	40'.8
16	47° 59'.1	95° 28'.8	25'.8	63° 52'.8	53'.4	38° 22'.0	57'.0	212° 30'.5	40'.7
17	63° 01'.5	110° 28'.2	25'.2	78° 53'.4	52'.6	53° 24'.0	57'.2	227° 33'.1	40'.6
18	78° 04'.0	125° 27'.6	24'.5	93° 54'.1	51'.9	68° 25'.9	57'.5	242° 35'.7	40'.6
19	93° 06'.5	140° 27'.0	23'.9	108° 54'.7	51'.1	83° 27'.8	57'.7	257° 38'.3	40'.5
20	108° 08'.9	155° 26'.5	23'.2	123° 55'.3	50'.3	98° 29'.7	57'.9	272° 40'.9	40'.4
21	123° 11'.4	170° 25'.9	22'.6	138° 56'.0	49'.6	113° 31'.6	58'.2	287° 43'.5	40'.4
22	138° 13'.9	185° 25'.3	21'.9	153° 56'.6	48'.8	128° 33'.6	58'.4	302° 46'.1	40'.3
23	153° 16'.3	200° 24'.7	21'.3	168° 57'.2	48'.0	143° 35'.5	58'.6	317° 48'.7	40'.2
	M.P. 12:53	v -0'.6	d 0'.6	v 0'.6	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.8 S
Achernar	335° 28'.3	57° 10'.9 S
Acrux	173° 10'.6	63° 09'.7 S
Adhara	255° 13'.6	28° 59'.5 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.5	55° 53'.6 N
Alkaid	152° 59'.7	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.2 N
Altair	62° 10'.0	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.2	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.5	69° 02'.6 S
Avior	234° 18'.3	59° 33'.1 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.7	52° 42'.5 S
Capella	280° 36'.8	46° 00'.7 N
Deneb	49° 33'.0	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.6	28° 37'.0 N
Eltanin	90° 47'.0	51° 28'.9 N
Enif	33° 49'.0	9° 55'.5 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 02'.9	23° 31'.0 N
Kaus Aust.	83° 46'.1	34° 22'.6 S
Kochab	137° 19'.1	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.2	36° 25'.5 S
Miaplacidus	221° 39'.4	69° 46'.1 S
Mirfak	308° 42'.9	49° 54'.2 N
Nunki	76° 00'.5	26° 16'.9 S
Peacock	53° 22'.1	56° 41'.7 S
Polaris	318° 50'.8	89° 19'.1 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.0	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.6	8° 11'.5 S
Rigil Kent	139° 53'.6	60° 52'.7 S
Sabik	102° 14'.4	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.1 N
Shaula	96° 24'.2	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.2 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 29'.0 S
Vega	80° 40'.2	38° 47'.4 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	49° 31'.7	09:37
Mars	17° 07'.2	11:46
Jupiter	350° 44'.5	13:30
Saturn	164° 25'.5	01:57

SUN

GHA	Dec
177° 15'.4	5° 06'.5 S
192° 15'.5	05'.5
207° 15'.7	04'.5
222° 15'.8	03'.5
237° 16'.0	02'.6
252° 16'.1	01'.6
267° 16'.3	00'.6
282° 16'.4	4° 59'.6 S
297° 16'.6	58'.7
312° 16'.7	57'.7
327° 16'.9	56'.7
342° 17'.0	55'.7
357° 17'.2	4° 54'.8 S
12° 17'.3	53'.8
27° 17'.5	52'.8
42° 17'.7	51'.8
57° 17'.8	50'.9
72° 18'.0	49'.9
87° 18'.1	48'.9
102° 18'.3	47'.9
117° 18'.4	47'.0
132° 18'.6	46'.0
147° 18'.7	45'.0
162° 18'.9	44'.0
177° 19'.0	4° 43'.1 S
192° 19'.2	42'.1
207° 19'.3	41'.1
222° 19'.5	40'.1
237° 19'.6	39'.2
252° 19'.8	38'.2
267° 20'.0	37'.2
282° 20'.1	36'.2
297° 20'.3	35'.2
312° 20'.4	34'.3
327° 20'.6	33'.3
342° 20'.7	32'.3
357° 20'.9	4° 31'.3 S
12° 21'.0	30'.4
27° 21'.2	29'.4
42° 21'.4	28'.4
57° 21'.5	27'.4
72° 21'.7	26'.4
87° 21'.8	25'.5
102° 22'.0	24'.5
117° 22'.1	23'.5
132° 22'.3	22'.5
147° 22'.5	21'.6
162° 22'.6	20'.6
177° 22'.8	4° 19'.6 S
192° 22'.9	18'.6
207° 23'.1	17'.6
222° 23'.2	16'.7
237° 23'.4	15'.7
252° 23'.6	14'.7
267° 23'.7	13'.7
282° 23'.9	12'.7
297° 24'.0	11'.8
312° 24'.2	10'.8
327° 24'.4	09'.8
342° 24'.5	08'.8
357° 24'.7	4° 07'.8 S
12° 24'.8	06'.9
27° 25'.0	05'.9
42° 25'.2	04'.9
57° 25'.3	03'.9
72° 25'.5	02'.9
87° 25'.6	02'.0
102° 25'.8	01'.0
117° 26'.0	00'.0
132° 26'.1	3° 59'.0 S
147° 26'.3	58'.0
162° 26'.4	57'.1
SD 16'.1	d 1'.0

MOON

GHA	v	Dec	d	HP
147° 36'.0	15'.0	12° 32'.8 N	10'.3	54'.1
162° 10'.0	15'.0	43'.1	10'.3	
176° 44'.0	14'.9	53'.4	10'.2	
191° 17'.9	14'.9	13° 03'.6 N	10'.2	
205° 51'.8	14'.8	13'.8	10'.1	
220° 25'.6	14'.8	23'.9	10'.0	
234° 59'.4	14'.8	33'.9	10'.1	
249° 33'.2	14'.7	44'.0	9'.9	
264° 06'.9	14'.6	53'.9	9'.9	
278° 40'.5	14'.6	14° 03'.8 N	9'.9	
293° 14'.1	14'.5	13'.7	9'.8	54'.2
307° 47'.6	14'.5	23'.5	9'.7	
322° 21'.1	14'.5	14° 33'.2 N	9'.7	54'.2
336° 54'.6	14'.4	42'.9	9'.7	
351° 28'.0	14'.3	52'.6	9'.5	
6° 01'.3	14'.3	15° 02'.1 N	9'.5	
20° 34'.6	14'.2	11'.6	9'.5	
35° 07'.8	14'.2	21'.1	9'.4	
49° 41'.0	14'.2	30'.5	9'.3	
64° 14'.2	14'.0	39'.8	9'.3	
78° 47'.2	14'.1	49'.1	9'.2	54'.3
93° 20'.3	13'.9	58'.3	9'.1	
107° 53'.2	13'.9	16° 07'.4 N	9'.1	
122° 26'.1	13'.9	16'.5	9'.0	
136° 59'.0	13'.8	16° 25'.5 N	8'.9	54'.3
151° 31'.8	13'.7	34'.4	8'.9	
166° 04'.5	13'.7	43'.3	8'.8	
180° 37'.2	13'.7	52'.1	8'.7	
195° 09'.9	13'.5	17° 00'.8 N	8'.7	54'.4
209° 42'.4	13'.5	09'.5	8'.6	
224° 14'.9	13'.5	18'.1	8'.5	
238° 47'.4	13'.4	26'.6	8'.5	
253° 19'.8	13'.3	35'.1	8'.4	
267° 52'.1	13'.3	43'.5	8'.3	
282° 24'.4	13'.2	51'.8	8'.2	
296° 56'.6	13'.2	18° 00'.0 N	8'.2	54'.5
311° 28'.8	13'.0	18° 08'.2 N	8'.1	54'.5
326° 00'.8	13'.1	16'.3	8'.0	
340° 32'.9	12'.9	24'.3	7'.9	
355° 04'.8	12'.9	32'.2	7'.9	
9° 36'.7	12'.9	40'.1	7'.7	
24° 08'.6	12'.8	47'.8	7'.7	
38° 40'.4	12'.7	55'.5	7'.6	54'.6
53° 12'.1	12'.6	19° 03'.1 N	7'.6	
67° 43'.7	12'.6	10'.7	7'.4	
82° 15'.3	12'.6	18'.1	7'.4	
96° 46'.9	12'.4	25'.5	7'.3	
111° 18'.3	12'.4	32'.8	7'.2	
125° 49'.7	12'.4	19° 40'.0 N	7'.1	54'.7
140° 21'.1	12'.2	47'.1	7'.0	
154° 52'.3	12'.3	54'.1	6'.9	
169° 23'.6	12'.1	20° 01'.0 N	6'.9	
183° 54'.7	12'.1	07'.9	6'.8	
198° 25'.8	12'.0	14'.7	6'.6	54'.8
212° 56'.8	11'.9	21'.3	6'.6	
227° 27'.7	11'.9	27'.9	6'.5	
241° 58'.6	11'.8	34'.4	6'.4	
256° 29'.4	11'.8	40'.8	6'.3	
271° 00'.2	11'.7	47'.1	6'.2	54'.9
285° 30'.9	11'.6	53'.3	6'.2	
300° 01'.5	11'.6	20° 59'.5 N	6'.0	54'.9
314° 32'.1	11'.5	21° 05'.5 N	5'.9	
329° 02'.6	11'.4	11'.4	5'.8	
343° 33'.0	11'.4	17'.2	5'.8	55'.0
358° 03'.4	11'.3	23'.0	5'.6	
12° 33'.7	11'.2	28'.6	5'.6	
27° 03'.9	11'.2	34'.2	5'.4	
41° 34'.1	11'.1	39'.6	5'.3	
56° 04'.2	11'.0	44'.9	5'.3	55'.1
70° 34'.2	11'.0	50'.2	5'.1	
85° 04'.2	10'.9	55'.3	5'.1	
99° 34'.1	10'.9	22° 00'.4 N	4'.9	
SD 14'.8		14'.8	15'.0	

Twilight / Sunrise / Moonrise

Lat	Nautical	Civil	Sunrise	Moonrise 8	9	10
N 72°	04:30	05:50	06:57	05:11	04:20	-
N 70°	04:40	05:51	06:52	05:36	05:11	-
68°	04:47	05:52	06:48	05:55	05:43	05:25
66°	04:53	05:53	06:44	06:10	06:07	06:04
64°	04:59	05:54	06:41	06:22	06:25	06:32
62°	05:03	05:54	06:38	06:33	06:41	06:53
60°	05:06	05:55	06:36	06:42	06:54	07:10
N 58°	05:09	05:55	06:34	06:50	07:05	07:25
56°	05:12	05:55	06:32	06:58	07:15	07:37
54°	05:14	05:55	06:30	07:04	07:23	07:48
52°	05:16	05:55	06:29	07:10	07:31	07:58
50°	05:18	05:55	06:28	07:15	07:38	08:07
45°	05:21	05:55	06:24	07:26	07:53	08:25
N 40°	05:24	05:55	06:22	07:36	08:06	08:40
35°	05:25	05:54	06:20	07:44	08:16	08:53
30°	05:26	05:54	06:17	07:51	08:26	09:04
20°	05:26	05:52	06:14	08:03	08:42	09:24
N 10°	05:25	05:50	06:11	08:14	08:56	09:40
0°	05:23	05:47	06:07	08:25	09:09	09:56
S 10°	05:18	05:43	06:04	08:35	09:23	10:12
20°	05:12	05:38	06:00	08:46	09:37	10:29
30°	05:04	05:32	05:56	08:59	09:53	10:49
35°	04:58	05:28	05:54	09:06	10:03	11:00
40°	04:51	05:23	05:51	09:15	10:14	11:14
45°	04:42	05:18	05:47	09:25	10:27	11:30
S 50°	04:31	05:10	05:43	09:37	10:43	11:49
52°	04:26	05:07	05:41	09:43	10:51	11:58
54°	04:19	05:03	05:39	09:49	10:59	12:09
56°	04:12	04:59	05:37	09:56	11:09	12:20
58°	04:04	04:54	05:35	10:04	11:19	12:34
S 60°	03:55	04:49	05:32	10:13	11:32	12:50
S 62°	03:44	04:42	05:28	10:23	11:47	13:10

Sunset / Twilight / Moonset

Lat	Sunset	Civil	Nautical	Moonset 8	9	10
N 72°	17:26	18:34	19:55	-	01:18	-
N 70°	17:31	18:32	19:44	-	00:29	-
68°	17:35	18:31	19:36	23:58	-	01:52
66°	17:39	18:30	19:30	23:35	-	01:13
64°	17:42	18:29	19:25	23:17	-	00:47
62°	17:44	18:28	19:20	23:03	-	00:26
60°	17:46	18:28	19:16	22:50	-	00:09
N 58°	17:48	18:28	19:13	22:40	23:55	25:08
56°	17:50	18:27	19:11	22:31	23:43	24:53
54°	17:52	18:27	19:08	22:23	23:32	24:40
52°	17:53	18:27	19:06	22:15	23:23	24:29
50°	17:55	18:27	19:04	22:09	23:15	24:19
45°	17:58	18:27	19:01	21:55	22:57	23:59
N 40°	18:00	18:27	18:58	21:43	22:43	23:42
35°	18:02	18:27	18:57	21:34	22:31	23:28
30°	18:04	18:28	18:56	21:25	22:20	23:16
20°	18:08	18:30	18:55	21:11	22:02	22:55
N 10°	18:11	18:32	18:56	20:58	21:46	22:37
0°	18:14	18:35	18:59	20:46	21:32	22:20
S 10°	18:17	18:38	19:03	20:34	21:17	22:03
20°	18:21	18:43	19:08	20:21	21:01	21:45
30°	18:25	18:49	19:17	20:07	20:43	21:24
35°	18:27	18:52	19:22	19:59	20:33	21:12
40°	18:30	18:57	19:29	19:49	20:21	20:58
45°	18:33	19:03	19:38	19:38	20:07	20:42
S 50°	18:37	19:10	19:49	19:25	19:50	20:22
52°	18:39	19:13	19:54	19:19	19:42	20:12
54°	18:41	19:17	20:00	19:12	19:33	20:02
56°	18:43	19:21	20:07	19:04	19:24	19:49
58°	18:45	19:25	20:15	18:56	19:12	19:35
S 60°	18:48	19:31	20:24	18:46	18:59	19:19
S 62°	18:51	19:37	20:35	18:35	18:44	18:59

SUN / MOON

Day	Eqn. of Time 00h	Eqn. of Time 12h	Mer. Pass.	MOON Mer. Pass. Upper	Mer. Pass. Lower	Age/ Vis
8	10 59	10 52	12:11	14:35	02:13	4d 12%
9	10 44	10 37	12:11	15:20	02:57	5d 18%
10	10 29	10 22	12:10	16:08	03:44	6d 26%

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2011 March 11, 12, 13 (Fri, Saturday, Sunday)

GMT	ARIES	VENUS -4.1		MARS +1.1		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
11 00	168° 18'.8	215° 24'.1	17° 20'.6 S	183° 57'.8	7° 47'.3 S	158° 37'.4	2° 58'.9 N	332° 51'.4	3° 40'.1 S
01	183° 21'.2	230° 23'.6	19'.9	198° 58'.5	46'.5	173° 39'.3	59'.1	347° 54'.0	40'.1
02	198° 23'.7	245° 23'.0	19'.3	213° 59'.1	45'.8	188° 41'.3	59'.3	2° 56'.6	40'.0
03	213° 26'.2	260° 22'.4	18'.6	228° 59'.7	45'.0	203° 43'.2	59'.6	17° 59'.2	39'.9
Friday 04	228° 28'.6	275° 21'.8	18'.0	244° 00'.4	44'.2	218° 45'.1	59'.8	33° 01'.8	39'.9
05	243° 31'.1	290° 21'.3	17'.3	259° 01'.0	43'.5	233° 47'.0	3° 00'.0 N	48° 04'.4	39'.8
06	258° 33'.6	305° 20'.7	16'.6	274° 01'.6	42'.7	248° 49'.0	00'.3	63° 07'.0	39'.7
07	273° 36'.0	320° 20'.1	16'.0	289° 02'.3	41'.9	263° 50'.9	00'.5	78° 09'.7	39'.7
08	288° 38'.5	335° 19'.5	15'.3	304° 02'.9	41'.2	278° 52'.8	00'.7	93° 12'.3	39'.6
09	303° 41'.0	350° 19'.0	14'.7	319° 03'.5	40'.4	293° 54'.7	01'.0	108° 14'.9	39'.5
10	318° 43'.4	5° 18'.4	14'.0	334° 04'.2	39'.7	308° 56'.7	01'.2	123° 17'.5	39'.5
11	333° 45'.9	20° 17'.8	13'.3	349° 04'.8	38'.9	323° 58'.6	01'.4	138° 20'.1	39'.4
12	348° 48'.4	35° 17'.2	17° 12'.7 S	4° 05'.4	7° 38'.1 S	339° 00'.5	3° 01'.7 N	153° 22'.7	3° 39'.3 S
13	3° 50'.8	50° 16'.7	12'.0	19° 06'.1	37'.4	354° 02'.4	01'.9	168° 25'.4	39'.2
14	18° 53'.3	65° 16'.1	11'.3	34° 06'.7	36'.6	9° 04'.3	02'.1	183° 28'.0	39'.2
15	33° 55'.7	80° 15'.5	10'.7	49° 07'.3	35'.8	24° 06'.3	02'.4	198° 30'.6	39'.1
16	48° 58'.2	95° 14'.9	10'.0	64° 08'.0	35'.1	39° 08'.2	02'.6	213° 33'.2	39'.0
17	64° 00'.7	110° 14'.4	09'.3	79° 08'.6	34'.3	54° 10'.1	02'.8	228° 35'.8	39'.0
18	79° 03'.1	125° 13'.8	08'.7	94° 09'.2	33'.5	69° 12'.0	03'.1	243° 38'.4	38'.9
19	94° 05'.6	140° 13'.2	08'.0	109° 09'.9	32'.8	84° 14'.0	03'.3	258° 41'.0	38'.8
20	109° 08'.1	155° 12'.6	07'.3	124° 10'.5	32'.0	99° 15'.9	03'.5	273° 43'.7	38'.8
21	124° 10'.5	170° 12'.1	06'.6	139° 11'.1	31'.3	114° 17'.8	03'.8	288° 46'.3	38'.7
22	139° 13'.0	185° 11'.5	06'.0	154° 11'.8	30'.5	129° 19'.7	04'.0	303° 48'.9	38'.6
23	154° 15'.5	200° 10'.9	05'.3	169° 12'.4	29'.7	144° 21'.6	04'.2	318° 51'.5	38'.6
12 00	169° 17'.9	215° 10'.4	17° 04'.6 S	184° 13'.0	7° 29'.0 S	159° 23'.6	3° 04'.5 N	333° 54'.1	3° 38'.5 S
01	184° 20'.4	230° 09'.8	03'.9	199° 13'.7	28'.2	174° 25'.5	04'.7	348° 56'.7	38'.4
02	199° 22'.9	245° 09'.2	03'.3	214° 14'.3	27'.4	189° 27'.4	04'.9	3° 59'.4	38'.3
Saturday 03	214° 25'.3	260° 08'.6	02'.6	229° 14'.9	26'.7	204° 29'.3	05'.2	19° 02'.0	38'.3
04	229° 27'.8	275° 08'.1	01'.9	244° 15'.6	25'.9	219° 31'.3	05'.4	34° 04'.6	38'.2
05	244° 30'.2	290° 07'.5	01'.2	259° 16'.2	25'.1	234° 33'.2	05'.6	49° 07'.2	38'.1
06	259° 32'.7	305° 06'.9	00'.5	274° 16'.8	24'.4	249° 35'.1	05'.9	64° 09'.8	38'.1
07	274° 35'.2	320° 06'.4	16° 59'.9 S	289° 17'.5	23'.6	264° 37'.0	06'.1	79° 12'.4	38'.0
08	289° 37'.6	335° 05'.8	59'.2	304° 18'.1	22'.8	279° 38'.9	06'.3	94° 15'.1	37'.9
09	304° 40'.1	350° 05'.2	58'.5	319° 18'.8	22'.1	294° 40'.9	06'.6	109° 17'.7	37'.9
10	319° 42'.6	5° 04'.7	57'.8	334° 19'.4	21'.3	309° 42'.8	06'.8	124° 20'.3	37'.8
11	334° 45'.0	20° 04'.1	57'.1	349° 20'.0	20'.5	324° 44'.7	07'.0	139° 22'.9	37'.7
12	349° 47'.5	35° 03'.5	16° 56'.4 S	4° 20'.7	7° 19'.8 S	339° 46'.6	3° 07'.3 N	154° 25'.5	3° 37'.6 S
13	4° 50'.0	50° 03'.0	55'.8	19° 21'.3	19'.0	354° 48'.6	07'.5	169° 28'.1	37'.6
14	19° 52'.4	65° 02'.4	55'.1	34° 21'.9	18'.2	9° 50'.5	07'.7	184° 30'.8	37'.5
15	34° 54'.9	80° 01'.8	54'.4	49° 22'.6	17'.5	24° 52'.4	08'.0	199° 33'.4	37'.4
16	49° 57'.3	95° 01'.3	53'.7	64° 23'.2	16'.7	39° 54'.3	08'.2	214° 36'.0	37'.4
17	64° 59'.8	110° 00'.7	53'.0	79° 23'.8	15'.9	54° 56'.2	08'.4	229° 38'.6	37'.3
18	80° 02'.3	125° 00'.1	52'.3	94° 24'.5	15'.2	69° 58'.2	08'.7	244° 41'.2	37'.2
19	95° 04'.7	139° 59'.6	51'.6	109° 25'.1	14'.4	85° 00'.1	08'.9	259° 43'.8	37'.1
20	110° 07'.2	154° 59'.0	50'.9	124° 25'.8	13'.6	100° 02'.0	09'.1	274° 46'.5	37'.1
21	125° 09'.7	169° 58'.4	50'.2	139° 26'.4	12'.9	115° 03'.9	09'.4	289° 49'.1	37'.0
22	140° 12'.1	184° 57'.9	49'.5	154° 27'.0	12'.1	130° 05'.8	09'.6	304° 51'.7	36'.9
23	155° 14'.6	199° 57'.3	48'.8	169° 27'.7	11'.3	145° 07'.8	09'.8	319° 54'.3	36'.9
13 00	170° 17'.1	214° 56'.7	16° 48'.2 S	184° 28'.3	7° 10'.6 S	160° 09'.7	3° 10'.1 N	334° 56'.9	3° 36'.8 S
01	185° 19'.5	229° 56'.2	47'.5	199° 28'.9	09'.8	175° 11'.6	10'.3	349° 59'.6	36'.7
02	200° 22'.0	244° 55'.6	46'.8	214° 29'.6	09'.0	190° 13'.5	10'.5	5° 02'.2	36'.7
03	215° 24'.5	259° 55'.1	46'.1	229° 30'.2	08'.3	205° 15'.5	10'.8	20° 04'.8	36'.6
Sunday 04	230° 26'.9	274° 54'.5	45'.4	244° 30'.9	07'.5	220° 17'.4	11'.0	35° 07'.4	36'.5
05	245° 29'.4	289° 53'.9	44'.7	259° 31'.5	06'.7	235° 19'.3	11'.2	50° 10'.0	36'.4
06	260° 31'.8	304° 53'.4	44'.0	274° 32'.1	06'.0	250° 21'.2	11'.5	65° 12'.6	36'.4
07	275° 34'.3	319° 52'.8	43'.3	289° 32'.8	05'.2	265° 23'.1	11'.7	80° 15'.3	36'.3
08	290° 36'.8	334° 52'.3	42'.6	304° 33'.4	04'.4	280° 25'.1	11'.9	95° 17'.9	36'.2
09	305° 39'.2	349° 51'.7	41'.9	319° 34'.0	03'.7	295° 27'.0	12'.2	110° 20'.5	36'.2
10	320° 41'.7	4° 51'.1	41'.1	334° 34'.7	02'.9	310° 28'.9	12'.4	125° 23'.1	36'.1
11	335° 44'.2	19° 50'.6	40'.4	349° 35'.3	02'.1	325° 30'.8	12'.6	140° 25'.7	36'.0
12	350° 46'.6	34° 50'.0	16° 39'.7 S	4° 36'.0	7° 01'.4 S	340° 32'.7	3° 12'.9 N	155° 28'.4	3° 35'.9 S
13	5° 49'.1	49° 49'.5	39'.0	19° 36'.6	00'.6	355° 34'.7	13'.1	170° 31'.0	35'.9
14	20° 51'.6	64° 48'.9	38'.3	34° 37'.2	6° 59'.8 S	10° 36'.6	13'.3	185° 33'.6	35'.8
15	35° 54'.0	79° 48'.3	37'.6	49° 37'.9	59'.1	25° 38'.5	13'.6	200° 36'.2	35'.7
16	50° 56'.5	94° 47'.8	36'.9	64° 38'.5	58'.3	40° 40'.4	13'.8	215° 38'.8	35'.7
17	65° 59'.0	109° 47'.2	36'.2	79° 39'.2	57'.5	55° 42'.3	14'.0	230° 41'.5	35'.6
18	81° 01'.4	124° 46'.7	35'.5	94° 39'.8	56'.8	70° 44'.3	14'.3	245° 44'.1	35'.5
19	96° 03'.9	139° 46'.1	34'.8	109° 40'.4	56'.0	85° 46'.2	14'.5	260° 46'.7	35'.4
20	111° 06'.3	154° 45'.5	34'.1	124° 41'.1	55'.2	100° 48'.1	14'.7	275° 49'.3	35'.4
21	126° 08'.8	169° 45'.0	33'.4	139° 41'.7	54'.4	115° 50'.0	15'.0	290° 51'.9	35'.3
22	141° 11'.3	184° 44'.4	32'.6	154° 42'.4	53'.7	130° 51'.9	15'.2	305° 54'.6	35'.2
23	156° 13'.7	199° 43'.9	31'.9	169° 43'.0	52'.9	145° 53'.9	15'.4	320° 57'.2	35'.2
	M.P. 12:41	v -0'.6	d 0'.7	v 0'.6	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.8 S
Achernar	335° 28'.3	57° 10'.9 S
Acrux	173° 10'.6	63° 09'.8 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.5	55° 53'.7 N
Alkaid	152° 59'.7	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.2 N
Altair	62° 10'.0	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.2	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.4	69° 02'.6 S
Avior	234° 18'.3	59° 33'.1 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.7	52° 42'.5 S
Capella	280° 36'.8	46° 00'.7 N
Deneb	49° 33'.0	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 47'.0	51° 28'.9 N
Enif	33° 49'.0	9° 55'.5 N
Fomalhaut	15° 26'.1	29° 33'.8 S
Gacrux	172° 02'.3	57° 10'.7 S
Gienah	175° 53'.7	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 02'.9	23° 31'.0 N
Kaus Aust.	83° 46'.0	34° 22'.6 S
Kochab	137° 19'.0	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.4	69° 46'.1 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.4	26° 16'.9 S
Peacock	53° 22'.1	56° 41'.7 S
Polaris	318° 51'.7	89° 19'.1 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 08'.0	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.6	8° 11'.5 S
Rigil Kent	139° 53'.6	60° 52'.8 S
Sabik	102° 14'.4	15° 44'.3 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.1	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.2 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 29'.0 S
Vega	80° 40'.2	38° 47'.4 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	45° 52'.4	09:40
Mars	14° 55'.1	11:43
Jupiter	350° 05'.6	13:21
Saturn	164° 36'.2	01:44

SUN						
GHA	Dec	GHA	v	Dec	d	HP
177° 26'.6	3° 56'.1 S	114° 04'.0	10'.8	22° 05'.3 N	4'.8	55'.2
192° 26'.8	55'.1	128° 33'.8	10'.7	10'.1	4'.7	
207° 26'.9	54'.1	143° 03'.5	10'.6	14'.8	4'.7	
222° 27'.1	53'.1	157° 33'.1	10'.6	19'.5	4'.5	
237° 27'.3	52'.2	172° 02'.7	10'.6	24'.0	4'.4	55'.3
252° 27'.4	51'.2	186° 32'.3	10'.4	28'.4	4'.3	
267° 27'.6	50'.2	201° 01'.7	10'.5	32'.7	4'.1	
282° 27'.7	49'.2	215° 31'.2	10'.3	36'.8	4'.1	
297° 27'.9	48'.2	230° 00'.5	10'.3	40'.9	4'.0	55'.4
312° 28'.1	47'.2	244° 29'.8	10'.2	44'.9	3'.8	
327° 28'.2	46'.3	258° 59'.0	10'.2	48'.7	3'.8	
342° 28'.4	45'.3	273° 28'.2	10'.1	52'.5	3'.6	
357° 28'.6	3° 44'.3 S	287° 57'.3	10'.0	22° 56'.1 N	3'.5	55'.5
12° 28'.7	43'.3	302° 26'.3	10'.0	59'.6	3'.4	
27° 28'.9	42'.3	316° 55'.3	9'.9	23° 03'.0 N	3'.3	
42° 29'.0	41'.4	331° 24'.2	9'.9	06'.3	3'.2	
57° 29'.2	40'.4	345° 53'.1	9'.8	09'.5	3'.0	55'.6
72° 29'.4	39'.4	0° 21'.9	9'.8	12'.5	3'.0	
87° 29'.5	38'.4	14° 50'.7	9'.7	15'.5	2'.8	
102° 29'.7	37'.4	29° 19'.4	9'.6	18'.3	2'.7	55'.7
117° 29'.9	36'.4	43° 48'.0	9'.6	21'.0	2'.6	
132° 30'.0	35'.5	58° 16'.6	9'.5	23'.6	2'.4	
147° 30'.2	34'.5	72° 45'.1	9'.5	26'.0	2'.4	
162° 30'.4	33'.5	87° 13'.6	9'.4	28'.4	2'.2	55'.8
177° 30'.5	3° 32'.5 S	101° 42'.0	9'.4	23° 30'.6 N	2'.1	55'.8
192° 30'.7	31'.5	116° 10'.4	9'.3	32'.7	2'.0	
207° 30'.9	30'.5	130° 38'.7	9'.3	34'.7	1'.9	55'.9
222° 31'.0	29'.6	145° 07'.0	9'.2	36'.6	1'.7	
237° 31'.2	28'.6	159° 35'.2	9'.1	38'.3	1'.6	
252° 31'.3	27'.6	174° 03'.3	9'.1	39'.9	1'.5	56'.0
267° 31'.5	26'.6	188° 31'.4	9'.1	41'.4	1'.4	
282° 31'.7	25'.6	202° 59'.5	9'.0	42'.8	1'.2	
297° 31'.8	24'.7	217° 27'.5	9'.0	44'.0	1'.1	
312° 32'.0	23'.7	231° 55'.5	8'.9	45'.1	1'.0	56'.1
327° 32'.2	22'.7	246° 23'.4	8'.8	46'.1	0'.8	
342° 32'.3	21'.7	260° 51'.2	8'.9	46'.9	0'.8	
357° 32'.5	3° 20'.7 S	275° 19'.1	8'.7	23° 47'.7 N	0'.6	56'.2
12° 32'.7	19'.7	289° 46'.8	8'.8	48'.3	0'.4	
27° 32'.8	18'.7	304° 14'.6	8'.7	48'.7	0'.4	
42° 33'.0	17'.8	318° 42'.3	8'.6	49'.1	0'.2	56'.3
57° 33'.2	16'.8	333° 09'.9	8'.6	49'.3	0'.1	
72° 33'.3	15'.8	347° 37'.5	8'.6	49'.4	0'.1	
87° 33'.5	14'.8	2° 05'.1	8'.5	49'.3	0'.2	56'.4
102° 33'.7	13'.8	16° 32'.6	8'.5	49'.1	0'.3	
117° 33'.8	12'.8	31° 00'.1	8'.4	48'.8	0'.4	
132° 34'.0	11'.9	45° 27'.5	8'.4	48'.4	0'.6	56'.5
147° 34'.2	10'.9	59° 54'.9	8'.4	47'.8	0'.7	
162° 34'.3	09'.9	74° 22'.3	8'.3	47'.1	0'.8	
177° 34'.5	3° 08'.9 S	88° 49'.6	8'.3	23° 46'.3 N	1'.0	56'.6
192° 34'.7	07'.9	103° 16'.9	8'.3	45'.3	1'.1	
207° 34'.9	06'.9	117° 44'.2	8'.2	44'.2	1'.3	
222° 35'.0	06'.0	132° 11'.4	8'.2	42'.9	1'.4	56'.7
237° 35'.2	05'.0	146° 38'.6	8'.2	41'.5	1'.5	
252° 35'.4	04'.0	161° 05'.8	8'.1	40'.0	1'.6	56'.8
267° 35'.5	03'.0	175° 32'.9	8'.1	38'.4	1'.8	
282° 35'.7	02'.0	190° 00'.0	8'.1	36'.6	1'.9	
297° 35'.9	01'.0	204° 27'.1	8'.0	34'.7	2'.1	56'.9
312° 36'.0	00'.0	218° 54'.1	8'.1	32'.6	2'.2	
327° 36'.2	2° 59'.1 S	233° 21'.2	8'.0	30'.4	2'.3	
342° 36'.4	58'.1	247° 48'.2	7'.9	28'.1	2'.5	57'.0
357° 36'.5	2° 57'.1 S	262° 15'.1	8'.0	23° 25'.6 N	2'.6	57'.0
12° 36'.7	56'.1	276° 42'.1	7'.9	23'.0	2'.7	
27° 36'.9	55'.1	291° 09'.0	7'.9	20'.3	2'.9	57'.1
42° 37'.1	54'.1	305° 35'.9	7'.9	17'.4	3'.0	
57° 37'.2	53'.2	320° 02'.8	7'.9	14'.4	3'.2	57'.2
72° 37'.4	52'.2	334° 29'.7	7'.8	11'.2	3'.3	
87° 37'.6	51'.2	348° 56'.5	7'.8	07'.9	3'.4	
102° 37'.7	50'.2	3° 23'.3	7'.8	04'.5	3'.6	57'.3
117° 37'.9	49'.2	17° 50'.1	7'.8	00'.9	3'.7	
132° 38'.1	48'.2	32° 16'.9	7'.8	22° 57'.2 N	3'.8	
147° 38'.2	47'.2	46° 43'.7	7'.8	53'.4	4'.0	57'.4
162° 38'.4	46'.3	61° 10'.5	7'.7	49'.4	4'.1	
SD 16'.1	d 1'.0	SD	15'.1	15'.3	15'.5	

MOON						
GHA	v	Dec	d	HP
114° 04'.0	10'.8	22° 05'.3 N	4'.8	55'.2
128° 33'.8	10'.7	10'.1	4'.7	
143° 03'.5	10'.6	14'.8	4'.7	
157° 33'.1	10'.6	19'.5	4'.5	
172° 02'.7	10'.6	24'.0	4'.4	55'.3
186° 32'.3	10'.4	28'.4	4'.3	
201° 01'.7	10'.5	32'.7	4'.1	
215° 31'.2	10'.3	36'.8	4'.1	
230° 00'.5	10'.3	40'.9	4'.0	55'.4
244° 29'.8	10'.2	44'.9	3'.8	
258° 59'.0	10'.2	48'.7	3'.8	
273° 28'.2	10'.1	52'.5	3'.6	
287° 57'.3	10'.0	22° 56'.1 N	3'.5	55'.5
302° 26'.3	10'.0	59'.6	3'.4	
316° 55'.3	9'.9	23° 03'.0 N	3'.3	
331° 24'.2	9'.9	06'.3	3'.2	
345° 53'.1	9'.8	09'.5	3'.0	55'.6
0° 21'.9	9'.8	12'.5	3'.0	
14° 50'.7	9'.7	15'.5	2'.8	
29° 19'.4	9'.6	18'.3	2'.7	55'.7
43° 48'.0	9'.6	21'.0	2'.6	
58° 16'.6	9'.5	23'.6	2'.4	
72° 45'.1	9'.5	26'.0	2'.4	
87° 13'.6	9'.4	28'.4	2'.2	55'.8
101° 42'.0	9'.4	23° 30'.6 N	2'.1	55'.8
116° 10'.4	9'.3	32'.7	2'.0	
130° 38'.7	9'.3	34'.7	1'.9	55'.9
145° 07'.0	9'.2	36'.6	1'.7	
159° 35'.2	9'.1	38'.3	1'.6	
174° 03'.3	9'.1	39'.9	1'.5	56'.0
188° 31'.4	9'.1	41'.4	1'.4	
202° 59'.5	9'.0	42'.8	1'.2	
217° 27'.5	9'.0	44'.0	1'.1	
231° 55'.5	8'.9	45'.1	1'.0	56'.1
246° 23'.4	8'.8	46'.1	0'.8	
260° 51'.2	8'.9	46'.9	0'.8	
275° 19'.1	8'.7	23° 47'.7 N	0'.6	56'.2
289° 46'.8	8'.8	48'.3	0'.4	
304° 14'.6	8'.7	48'.7	0'.4	
318° 42'.3	8'.6	49'.1	0'.2	56'.3
333° 09'.9	8'.6	49'.3	0'.1	
347° 37'.5	8'.6	49'.4	0'.1	
2° 05'.1	8'.5	49'.3	0'.2	56'.4
16° 32'.6	8'.5	49'.1	0'.3	
31° 00'.1	8'.4	48'.8	0'.4	
45° 27'.5	8'.4	48'.4	0'.6	56'.5
59° 54'.9	8'.4	47'.8	0'.7	
74° 22'.3	8'.3	47'.1	0'.8	
88° 49'.6	8'.3	23° 46'.3 N	1'.0	56'.6
103° 16'.9	8'.3	45'.3	1'.1	
117° 44'.2	8'.2	44'.2	1'.3	
132° 11'.4	8'.2	42'.9	1'.4	56'.7
146° 38'.6	8'.2	41'.5	1'.5	
161° 05'.8	8'.1	40'.0	1'.6	56'.8
175° 32'.9	8'.1	38'.4	1'.8	
190° 00'.0	8'.1	36'.6	1'.9	
204° 27'.1	8'.0	34'.7	2'.1	56'.9
218° 54'.1	8'.1	32'.6	2'.2	
233° 21'.2	8'.0	30'.4	2'.3	
247° 48'.2	7'.9	28'.1	2'.5	57'.0
262° 15'.1	8'.0	23° 25'.6 N	2'.6	57'.0
276° 42'.1	7'.9	23'.0	2'.7	
291° 09'.0	7'.9	20'.3	2'.9	57'.1
305° 35'.9	7'.9	17'.4	3'.0	
320° 02'.8	7'.9	14'.4	3'.2	57'.2
334° 29'.7	7'.8	11'.2	3'.3	
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3° 23'.3	7'.8	04'.5	3'.6	57'.3
17° 50'.1	7'.8	00'.9	3'.7	
32° 16'.9	7'.8	22° 57'.2 N	3'.8	
46° 43'.7	7'.8	53'.4	4'.0	57'.4
61° 10'.5	7'.7	49'.4	4'.1	
SD	15'.1	15'.3	15'.5	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 11	Moonrise 12	Moonrise 13
N 72°	04:13	05:35	06:41	-	-	-
N 70°	04:25	05:38	06:38	-	-	-
68°	04:34	05:40	06:35	-	-	-
66°	04:42	05:42	06:33	06:04	06:12	07:11
64°	04:48	05:43	06:31	06:45	07:14	08:12
62°	04:53	05:45	06:29	07:13	07:49	08:46
60°	04:57	05:46	06:27	07:35	08:14	09:10
N 58°	05:01	05:47	06:26	07:53	08:34	09:30
56°	05:04	05:47	06:24	08:08	08:50	09:47
54°	05:07	05:48	06:23	08:21	09:04	10:01
52°	05:09	05:49	06:22	08:32	09:17	10:13
50°	05:12	05:49	06:21	08:42	09:28	10:24
45°	05:16	05:50	06:19	09:04	09:50	10:46
N 40°	05:19	05:50	06:17	09:21	10:09	11:04
35°	05:21	05:50	06:15	09:35	10:24	11:19
30°	05:22	05:50	06:14	09:48	10:37	11:33
20°	05:24	05:49	06:11	10:10	11:00	11:55
N 10°	05:24	05:48	06:09	10:28	11:20	12:15
0°	05:22	05:46	06:07	10:46	11:38	12:33
S 10°	05:19	05:43	06:04	11:04	11:57	12:51
20°	05:14	05:39	06:01	11:23	12:17	13:10
30°	05:06	05:34	05:58	11:45	12:40	13:33
35°	05:01	05:31	05:56	11:58	12:53	13:46
40°	04:55	05:27	05:54	12:12	13:09	14:01
45°	04:47	05:22	05:51	12:30	13:27	14:19
S 50°	04:37	05:16	05:48

2011 March 14, 15, 16 (Mon, Tue, Wed)

GMT	ARIES	VENUS -4.0		MARS +1.1		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
14 00	171° 16'.2	214° 43'.3	16° 31'.2 S	184° 43'.6	6° 52'.1 S	160° 55'.8	3° 15'.7 N	335° 59'.8	3° 35'.1 S
01	186° 18'.7	229° 42'.8	30'.5	199° 44'.3	51'.4	175° 57'.7	15'.9	351° 02'.4	35'.0
02	201° 21'.1	244° 42'.2	29'.8	214° 44'.9	50'.6	190° 59'.6	16'.1	6° 05'.0	35'.0
03	216° 23'.6	259° 41'.7	29'.1	229° 45'.6	49'.8	206° 01'.5	16'.4	21° 07'.7	34'.9
04	231° 26'.1	274° 41'.1	28'.3	244° 46'.2	49'.1	221° 03'.5	16'.6	36° 10'.3	34'.8
05	246° 28'.5	289° 40'.5	27'.6	259° 46'.9	48'.3	236° 05'.4	16'.8	51° 12'.9	34'.7
06	261° 31'.0	304° 40'.0	26'.9	274° 47'.5	47'.5	251° 07'.3	17'.1	66° 15'.5	34'.7
07	276° 33'.5	319° 39'.4	26'.2	289° 48'.1	46'.7	266° 09'.2	17'.3	81° 18'.1	34'.6
08	291° 35'.9	334° 38'.9	25'.5	304° 48'.8	46'.0	281° 11'.1	17'.5	96° 20'.8	34'.5
09	306° 38'.4	349° 38'.3	24'.7	319° 49'.4	45'.2	296° 13'.1	17'.8	111° 23'.4	34'.5
10	321° 40'.8	4° 37'.8	24'.0	334° 50'.1	44'.4	311° 15'.0	18'.0	126° 26'.0	34'.4
11	336° 43'.3	19° 37'.2	23'.3	349° 50'.7	43'.7	326° 16'.9	18'.2	141° 28'.6	34'.3
12	351° 45'.8	34° 36'.7	16° 22'.6 S	4° 51'.3	6° 42'.9 S	341° 18'.8	3° 18'.5 N	156° 31'.3	3° 34'.2 S
13	6° 48'.2	49° 36'.1	21'.8	19° 52'.0	42'.1	356° 20'.7	18'.7	171° 33'.9	34'.2
14	21° 50'.7	64° 35'.6	21'.1	34° 52'.6	41'.4	11° 22'.7	18'.9	186° 36'.5	34'.1
15	36° 53'.2	79° 35'.0	20'.4	49° 53'.3	40'.6	26° 24'.6	19'.2	201° 39'.1	34'.0
16	51° 55'.6	94° 34'.5	19'.6	64° 53'.9	39'.8	41° 26'.5	19'.4	216° 41'.7	34'.0
17	66° 58'.1	109° 33'.9	18'.9	79° 54'.6	39'.0	56° 28'.4	19'.6	231° 44'.4	33'.9
18	82° 00'.6	124° 33'.4	18'.2	94° 55'.2	38'.3	71° 30'.3	19'.9	246° 47'.0	33'.8
19	97° 03'.0	139° 32'.8	17'.5	109° 55'.8	37'.5	86° 32'.2	20'.1	261° 49'.6	33'.7
20	112° 05'.5	154° 32'.3	16'.7	124° 56'.5	36'.7	101° 34'.2	20'.4	276° 52'.2	33'.7
21	127° 07'.9	169° 31'.7	16'.0	139° 57'.1	36'.0	116° 36'.1	20'.6	291° 54'.8	33'.6
22	142° 10'.4	184° 31'.2	15'.3	154° 57'.8	35'.2	131° 38'.0	20'.8	306° 57'.5	33'.5
23	157° 12'.9	199° 30'.6	14'.5	169° 58'.4	34'.4	146° 39'.9	21'.1	322° 00'.1	33'.4
15 00	172° 15'.3	214° 30'.1	16° 13'.8 S	184° 59'.1	6° 33'.6 S	161° 41'.8	3° 21'.3 N	337° 02'.7	3° 33'.4 S
01	187° 17'.8	229° 29'.5	13'.1	199° 59'.7	32'.9	176° 43'.8	21'.5	352° 05'.3	33'.3
02	202° 20'.3	244° 29'.0	12'.3	215° 00'.3	32'.1	191° 45'.7	21'.8	7° 08'.0	33'.2
03	217° 22'.7	259° 28'.4	11'.6	230° 01'.0	31'.3	206° 47'.6	22'.0	22° 10'.6	33'.2
04	232° 25'.2	274° 27'.9	10'.8	245° 01'.6	30'.6	221° 49'.5	22'.2	37° 13'.2	33'.1
05	247° 27'.7	289° 27'.3	10'.1	260° 02'.3	29'.8	236° 51'.4	22'.5	52° 15'.8	33'.0
06	262° 30'.1	304° 26'.8	09'.4	275° 02'.9	29'.0	251° 53'.4	22'.7	67° 18'.5	32'.9
07	277° 32'.6	319° 26'.2	08'.6	290° 03'.6	28'.2	266° 55'.3	22'.9	82° 21'.1	32'.9
08	292° 35'.1	334° 25'.7	07'.9	305° 04'.2	27'.5	281° 57'.2	23'.2	97° 23'.7	32'.8
09	307° 37'.5	349° 25'.1	07'.1	320° 04'.9	26'.7	296° 59'.1	23'.4	112° 26'.3	32'.7
10	322° 40'.0	4° 24'.6	06'.4	335° 05'.5	25'.9	312° 01'.0	23'.6	127° 28'.9	32'.7
11	337° 42'.4	19° 24'.1	05'.7	350° 06'.1	25'.1	327° 02'.9	23'.9	142° 31'.6	32'.6
12	352° 44'.9	34° 23'.5	16° 04'.9 S	5° 06'.8	6° 24'.4 S	342° 04'.9	3° 24'.1 N	157° 34'.2	3° 32'.5 S
13	7° 47'.4	49° 23'.0	04'.2	20° 07'.4	23'.6	357° 06'.8	24'.3	172° 36'.8	32'.4
14	22° 49'.8	64° 22'.4	03'.4	35° 08'.1	22'.8	12° 08'.7	24'.6	187° 39'.4	32'.4
15	37° 52'.3	79° 21'.9	02'.7	50° 08'.7	22'.1	27° 10'.6	24'.8	202° 42'.1	32'.3
16	52° 54'.8	94° 21'.3	01'.9	65° 09'.4	21'.3	42° 12'.5	25'.0	217° 44'.7	32'.2
17	67° 57'.2	109° 20'.8	01'.2	80° 10'.0	20'.5	57° 14'.5	25'.3	232° 47'.3	32'.2
18	82° 59'.7	124° 20'.2	00'.4	95° 10'.7	19'.7	72° 16'.4	25'.5	247° 49'.9	32'.1
19	98° 02'.2	139° 19'.7	15° 59'.7 S	110° 11'.3	19'.0	87° 18'.3	25'.7	262° 52'.6	32'.0
20	113° 04'.6	154° 19'.2	58'.9	125° 12'.0	18'.2	102° 20'.2	26'.0	277° 55'.2	31'.9
21	128° 07'.1	169° 18'.6	58'.2	140° 12'.6	17'.4	117° 22'.1	26'.2	292° 57'.8	31'.9
22	143° 09'.6	184° 18'.1	57'.4	155° 13'.3	16'.6	132° 24'.0	26'.4	308° 00'.4	31'.8
23	158° 12'.0	199° 17'.5	56'.7	170° 13'.9	15'.9	147° 26'.0	26'.7	323° 03'.1	31'.7
16 00	173° 14'.5	214° 17'.0	15° 55'.9 S	185° 14'.5	6° 15'.1 S	162° 27'.9	3° 26'.9 N	338° 05'.7	3° 31'.6 S
01	188° 16'.9	229° 16'.5	55'.2	200° 15'.2	14'.3	177° 29'.8	27'.1	353° 08'.3	31'.6
02	203° 19'.4	244° 15'.9	54'.4	215° 15'.8	13'.5	192° 31'.7	27'.4	8° 10'.9	31'.5
03	218° 21'.9	259° 15'.4	53'.7	230° 16'.5	12'.8	207° 33'.6	27'.6	23° 13'.5	31'.4
04	233° 24'.3	274° 14'.8	52'.9	245° 17'.1	12'.0	222° 35'.5	27'.8	38° 16'.2	31'.4
05	248° 26'.8	289° 14'.3	52'.1	260° 17'.8	11'.2	237° 37'.5	28'.1	53° 18'.8	31'.3
06	263° 29'.3	304° 13'.8	51'.4	275° 18'.4	10'.4	252° 39'.4	28'.3	68° 21'.4	31'.2
07	278° 31'.7	319° 13'.2	50'.6	290° 19'.1	09'.7	267° 41'.3	28'.6	83° 24'.0	31'.1
08	293° 34'.2	334° 12'.7	49'.9	305° 19'.7	08'.9	282° 43'.2	28'.8	98° 26'.7	31'.1
09	308° 36'.7	349° 12'.1	49'.1	320° 20'.4	08'.1	297° 45'.1	29'.0	113° 29'.3	31'.0
10	323° 39'.1	4° 11'.6	48'.3	335° 21'.0	07'.3	312° 47'.0	29'.3	128° 31'.9	30'.9
11	338° 41'.6	19° 11'.1	47'.6	350° 21'.7	06'.6	327° 49'.0	29'.5	143° 34'.5	30'.8
12	353° 44'.1	34° 10'.5	15° 46'.8 S	5° 22'.3	6° 05'.8 S	342° 50'.9	3° 29'.7 N	158° 37'.2	3° 30'.8 S
13	8° 46'.5	49° 10'.0	46'.1	20° 23'.0	05'.0	357° 52'.8	30'.0	173° 39'.8	30'.7
14	23° 49'.0	64° 09'.5	45'.3	35° 23'.6	04'.2	12° 54'.7	30'.2	188° 42'.4	30'.6
15	38° 51'.4	79° 08'.9	44'.5	50° 24'.3	03'.5	27° 56'.6	30'.4	203° 45'.0	30'.6
16	53° 53'.9	94° 08'.4	43'.8	65° 24'.9	02'.7	42° 58'.5	30'.7	218° 47'.7	30'.5
17	68° 56'.4	109° 07'.9	43'.0	80° 25'.6	01'.9	58° 00'.5	30'.9	233° 50'.3	30'.4
18	83° 58'.8	124° 07'.3	42'.2	95° 26'.2	01'.1	73° 02'.4	31'.1	248° 52'.9	30'.3
19	99° 01'.3	139° 06'.8	41'.5	110° 26'.9	00'.4	88° 04'.3	31'.4	263° 55'.6	30'.3
20	114° 03'.8	154° 06'.3	40'.7	125° 27'.5	5° 59'.6 S	103° 06'.2	31'.6	278° 58'.2	30'.2
21	129° 06'.2	169° 05'.7	39'.9	140° 28'.1	58'.8	118° 08'.1	31'.8	294° 00'.8	30'.1
22	144° 08'.7	184° 05'.2	39'.1	155° 28'.8	58'.0	133° 10'.0	32'.1	309° 03'.4	30'.0
23	159° 11'.2	199° 04'.7	38'.4	170° 29'.4	57'.3	148° 12'.0	32'.3	324° 06'.1	30'.0
	M.P. 12:29	v -0'.5	d 0'.7	v 0'.6	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.8 S
Achernar	335° 28'.3	57° 10'.9 S
Acrux	173° 10'.6	63° 09'.8 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.7	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.2 N
Altair	62° 10'.0	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.8 S
Antares	112° 28'.1	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.4	69° 02'.6 S
Avior	234° 18'.3	59° 33'.1 S
Bellatrix	278° 33'.7	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.8	52° 42'.5 S
Capella	280° 36'.9	46° 00'.7 N
Deneb	49° 32'.9	45° 19'.1 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 46'.9	51° 28'.9 N
Enif	33° 49'.0	9° 55'.5 N
Fomalhaut	15° 26'.1	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.7 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 02'.9	23° 31'.0 N
Kaus Aust.	83° 46'.0	34° 22'.6 S
Kochab	137° 19'.0	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.4	69° 46'.1 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.4	26° 16'.9 S
Peacock	53° 22'.1	56° 41'.7 S
Polaris	318° 52'.6	89° 19'.1 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 07'.9	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.6	8° 11'.5 S
Rigil Kent	139° 53'.5	60° 52'.8 S
Sabik	102° 14'.3	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.1	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.2 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 29'.0 S
Vega	80° 40'.2	38° 47'.4 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	42° 14'.7	09:42
Mars	12° 43'.7	11:40
Jupiter	349° 26'.5	13:12
Saturn	164° 47'.4	01:32

SUN						
GHA	Dec	GHA	v	Dec	d	HP
177° 38'.6	2° 45'.3 S	75° 37'.2	7'.7	22° 45'.3 N	4'.3	57'.5
192° 38'.8	44'.3	90° 03'.9	7'.8	41'.0	4'.4	
207° 38'.9	43'.3	104° 30'.7	7'.7	36'.6	4'.5	
222° 39'.1	42'.3	118° 57'.4	7'.7	32'.1	4'.7	57'.6
237° 39'.3	41'.3	133° 24'.1	7'.7	27'.4	4'.8	
252° 39'.4	40'.3	147° 50'.8	7'.7	22'.6	5'.0	57'.7
267° 39'.6	39'.4	162° 17'.5	7'.6	17'.6	5'.0	
282° 39'.8	38'.4	176° 44'.1	7'.7	12'.6	5'.3	
297° 40'.0	37'.4	191° 10'.8	7'.7	07'.3	5'.3	57'.8
312° 40'.1	36'.4	205° 37'.5	7'.6	02'.0	5'.5	
327° 40'.3	35'.4	220° 04'.1	7'.7	21° 56'.5 N	5'.7	57'.9
342° 40'.5	34'.4	234° 30'.8	7'.6	50'.8	5'.7	
357° 40'.7	2° 33'.4 S	248° 57'.4	7'.7	21° 45'.1 N	5'.9	57'.9
12° 40'.8	32'.5	263° 24'.1	7'.6	39'.2	6'.1	58'.0
27° 41'.0	31'.5	277° 50'.7	7'.7	33'.1	6'.2	
42° 41'.2	30'.5	292° 17'.4	7'.6	26'.9	6'.3	58'.1
57° 41'.3	29'.5	306° 44'.0	7'.7	20'.6	6'.4	
72° 41'.5	28'.5	321° 10'.7	7'.6	14'.2	6'.6	
87° 41'.7	27'.5	335° 37'.3	7'.7	07'.6	6'.8	58'.2
102° 41'.9	26'.5	350° 04'.0	7'.6	00'.8	6'.8	
117° 42'.0	25'.6	4° 30'.6	7'.7	20° 54'.0 N	7'.0	58'.3
132° 42'.2	24'.6	18° 57'.3	7'.6	47'.0	7'.1	
147° 42'.4	23'.6	33° 23'.9	7'.7	39'.9	7'.3	
162° 42'.6	22'.6	47° 50'.6	7'.7	32'.6	7'.4	58'.4
177° 42'.7	2° 21'.6 S	62° 17'.3	7'.6	20° 25'.2 N	7'.5	58'.4
192° 42'.9	20'.6	76° 43'.9	7'.7	17'.7	7'.7	58'.5
207° 43'.1	19'.6	91° 10'.6	7'.7	10'.0	7'.7	
222° 43'.3	18'.6	105° 37'.3	7'.7	02'.3	8'.0	
237° 43'.4	17'.7	120° 04'.0	7'.7	19° 54'.3 N	8'.0	58'.6
252° 43'.6	16'.7	134° 30'.7	7'.7	46'.3	8'.2	
267° 43'.8	15'.7	148° 57'.4	7'.8	38'.1	8'.3	58'.7
282° 44'.0	14'.7	163° 24'.2	7'.7	29'.8	8'.4	
297° 44'.1	13'.7	177° 50'.9	7'.8	21'.4	8'.6	
312° 44'.3	12'.7	192° 17'.7	7'.7	12'.8	8'.7	58'.8
327° 44'.5	11'.7	206° 44'.4	7'.8	04'.1	8'.8	
342° 44'.7	10'.7	221° 11'.2	7'.8	18° 55'.3 N	8'.9	58'.9
357° 44'.8	2° 09'.8 S	235° 38'.0	7'.8	18° 46'.4 N	9'.1	58'.9
12° 45'.0	08'.8	250° 04'.8	7'.8	37'.3	9'.2	
27° 45'.2	07'.8	264° 31'.6	7'.8	28'.1	9'.3	59'.0
42° 45'.4	06'.8	278° 58'.4	7'.8	18'.8	9'.5	
57° 45'.5	05'.8	293° 25'.2	7'.9	09'.3	9'.5	59'.1
72° 45'.7	04'.8	307° 52'.1	7'.8	17° 59'.8 N	9'.7	
87° 45'.9	03'.8	322° 18'.9	7'.9	50'.1	9'.8	
102° 46'.1	02'.9	336° 45'.8	7'.9	40'.3	10'.0	59'.2
117° 46'.2	01'.9	351° 12'.7	7'.9	30'.3	10'.0	
132° 46'.4	00'.9	5° 39'.6	7'.9	20'.3	10'.2	59'.3
147° 46'.6	1° 59'.9 S	20° 06'.5	8'.0	10'.1	10'.2	
162° 46'.8	58'.9	34° 33'.5	7'.9	16° 59'.9 N	10'.4	
177° 46'.9	1° 57'.9 S	49° 00'.4	8'.0	16° 49'.5 N	10'.6	59'.4
192° 47'.1	56'.9	63° 27'.4	8'.0	38'.9	10'.6	
207° 47'.3	55'.9	77° 54'.4	8'.0	28'.3	10'.7	59'.5
222° 47'.5	55'.0	92° 21'.4	8'.0	17'.6	10'.9	
237° 47'.6	54'.0	106° 48'.4	8'.1	06'.7	11'.0	
252° 47'.8	53'.0	121° 15'.5	8'.0	15° 55'.7 N	11'.0	59'.6
267° 48'.0	52'.0	135° 42'.5	8'.1	44'.7	11'.2	
282° 48'.2	51'.0	150° 09'.6	8'.1	33'.5	11'.3	
297° 48'.4	50'.0	164° 36'.7	8'.1	22'.2	11'.4	59'.7
312° 48'.5	49'.0	179° 03'.8	8'.1	10'.8	11'.5	
327° 48'.7	48'.0	193° 30'.9	8'.1	14° 59'.3 N	11'.7	59'.8
342° 48'.9	47'.1	207° 58'.0	8'.2	47'.6	11'.7	
357° 49'.1	1° 46'.1 S	222° 25'.2	8'.2	14° 35'.9 N	11'.8	59'.8
12° 49'.2	45'.1	236° 52'.4	8'.1	24'.1	11'.9	59'.9
27° 49'.4	44'.1	251° 19'.5	8'.3	12'.2	12'.1	
42° 49'.6	43'.1	265° 46'.8	8'.2	00'.1	12'.1	
57° 49'.8	42'.1	280° 14'.0	8'.2	13° 48'.0 N	12'.2	60'.0
72° 50'.0	41'.1	294° 41'.2	8'.3	35'.8	12'.4	
87° 50'.1	40'.1	309° 08'.5	8'.2	23'.4	12'.4	
102° 50'.3	39'.2	323° 35'.7	8'.3	11'.0	12'.5	60'.1
117° 50'.5	38'.2	338° 03'.0	8'.3	12° 58'.5 N	12'.6	
132° 50'.7	37'.2	352° 30'.3	8'.4	45'.9	12'.7	60'.2
147° 50'.9	36'.2	6° 57'.7	8'.3	33'.2	12'.8	
162° 51'.0	35'.2	21° 25'.0	8'.3	20'.4	12'.9	
SD 16'.1	d 1'.0	SD 15'.8		16'.0	16'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 14	Moonrise 15	Moonrise 16
N 72°	03:56	05:19	06:26	-	-	11:38
N 70°	04:10	05:24	06:24	-	09:27	12:11
68°	04:20	05:27	06:23	-	10:23	12:35
66°	04:29	05:30	06:21	08:59	10:56	12:53
64°	04:37	05:33	06:20	09:38	11:20	13:08
62°	04:43	05:35	06:19	10:05	11:39	13:20
60°	04:48	05:37	06:18	10:26	11:54	13:30
N 58°	04:52	05:38	06:17	10:43	12:07	13:39
56°	04:56	05:40	06:17	10:57	12:19	13:47
54°	04:59	05:41	06:16	11:10	12:29	13:54
52°	05:02	05:42	06:15	11:21	12:37	14:00
50°	05:05	05:43	06:15	11:30	12:45	14:06
45°	05:10	05:44	06:13	11:51	13:02	14:18
N 40°	05:14	05:45	06:12	12:07	13:16	14:28
35°	05:17	05:46	06:11	12:21	13:27	14:36
30°	05:19	05:47	06:10	12:33	13:37	14:44
20°	05:21	05:47	06:09	12:54	13:54	14:57
N 10°	05:22	05:46	06:07	13:11	14:09	15:08
0°	05:21	05:45	06:06	13:28	14:23	15:18
S 10°	05:19	05:43	06:04	13:45	14:37	15:29
20°	05:15	05:40	06:02	14:02	14:52	15:40
30°	05:08	05:36	06:00	14:23	15:09	15:52
35°	05:04	05:33	05:59	14:35	15:19	15:59
40°	04:58	05:30	05:57	14:48	15:30	16:08
45°	04:51	05:26	05:55	15:04	15:43	16:17
S 50°	04:42	05:21	05:53	15:24	15:59	16:29
52°	04:38	05:18	05:52	15:34	16:07	16:34
54°	04:33	05:15	05:51	15:44	16:15	16:40
56°	04:27	05:12	05:50	15:56	16:24	16:46
58°	04:20	05:09	05:48	16:10	16:35	16:54
S 60°	04:13	05:05	05:47	16:26	16:47	17:02
S 62°	04:04	05:00	05:45	16:45	17:01	17:11

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 14	Moonset 15	Moonset 16
N 72°	17:54	19:02	20:26	-	-	06:52
N 70°	17:56	18:57	20:12	-	07:05	06:17
68°	17:57	18:53	20:00	-	06:09	05:52
66°	17:59	18:50	19:51	05:35	05:35	05:32
64°	18:00	18:47	19:44	04:56	05:10	05:16
62°	18:01	18:45	19:37	04:29	04:50	05:03
60°	18:01	18:43	19:32	04:08	04:34	04:52
N 58°	18:02	18:41	19:27	03:50	04:20	04:42
56°	18:03	18:40	19:23	03:36	04:08	04:33
54°	18:03	18:38	19:20	03:23	03:58	04:26
52°	18:04	18:37	19:17	03:12	03:49	04:19
50°	18:04	18:37	19:14	03:02	03:40	04:12
45°	18:05	18:35	19:09	02:41	03:23	03:59
N 40°	18:06	18:33	19:05	02:24	03:08	03:48
35°	18:07	18:32	19:02	02:09	02:56	03:38
30°	18:08	18:32	19:00	01:57	02:45	03:30
20°	18:09	18:31	18:57	01:35	02:26	03:15
N 10°	18:11	18:32	18:56	01:17	02:10	03:02
0°	18:12	18:33	18:57	00:59	01:54	02:50
S 10°	18:14	18:35	18:59	00:42	01:39	02:37
20°	18:15	18:38	19:03	00:23	01:22	02:24
30°	18:18	18:41	19:09	00:01	01:03	02:09
35°	18:19	18:44	19:14	-	00:52	02:00
40°	18:20	18:47	19:19	-	00:39	01:50
45°	18:22	18:51	19:26	-	00:24	01:38
S 50°	18:24	18:56	19:35	-	00:05	01:23
52°	18:25	18:59	19:39	23:56	-	01:16
54°	18:26	19:01	19:44	23:46	-	01:08
56°	18:27	19:04	19:49	23:34	-	01:00
58°	18:28	19:08	19:56	23:21	-	00:50
S 60°	18:30	19:12	20:03	23:05	-	00:39
S 62°	18:32	19:16	20:12	22:47	-	00:25

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
14	9 26	9 18	12:09	19:41	07:14	10d 66%
15	9 09	9 01	12:09	20:36	08:09	11d 76%
16	8 53	8 44	12:09	21:31	09:04	12d 85%

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2011 March 17, 18, 19 (Thur, Fri, Sat)

GMT	ARIES	VENUS -4.0		MARS +1.1		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
17 Thursday 00	174° 13'.6	214° 04'.1	15° 37'.6 S	185° 30'.1	5° 56'.5 S	163° 13'.9	3° 32'.5 N	339° 08'.7	3° 29'.9 S
01	189° 16'.1	229° 03'.6	36'.8	200° 30'.7	55'.7	178° 15'.8	32'.8	354° 11'.3	29'.8
02	204° 18'.5	244° 03'.1	36'.0	215° 31'.4	54'.9	193° 17'.7	33'.0	9° 13'.9	29'.8
03	219° 21'.0	259° 02'.5	35'.3	230° 32'.0	54'.2	208° 19'.6	33'.2	24° 16'.6	29'.7
04	234° 23'.5	274° 02'.0	34'.5	245° 32'.7	53'.4	223° 21'.5	33'.5	39° 19'.2	29'.6
05	249° 25'.9	289° 01'.5	33'.7	260° 33'.3	52'.6	238° 23'.5	33'.7	54° 21'.8	29'.5
06	264° 28'.4	304° 00'.9	32'.9	275° 34'.0	51'.8	253° 25'.4	33'.9	69° 24'.4	29'.5
07	279° 30'.9	319° 00'.4	32'.2	290° 34'.6	51'.1	268° 27'.3	34'.2	84° 27'.1	29'.4
08	294° 33'.3	333° 59'.9	31'.4	305° 35'.3	50'.3	283° 29'.2	34'.4	99° 29'.7	29'.3
09	309° 35'.8	348° 59'.3	30'.6	320° 35'.9	49'.5	298° 31'.1	34'.6	114° 32'.3	29'.2
10	324° 38'.3	3° 58'.8	29'.8	335° 36'.6	48'.7	313° 33'.0	34'.9	129° 34'.9	29'.2
11	339° 40'.7	18° 58'.3	29'.0	350° 37'.2	48'.0	328° 35'.0	35'.1	144° 37'.6	29'.1
12	354° 43'.2	33° 57'.7	15° 28'.3 S	5° 37'.9	5° 47'.2 S	343° 36'.9	3° 35'.3 N	159° 40'.2	3° 29'.0 S
13	9° 45'.7	48° 57'.2	27'.5	20° 38'.5	46'.4	358° 38'.8	35'.6	174° 42'.8	29'.0
14	24° 48'.1	63° 56'.7	26'.7	35° 39'.2	45'.6	13° 40'.7	35'.8	189° 45'.5	28'.9
15	39° 50'.6	78° 56'.2	25'.9	50° 39'.9	44'.9	28° 42'.6	36'.1	204° 48'.1	28'.8
16	54° 53'.0	93° 55'.6	25'.1	65° 40'.5	44'.1	43° 44'.5	36'.3	219° 50'.7	28'.7
17	69° 55'.5	108° 55'.1	24'.3	80° 41'.2	43'.3	58° 46'.5	36'.5	234° 53'.3	28'.7
18 Friday 00	84° 58'.0	123° 54'.6	23'.6	95° 41'.8	42'.5	73° 48'.4	36'.8	249° 56'.0	28'.6
01	100° 00'.4	138° 54'.1	22'.8	110° 42'.5	41'.7	88° 50'.3	37'.0	264° 58'.6	28'.5
02	115° 02'.9	153° 53'.5	22'.0	125° 43'.1	41'.0	103° 52'.2	37'.2	280° 01'.2	28'.4
03	130° 05'.4	168° 53'.0	21'.2	140° 43'.8	40'.2	118° 54'.1	37'.5	295° 03'.8	28'.4
04	145° 07'.8	183° 52'.5	20'.4	155° 44'.4	39'.4	133° 56'.0	37'.7	310° 06'.5	28'.3
05	160° 10'.3	198° 52'.0	19'.6	170° 45'.1	38'.6	148° 57'.9	37'.9	325° 09'.1	28'.2
06	175° 12'.8	213° 51'.4	15° 18'.8 S	185° 45'.7	5° 37'.9 S	163° 59'.9	3° 38'.2 N	340° 11'.7	3° 28'.1 S
07	190° 15'.2	228° 50'.9	18'.0	200° 46'.4	37'.1	179° 01'.8	38'.4	355° 14'.4	28'.1
08	205° 17'.7	243° 50'.4	17'.2	215° 47'.0	36'.3	194° 03'.7	38'.6	10° 17'.0	28'.0
09	220° 20'.1	258° 49'.9	16'.5	230° 47'.7	35'.5	209° 05'.6	38'.9	25° 19'.6	27'.9
10	235° 22'.6	273° 49'.3	15'.7	245° 48'.3	34'.7	224° 07'.5	39'.1	40° 22'.2	27'.9
11	250° 25'.1	288° 48'.8	14'.9	260° 49'.0	34'.0	239° 09'.4	39'.3	55° 24'.9	27'.8
12 Saturday 00	265° 27'.5	303° 48'.3	14'.1	275° 49'.6	33'.2	254° 11'.4	39'.6	70° 27'.5	27'.7
01	280° 30'.0	318° 47'.8	13'.3	290° 50'.3	32'.4	269° 13'.3	39'.8	85° 30'.1	27'.6
02	295° 32'.5	333° 47'.2	12'.5	305° 50'.9	31'.6	284° 15'.2	40'.0	100° 32'.8	27'.6
03	310° 34'.9	348° 46'.7	11'.7	320° 51'.6	30'.9	299° 17'.1	40'.3	115° 35'.4	27'.5
04	325° 37'.4	3° 46'.2	10'.9	335° 52'.2	30'.1	314° 19'.0	40'.5	130° 38'.0	27'.4
05	340° 39'.9	18° 45'.7	10'.1	350° 52'.9	29'.3	329° 20'.9	40'.7	145° 40'.6	27'.3
06	355° 42'.3	33° 45'.1	15° 09'.3 S	5° 53'.5	5° 28'.5 S	344° 22'.8	3° 41'.0 N	160° 43'.3	3° 27'.3 S
07	10° 44'.8	48° 44'.6	08'.5	20° 54'.2	27'.7	359° 24'.8	41'.2	175° 45'.9	27'.2
08	25° 47'.3	63° 44'.1	07'.7	35° 54'.9	27'.0	14° 26'.7	41'.4	190° 48'.5	27'.1
09	40° 49'.7	78° 43'.6	06'.9	50° 55'.5	26'.2	29° 28'.6	41'.7	205° 51'.2	27'.0
10	55° 52'.2	93° 43'.1	06'.1	65° 56'.2	25'.4	44° 30'.5	41'.9	220° 53'.8	27'.0
11	70° 54'.6	108° 42'.5	05'.3	80° 56'.8	24'.6	59° 32'.4	42'.2	235° 56'.4	26'.9
12 Sunday 00	85° 57'.1	123° 42'.0	04'.5	95° 57'.5	23'.8	74° 34'.3	42'.4	250° 59'.0	26'.8
01	100° 59'.6	138° 41'.5	03'.7	110° 58'.1	23'.1	89° 36'.2	42'.6	266° 01'.7	26'.7
02	116° 02'.0	153° 41'.0	02'.9	125° 58'.8	22'.3	104° 38'.2	42'.9	281° 04'.3	26'.7
03	131° 04'.5	168° 40'.5	02'.0	140° 59'.4	21'.5	119° 40'.1	43'.1	296° 06'.9	26'.6
04	146° 07'.0	183° 40'.0	01'.2	156° 00'.1	20'.7	134° 42'.0	43'.3	311° 09'.6	26'.5
05	161° 09'.4	198° 39'.4	00'.4	171° 00'.7	20'.0	149° 43'.9	43'.6	326° 12'.2	26'.4
06	176° 11'.9	213° 38'.9	14° 59'.6 S	186° 01'.4	5° 19'.2 S	164° 45'.8	3° 43'.8 N	341° 14'.8	3° 26'.4 S
07	191° 14'.4	228° 38'.4	58'.8	201° 02'.0	18'.4	179° 47'.7	44'.0	356° 17'.4	26'.3
08	206° 16'.8	243° 37'.9	58'.0	216° 02'.7	17'.6	194° 49'.6	44'.3	11° 20'.1	26'.2
09	221° 19'.3	258° 37'.4	57'.2	231° 03'.4	16'.8	209° 51'.6	44'.5	26° 22'.7	26'.2
10	236° 21'.7	273° 36'.9	56'.4	246° 04'.0	16'.1	224° 53'.5	44'.7	41° 25'.3	26'.1
11	251° 24'.2	288° 36'.3	55'.6	261° 04'.7	15'.3	239° 55'.4	45'.0	56° 28'.0	26'.0
12 Monday 00	266° 26'.7	303° 35'.8	54'.8	276° 05'.3	14'.5	254° 57'.3	45'.2	71° 30'.6	25'.9
01	281° 29'.1	318° 35'.3	53'.9	291° 06'.0	13'.7	269° 59'.2	45'.4	86° 33'.2	25'.9
02	296° 31'.6	333° 34'.8	53'.1	306° 06'.6	12'.9	285° 01'.1	45'.7	101° 35'.8	25'.8
03	311° 34'.1	348° 34'.3	52'.3	321° 07'.3	12'.2	300° 03'.0	45'.9	116° 38'.5	25'.7
04	326° 36'.5	3° 33'.8	51'.5	336° 07'.9	11'.4	315° 05'.0	46'.1	131° 41'.1	25'.6
05	341° 39'.0	18° 33'.3	50'.7	351° 08'.6	10'.6	330° 06'.9	46'.4	146° 43'.7	25'.6
06	356° 41'.5	33° 32'.7	14° 49'.9 S	6° 09'.3	5° 09'.8 S	345° 08'.8	3° 46'.6 N	161° 46'.4	3° 25'.5 S
07	11° 43'.9	48° 32'.2	49'.0	21° 09'.9	09'.0	0° 10'.7	46'.8	176° 49'.0	25'.4
08	26° 46'.4	63° 31'.7	48'.2	36° 10'.6	08'.3	15° 12'.6	47'.1	191° 51'.6	25'.3
09	41° 48'.9	78° 31'.2	47'.4	51° 11'.2	07'.5	30° 14'.5	47'.3	206° 54'.3	25'.3
10	56° 51'.3	93° 30'.7	46'.6	66° 11'.9	06'.7	45° 16'.4	47'.5	221° 56'.9	25'.2
11	71° 53'.8	108° 30'.2	45'.8	81° 12'.5	05'.9	60° 18'.4	47'.8	236° 59'.5	25'.1
12 Tuesday 00	86° 56'.2	123° 29'.7	44'.9	96° 13'.2	05'.1	75° 20'.3	48'.0	252° 02'.2	25'.0
01	101° 58'.7	138° 29'.2	44'.1	111° 13'.9	04'.4	90° 22'.2	48'.3	267° 04'.8	25'.0
02	117° 01'.2	153° 28'.6	43'.3	126° 14'.5	03'.6	105° 24'.1	48'.5	282° 07'.4	24'.9
03	132° 03'.6	168° 28'.1	42'.5	141° 15'.2	02'.8	120° 26'.0	48'.7	297° 10'.0	24'.8
04	147° 06'.1	183° 27'.6	41'.6	156° 15'.8	02'.0	135° 27'.9	49'.0	312° 12'.7	24'.7
05	162° 08'.6	198° 27'.1	40'.8	171° 16'.5	01'.2	150° 29'.8	49'.2	327° 15'.3	24'.7
	M.P. 12:17	v -0'.5	d 0'.8	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.8 S
Achernar	335° 28'.4	57° 10'.9 S
Acrux	173° 10'.6	63° 09'.8 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.6	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.1	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.2 N
Altair	62° 10'.0	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.1	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.3	69° 02'.6 S
Avior	234° 18'.4	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.8	52° 42'.5 S
Capella	280° 36'.9	46° 00'.7 N
Deneb	49° 32'.9	45° 19'.1 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.6 S
Dubhe	193° 52'.8	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 46'.9	51° 28'.9 N
Enif	33° 49'.0	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.7 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 46'.0	34° 22'.6 S
Kochab	137° 18'.9	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.5	69° 46'.1 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.4	26° 16'.9 S
Peacock	53° 22'.0	56° 41'.7 S
Polaris	318° 53'.7	89° 19'.0 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.2	5° 11'.6 N
Rasalhague	96° 07'.9	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.6	8° 11'.5 S
Rigil Kent	139° 53'.5	60° 52'.8 S
Sabik	102° 14'.3	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.1	37° 06'.6 S
Sirius	258° 35'.0	16° 44'.2 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.3	43° 29'.0 S
Vega	80° 40'.1	38° 47'.4 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	38° 38'.7	09:45
Mars	10° 33'.0	11:36
Jupiter	348° 47'.1	13:02
Saturn	164° 59'.0	01:19

SUN						
GHA	Dec	GHA	v	Dec	d	HP
177° 51'.2	1° 34'.2 S	35° 52'.3	8'.4	12° 07'.5 N	13'.0	60'.3
192° 51'.4	33'.2	50° 19'.7	8'.4	11° 54'.5 N	13'.0	
207° 51'.6	32'.2	64° 47'.1	8'.4	41'.5	13'.2	
222° 51'.7	31'.3	79° 14'.5	8'.4	28'.3	13'.2	60'.4
237° 51'.9	30'.3	93° 41'.9	8'.4	15'.1	13'.3	
252° 52'.1	29'.3	108° 09'.3	8'.4	01'.8	13'.4	
267° 52'.3	28'.3	122° 36'.7	8'.5	10° 48'.4 N	13'.5	
282° 52'.5	27'.3	137° 04'.2	8'.5	34'.9	13'.5	60'.5
297° 52'.6	26'.3	151° 31'.7	8'.4	21'.4	13'.7	
312° 52'.8	25'.3	165° 59'.1	8'.5	07'.7	13'.7	
327° 53'.0	24'.3	180° 26'.6	8'.5	9° 54'.0 N	13'.8	60'.6
342° 53'.2	23'.3	194° 54'.1	8'.5	40'.2	13'.8	
357° 53'.4	1° 22'.4 S	209° 21'.6	8'.5	9° 26'.4 N	14'.0	60'.6
12° 53'.5	21'.4	223° 49'.1	8'.6	12'.4	13'.9	60'.7
27° 53'.7	20'.4	238° 16'.7	8'.5	8° 58'.5 N	14'.1	
42° 53'.9	19'.4	252° 44'.2	8'.6	44'.4	14'.1	
57° 54'.1	18'.4	267° 11'.8	8'.5	30'.3	14'.2	
72° 54'.3	17'.4	281° 39'.3	8'.6	16'.1	14'.3	60'.8
87° 54'.4	16'.4	296° 06'.9	8'.6	01'.8	14'.3	
102° 54'.6	15'.4	310° 34'.5	8'.6	7° 47'.5 N	14'.4	
117° 54'.8	14'.5	325° 02'.1	8'.5	33'.1	14'.5	60'.9
132° 55'.0	13'.5	339° 29'.6	8'.6	18'.6	14'.5	
147° 55'.2	12'.5	353° 57'.2	8'.6	04'.1	14'.5	
162° 55'.4	11'.5	8° 24'.8	8'.6	6° 49'.6 N	14'.6	
177° 55'.5	1° 10'.5 S	22° 52'.4	8'.7	6° 35'.0 N	14'.7	61'.0
192° 55'.7	09'.5	37° 20'.1	8'.6	20'.3	14'.7	
207° 55'.9	08'.5	51° 47'.7	8'.6	05'.6	14'.8	
222° 56'.1	07'.5	66° 15'.3	8'.6	5° 50'.8 N	14'.8	
237° 56'.3	06'.5	80° 42'.9	8'.6	36'.0	14'.8	
252° 56'.4	05'.6	95° 10'.5	8'.7	21'.2	14'.9	61'.1
267° 56'.6	04'.6	109° 38'.2	8'.6	06'.3	15'.0	
282° 56'.8	03'.6	124° 05'.8	8'.6	4° 51'.3 N	14'.9	
297° 57'.0	02'.6	138° 33'.4	8'.6	36'.4	15'.1	
312° 57'.2	01'.6	153° 01'.0	8'.7	21'.3	15'.0	
327° 57'.3	00'.6	167° 28'.7	8'.6	06'.3	15'.1	61'.2
342° 57'.5	0° 59'.6 S	181° 56'.3	8'.6	3° 51'.2 N	15'.1	
357° 57'.7	0° 58'.6 S	196° 23'.9	8'.6	3° 36'.1 N	15'.2	61'.2
12° 57'.9	57'.7	210° 51'.5	8'.6	20'.9	15'.2	
27° 58'.1	56'.7	225° 19'.1	8'.6	05'.7	15'.2	
42° 58'.3	55'.7	239° 46'.7	8'.6	2° 50'.5 N	15'.2	61'.3
57° 58'.4	54'.7	254° 14'.3	8'.6	35'.3	15'.3	
72° 58'.6	53'.7	268° 41'.9	8'.6	20'.0	15'.3	
87° 58'.8	52'.7	283° 09'.5	8'.6	04'.7	15'.3	
102° 59'.0	51'.7	297° 37'.1	8'.6	1° 49'.4 N	15'.3	
117° 59'.2	50'.7	312° 04'.7	8'.6	34'.1	15'.3	
132° 59'.4	49'.8	326° 32'.3	8'.5	18'.8	15'.4	
147° 59'.5	48'.8	340° 59'.8	8'.6	03'.4	15'.3	61'.4
162° 59'.7	47'.8	355° 27'.4	8'.5	0° 48'.1 N	15'.4	
177° 59'.9	0° 46'.8 S	9° 54'.9	8'.6	0° 32'.7 N	15'.4	61'.4
193° 00'.1	45'.8	24° 22'.5	8'.5	17'.3	15'.4	
208° 00'.3	44'.8	38° 50'.0	8'.5	01'.9	15'.4	
223° 00'.5	43'.8	53° 17'.5	8'.5	0° 13'.5 S	15'.4	
238° 00'.6	42'.8	67° 45'.0	8'.5	28'.9	15'.4	
253° 00'.8	41'.8	82° 12'.5	8'.4	44'.3	15'.4	
268° 01'.0	40'.9	96° 39'.9	8'.5	59'.7	15'.4	
283° 01'.2	39'.9	111° 07'.4	8'.4	1° 15'.1 S	15'.4	61'.5
298° 01'.4	38'.9	125° 34'.8	8'.4	30'.5	15'.4	
313° 01'.6	37'.9	140° 02'.2	8'.4	45'.9	15'.4	
328° 01'.7	36'.9	154° 29'.6	8'.4	2° 01'.3 S	15'.4	
343° 01'.9	35'.9	168° 57'.0	8'.4	16'.7	15'.3	
358° 02'.1	0° 34'.9 S	183° 24'.4	8'.3	2° 32'.0 S	15'.4	61'.5
13° 02'.3	33'.9	197° 51'.7	8'.3	47'.4	15'.3	
28° 02'.5	33'.0	212° 19'.0	8'.3	3° 02'.7 S	15'.3	
43° 02'.7	32'.0	226° 46'.3	8'.3	18'.0	15'.3	
58° 02'.8	31'.0	241° 13'.6	8'.3	33'.3	15'.3	
73° 03'.0	30'.0	255° 40'.9	8'.2	48'.6	15'.2	
88° 03'.2	29'.0	270° 08'.1	8'.2	4° 03'.8 S	15'.2	
103° 03'.4	28'.0	284° 35'.3	8'.2	19'.0	15'.2	
118° 03'.6	27'.0	299° 02'.5	8'.2	34'.2	15'.2	
133° 03'.8	26'.0	313° 29'.7	8'.1	49'.4	15'.1	
148° 03'.9	25'.0	327° 56'.8	8'.1	5° 04'.5 S	15'.1	
163° 04'.1	24'.1	342° 23'.9	8'.1	19'.6	15'.1	
SD 16'.1	d 1'.0	SD 16'.5		16'.7	16'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 17	Moonrise 18	Moonrise 19
N 72°	03:37	05:03	06:11	14:14	16:37	18:58
N 70°	03:53	05:10	06:10	14:29	16:40	18:51
68°	04:06	05:15	06:10	14:40	16:43	18:46
66°	04:17	05:19	06:10	14:49	16:45	18:41
64°	04:25	05:22	06:09	14:57	16:47	18:37
62°	04:32	05:25	06:09	15:04	16:48	18:34
60°	04:38	05:28	06:09	15:09	16:50	18:31
N 58°	04:43	05:30	06:09	15:14	16:51	18:29
56°	04:48	05:32	06:09	15:19	16:52	18:27
54°	04:52	05:33	06:08	15:23	16:53	18:25
52°	04:55	05:35	06:08	15:26	16:54	18:23
50°	04:58	05:36	06:08	15:30	16:55	18:21
45°	05:04	05:39	06:08	15:37	16:57	18:18
N 40°	05:09	05:41	06:07	15:42	16:58	18:15
35°	05:13	05:42	06:07	15:47	17:00	18:12
30°	05:15	05:43	06:07	15:52	17:01	18:10
20°	05:19	05:44	06:06	15:59	17:03	18:06
N 10°	05:20	05:45	06:06	16:06	17:04	18:03
0°	05:20	05:44	06:05	16:12	17:06	18:00
S 10°	05:19	05:43	06:04	16:19	17:08	17:57
20°	05:15	05:41	06:03	16:25	17:10	17:54
30°	05:10	05:38	06:02	16:33	17:12	17:51
35°	05:06	05:36	06:01	16:37	17:13	17:49
40°	05:01	05:33	06:00	16:42	17:14	17:46
45°	04:55	05:30	05:59	16:48	17:16	17:44
S 50°	04:47	05:26	05:58	16:54	17:18	17:41
52°	04:43	05:23	05:57	16:57	17:19	17:39
54°	04:39	05:21	05:57	17:01	17:20	17:38
56°	04:34	05:19	05:56	17:04	17:21	17:36
58°	04:28	05:16	05:55	17:09	17:22	17:34
S 60°	04:21	05:12	05:54	17:13	17:23	17:32
S 62°	04:14	05:08	05:53	17:18	17:24	17:30

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 17	Moonset 18	Moonset 19
N 72°	18:08	19:16	20:44	06:11	05:43	05:19
N 70°	18:08	19:09	20:26	05:54	05:36	05:21
68°	18:08	19:04	20:13	05:40	05:31	05:22
66°	18:08	19:00	20:02	05:29	05:26	05:23
64°	18:09	18:56	19:54	05:20	05:22	05:24
62°	18:09	18:53	19:46	05:12	05:18	05:24
60°	18:09	18:50	19:40	05:05	05:15	05:25
N 58°	18:09	18:48	19:35	04:59	05:13	05:25
56°	18:09	18:46	19:30	04:53	05:10	05:26
54°	18:09	18:44	19:26	04:48	05:08	05:26
52°	18:09	18:43	19:22	04:44	05:06	05:27
50°	18:09	18:41	19:19	04:40	05:04	05:27
45°	18:09	18:39	19:13	04:31	05:00	05:28
N 40°	18:09	18:37	19:08	04:23	04:56	05:28
35°	18:10	18:35	19:04	04:17	04:53	05:29
30°	18:10	18:34	19:02	04:11	04:51	05:29
20°	18:10	18:32	18:58	04:01	04:46	05:30
N 10°	18:11	18:32	18:56	03:52	04:42	05:31
0°	18:11	18:32	18:56	03:44	04:38	05:32
S 10°	18:12	18:33	18:57	03:36	04:34	05:32
20°	18:13	18:35	19:00	03:26	04:29	05:33
30°	18:14	18:38	19:06	03:16	04:24	05:34
35°	18:15	18:40	19:09	03:10	04:22	05:34
40°	18:15	18:42	19:14	03:03	04:18	05:34
45°	18:16	18:46	19:20	02:55	04:14	05:35
S 50°	18:17	18:50	19:28	02:45	04:10	05:36
52°	18:18	18:52	19:32	02:41	04:08	05:36
54°	18:19	18:54	19:36	02:36	04:05	05:36
56°	18:19	18:56	19:41	02:30	04:03	05:37
58°	18:20	18:59	19:46	02:24	04:00	05:37
S 60°	18:21	19:02	19:53	02:16	03:56	05:37
S 62°	18:22	19:06	20:00	02:08	03:53	05:38

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
17	8 36	8 27	12:08	22:25	09:58	13d 92%
18	8 18	8 10	12:08	23:19	10:52	14d 97%
19	8 01	7 52	12:08	24:13	11:46	15d Full

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2011 March 20, 21, 22 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
20 Sunday 00	177° 11'.0	213° 26'.6	14° 40'.0 S	186° 17'.1	5° 00'.5 S	165° 31'.7	3° 49'.4 N	342° 17'.9	3° 24'.6 S
01	192° 13'.5	228° 26'.1	39'.2	201° 17'.8	4° 59'.7 S	180° 33'.7	49'.7	357° 20'.6	24'.5
02	207° 16'.0	243° 25'.6	38'.3	216° 18'.5	58'.9	195° 35'.6	49'.9	12° 23'.2	24'.4
03	222° 18'.4	258° 25'.1	37'.5	231° 19'.1	58'.1	210° 37'.5	50'.1	27° 25'.8	24'.4
04	237° 20'.9	273° 24'.6	36'.7	246° 19'.8	57'.3	225° 39'.4	50'.4	42° 28'.5	24'.3
05	252° 23'.4	288° 24'.1	35'.9	261° 20'.4	56'.5	240° 41'.3	50'.6	57° 31'.1	24'.2
06	267° 25'.8	303° 23'.6	35'.0	276° 21'.1	55'.8	255° 43'.2	50'.8	72° 33'.7	24'.1
07	282° 28'.3	318° 23'.0	34'.2	291° 21'.7	55'.0	270° 45'.1	51'.1	87° 36'.4	24'.1
08	297° 30'.7	333° 22'.5	33'.4	306° 22'.4	54'.2	285° 47'.1	51'.3	102° 39'.0	24'.0
09	312° 33'.2	348° 22'.0	32'.5	321° 23'.1	53'.4	300° 49'.0	51'.5	117° 41'.6	23'.9
10	327° 35'.7	3° 21'.5	31'.7	336° 23'.7	52'.6	315° 50'.9	51'.8	132° 44'.2	23'.8
11	342° 38'.1	18° 21'.0	30'.9	351° 24'.4	51'.9	330° 52'.8	52'.0	147° 46'.9	23'.8
12	357° 40'.6	33° 20'.5	14° 30'.0 S	6° 25'.0	4° 51'.1 S	345° 54'.7	3° 52'.2 N	162° 49'.5	3° 23'.7 S
13	12° 43'.1	48° 20'.0	29'.2	21° 25'.7	50'.3	0° 56'.6	52'.5	177° 52'.1	23'.6
14	27° 45'.5	63° 19'.5	28'.3	36° 26'.3	49'.5	15° 58'.5	52'.7	192° 54'.8	23'.6
15	42° 48'.0	78° 19'.0	27'.5	51° 27'.0	48'.7	31° 00'.4	52'.9	207° 57'.4	23'.5
16	57° 50'.5	93° 18'.5	26'.7	66° 27'.7	48'.0	46° 02'.4	53'.2	223° 00'.0	23'.4
17	72° 52'.9	108° 18'.0	25'.8	81° 28'.3	47'.2	61° 04'.3	53'.4	238° 02'.7	23'.3
18	87° 55'.4	123° 17'.5	25'.0	96° 29'.0	46'.4	76° 06'.2	53'.7	253° 05'.3	23'.3
19	102° 57'.8	138° 17'.0	24'.2	111° 29'.6	45'.6	91° 08'.1	53'.9	268° 07'.9	23'.2
20	118° 00'.3	153° 16'.5	23'.3	126° 30'.3	44'.8	106° 10'.0	54'.1	283° 10'.6	23'.1
21	133° 02'.8	168° 16'.0	22'.5	141° 31'.0	44'.0	121° 11'.9	54'.4	298° 13'.2	23'.0
22	148° 05'.2	183° 15'.5	21'.6	156° 31'.6	43'.3	136° 13'.8	54'.6	313° 15'.8	23'.0
23	163° 07'.7	198° 15'.0	20'.8	171° 32'.3	42'.5	151° 15'.7	54'.8	328° 18'.5	22'.9
21 Monday 00	178° 10'.2	213° 14'.5	14° 19'.9 S	186° 32'.9	4° 41'.7 S	166° 17'.7	3° 55'.1 N	343° 21'.1	3° 22'.8 S
01	193° 12'.6	228° 14'.0	19'.1	201° 33'.6	40'.9	181° 19'.6	55'.3	358° 23'.7	22'.7
02	208° 15'.1	243° 13'.5	18'.3	216° 34'.3	40'.1	196° 21'.5	55'.5	13° 26'.4	22'.7
03	223° 17'.6	258° 13'.0	17'.4	231° 34'.9	39'.4	211° 23'.4	55'.8	28° 29'.0	22'.6
04	238° 20'.0	273° 12'.5	16'.6	246° 35'.6	38'.6	226° 25'.3	56'.0	43° 31'.6	22'.5
05	253° 22'.5	288° 12'.0	15'.7	261° 36'.2	37'.8	241° 27'.2	56'.2	58° 34'.3	22'.4
06	268° 25'.0	303° 11'.5	14'.9	276° 36'.9	37'.0	256° 29'.1	56'.5	73° 36'.9	22'.4
07	283° 27'.4	318° 11'.0	14'.0	291° 37'.6	36'.2	271° 31'.0	56'.7	88° 39'.5	22'.3
08	298° 29'.9	333° 10'.5	13'.2	306° 38'.2	35'.4	286° 33'.0	56'.9	103° 42'.2	22'.2
09	313° 32'.3	348° 10'.0	12'.3	321° 38'.9	34'.7	301° 34'.9	57'.2	118° 44'.8	22'.1
10	328° 34'.8	3° 09'.5	11'.5	336° 39'.5	33'.9	316° 36'.8	57'.4	133° 47'.4	22'.1
11	343° 37'.3	18° 09'.0	10'.6	351° 40'.2	33'.1	331° 38'.7	57'.6	148° 50'.1	22'.0
12	358° 39'.7	33° 08'.5	14° 09'.8 S	6° 40'.9	4° 32'.3 S	346° 40'.6	3° 57'.9 N	163° 52'.7	3° 21'.9 S
13	13° 42'.2	48° 08'.0	08'.9	21° 41'.5	31'.5	1° 42'.5	58'.1	178° 55'.3	21'.8
14	28° 44'.7	63° 07'.5	08'.1	36° 42'.2	30'.7	16° 44'.4	58'.3	193° 58'.0	21'.8
15	43° 47'.1	78° 07'.0	07'.2	51° 42'.8	30'.0	31° 46'.3	58'.6	209° 00'.6	21'.7
16	58° 49'.6	93° 06'.5	06'.4	66° 43'.5	29'.2	46° 48'.3	58'.8	224° 03'.2	21'.6
17	73° 52'.1	108° 06'.0	05'.5	81° 44'.2	28'.4	61° 50'.2	59'.1	239° 05'.9	21'.5
18	88° 54'.5	123° 05'.5	04'.6	96° 44'.8	27'.6	76° 52'.1	59'.3	254° 08'.5	21'.5
19	103° 57'.0	138° 05'.0	03'.8	111° 45'.5	26'.8	91° 54'.0	59'.5	269° 11'.1	21'.4
20	118° 59'.4	153° 04'.5	02'.9	126° 46'.1	26'.0	106° 55'.9	59'.8	284° 13'.8	21'.3
21	134° 01'.9	168° 04'.0	02'.1	141° 46'.8	25'.3	121° 57'.8	4° 00'.0 N	299° 16'.4	21'.2
22	149° 04'.4	183° 03'.5	01'.2	156° 47'.5	24'.5	136° 59'.7	00'.2	314° 19'.0	21'.2
23	164° 06'.8	198° 03'.0	00'.4	171° 48'.1	23'.7	152° 01'.6	00'.5	329° 21'.7	21'.1
22 Tuesday 00	179° 09'.3	213° 02'.5	13° 59'.5 S	186° 48'.8	4° 22'.9 S	167° 03'.5	4° 00'.7 N	344° 24'.3	3° 21'.0 S
01	194° 11'.8	228° 02'.0	58'.6	201° 49'.5	22'.1	182° 05'.5	00'.9	359° 26'.9	20'.9
02	209° 14'.2	243° 01'.5	57'.8	216° 50'.1	21'.3	197° 07'.4	01'.2	14° 29'.6	20'.9
03	224° 16'.7	258° 01'.1	56'.9	231° 50'.8	20'.6	212° 09'.3	01'.4	29° 32'.2	20'.8
04	239° 19'.2	273° 00'.6	56'.0	246° 51'.4	19'.8	227° 11'.2	01'.6	44° 34'.8	20'.7
05	254° 21'.6	288° 00'.1	55'.2	261° 52'.1	19'.0	242° 13'.1	01'.9	59° 37'.5	20'.6
06	269° 24'.1	302° 59'.6	54'.3	276° 52'.8	18'.2	257° 15'.0	02'.1	74° 40'.1	20'.6
07	284° 26'.6	317° 59'.1	53'.4	291° 53'.4	17'.4	272° 16'.9	02'.3	89° 42'.7	20'.5
08	299° 29'.0	332° 58'.6	52'.6	306° 54'.1	16'.6	287° 18'.8	02'.6	104° 45'.4	20'.4
09	314° 31'.5	347° 58'.1	51'.7	321° 54'.8	15'.9	302° 20'.7	02'.8	119° 48'.0	20'.3
10	329° 33'.9	2° 57'.6	50'.8	336° 55'.4	15'.1	317° 22'.7	03'.0	134° 50'.6	20'.3
11	344° 36'.4	17° 57'.1	50'.0	351° 56'.1	14'.3	332° 24'.6	03'.3	149° 53'.3	20'.2
12	359° 38'.9	32° 56'.6	13° 49'.1 S	6° 56'.7	4° 13'.5 S	347° 26'.5	4° 03'.5 N	164° 55'.9	3° 20'.1 S
13	14° 41'.3	47° 56'.1	48'.2	21° 57'.4	12'.7	2° 28'.4	03'.8	179° 58'.5	20'.0
14	29° 43'.8	62° 55'.7	47'.4	36° 58'.1	11'.9	17° 30'.3	04'.0	195° 01'.2	20'.0
15	44° 46'.3	77° 55'.2	46'.5	51° 58'.7	11'.1	32° 32'.2	04'.2	210° 03'.8	19'.9
16	59° 48'.7	92° 54'.7	45'.6	66° 59'.4	10'.4	47° 34'.1	04'.5	225° 06'.4	19'.8
17	74° 51'.2	107° 54'.2	44'.8	82° 00'.1	09'.6	62° 36'.0	04'.7	240° 09'.1	19'.7
18	89° 53'.7	122° 53'.7	43'.9	97° 00'.7	08'.8	77° 37'.9	04'.9	255° 11'.7	19'.7
19	104° 56'.1	137° 53'.2	43'.0	112° 01'.4	08'.0	92° 39'.9	05'.2	270° 14'.3	19'.6
20	119° 58'.6	152° 52'.7	42'.1	127° 02'.0	07'.2	107° 41'.8	05'.4	285° 17'.0	19'.5
21	135° 01'.1	167° 52'.2	41'.3	142° 02'.7	06'.4	122° 43'.7	05'.6	300° 19'.6	19'.4
22	150° 03'.5	182° 51'.8	40'.4	157° 03'.4	05'.7	137° 45'.6	05'.9	315° 22'.2	19'.4
23	165° 06'.0	197° 51'.3	39'.5	172° 04'.0	04'.9	152° 47'.5	06'.1	330° 24'.9	19'.3
	M.P. 12:05	v -0'.5	d 0'.9	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.8 S
Achernar	335° 28'.4	57° 10'.9 S
Acrux	173° 10'.6	63° 09'.8 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.6	49° 15'.1 N
Alnair	27° 46'.1	46° 54'.3 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.1	26° 40'.3 N
Alpheratz	357° 45'.6	29° 09'.1 N
Altair	62° 09'.9	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.1	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.3	69° 02'.6 S
Avior	234° 18'.4	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.8	52° 42'.5 S
Capella	280° 36'.9	46° 00'.7 N
Deneb	49° 32'.9	45° 19'.1 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 46'.9	51° 28'.9 N
Enif	33° 49'.0	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.7 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.7	60° 25'.6 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 46'.0	34° 22'.6 S
Kochab	137° 18'.9	74° 06'.2 N
Markab	13° 40'.3	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.5	69° 46'.1 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.4	26° 16'.9 S
Peacock	53° 22'.0	56° 41'.7 S
Polaris	318° 54'.6	89° 19'.0 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.9	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.5	60° 52'.8 S
Sabik	102° 14'.3	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.0	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.0 S
Vega	80° 40'.1	38° 47'.4 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	35° 04'.3	09:47
Mars	8° 22'.8	11:33
Jupiter	348° 07'.5	12:53
Saturn	165° 10'.9	01:06

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 04'.3	0° 23'.1 S	356° 51'.0	8'.1	5° 34'.7 S	15'.0	61'.5
193° 04'.5	22'.1	11° 18'.1	8'.0	49'.7	15'.0	
208° 04'.7	21'.1	25° 45'.1	8'.0	6° 04'.7 S	15'.0	
223° 04'.9	20'.1	40° 12'.1	8'.0	19'.7	14'.9	
238° 05'.1	19'.1	54° 39'.1	7'.9	34'.6	14'.8	
253° 05'.2	18'.1	69° 06'.0	8'.0	49'.4	14'.8	
268° 05'.4	17'.1	83° 33'.0	7'.9	7° 04'.2 S	14'.8	
283° 05'.6	16'.2	97° 59'.9	7'.8	19'.0	14'.7	
298° 05'.8	15'.2	112° 26'.7	7'.8	33'.7	14'.7	61'.4
313° 06'.0	14'.2	126° 53'.5	7'.8	48'.4	14'.6	
328° 06'.2	13'.2	141° 20'.3	7'.8	8° 03'.0 S	14'.5	
343° 06'.4	12'.2	155° 47'.1	7'.7	17'.5	14'.5	
358° 06'.5	0° 11'.2 S	170° 13'.8	7'.7	8° 32'.0 S	14'.4	61'.4
13° 06'.7	10'.2	184° 40'.5	7'.7	46'.4	14'.4	
28° 06'.9	09'.2	199° 07'.2	7'.6	9° 00'.8 S	14'.3	
43° 07'.1	08'.3	213° 33'.8	7'.6	15'.1	14'.3	
58° 07'.3	07'.3	228° 00'.4	7'.6	29'.4	14'.1	
73° 07'.5	06'.3	242° 27'.0	7'.5	43'.5	14'.1	
88° 07'.6	05'.3	256° 53'.5	7'.5	57'.6	14'.1	61'.3
103° 07'.8	04'.3	271° 20'.0	7'.5	10° 11'.7 S	13'.9	
118° 08'.0	03'.3	285° 46'.5	7'.4	25'.6	13'.9	
133° 08'.2	02'.3	300° 12'.9	7'.4	39'.5	13'.8	
148° 08'.4	01'.3	314° 39'.3	7'.4	53'.3	13'.7	
163° 08'.6	00'.3	329° 05'.7	7'.3	11° 07'.0 S	13'.7	
178° 08'.8	0° 00'.6 N	343° 32'.0	7'.3	11° 20'.7 S	13'.6	61'.2
193° 09'.0	01'.6	357° 58'.3	7'.2	34'.3	13'.4	
208° 09'.1	02'.6	12° 24'.5	7'.2	47'.7	13'.4	
223° 09'.3	03'.6	26° 50'.7	7'.2	12° 01'.1 S	13'.4	
238° 09'.5	04'.6	41° 16'.9	7'.1	14'.5	13'.2	
253° 09'.7	05'.6	55° 43'.0	7'.1	27'.7	13'.1	
268° 09'.9	06'.6	70° 09'.1	7'.1	40'.8	13'.1	61'.1
283° 10'.1	07'.6	84° 35'.2	7'.0	53'.9	12'.9	
298° 10'.3	08'.5	99° 01'.2	7'.0	13° 06'.8 S	12'.9	
313° 10'.4	09'.5	113° 27'.2	7'.0	19'.7	12'.7	
328° 10'.6	10'.5	127° 53'.2	6'.9	32'.4	12'.7	
343° 10'.8	11'.5	142° 19'.1	6'.8	45'.1	12'.5	61'.0
358° 11'.0	0° 12'.5 N	156° 44'.9	6'.9	13° 57'.6 S	12'.5	61'.0
13° 11'.2	13'.5	171° 10'.8	6'.8	14° 10'.1 S	12'.3	
28° 11'.4	14'.5	185° 36'.6	6'.8	22'.4	12'.3	
43° 11'.6	15'.4	200° 02'.4	6'.7	34'.7	12'.1	60'.9
58° 11'.7	16'.4	214° 28'.1	6'.7	46'.8	12'.0	
73° 11'.9	17'.4	228° 53'.8	6'.6	58'.8	12'.0	
88° 12'.1	18'.4	243° 19'.4	6'.7	15° 10'.8 S	11'.8	
103° 12'.3	19'.4	257° 45'.1	6'.6	22'.6	11'.7	60'.8
118° 12'.5	20'.4	272° 10'.7	6'.5	34'.3	11'.6	
133° 12'.7	21'.4	286° 36'.2	6'.5	45'.9	11'.4	
148° 12'.9	22'.4	301° 01'.7	6'.5	57'.3	11'.4	
163° 13'.1	23'.3	315° 27'.2	6'.5	16° 08'.7 S	11'.2	60'.7
178° 13'.2	0° 24'.3 N	329° 52'.7	6'.4	16° 19'.9 S	11'.1	60'.7
193° 13'.4	25'.3	344° 18'.1	6'.4	31'.0	11'.0	
208° 13'.6	26'.3	358° 43'.5	6'.3	42'.0	10'.9	60'.6
223° 13'.8	27'.3	13° 08'.8	6'.3	52'.9	10'.8	
238° 14'.0	28'.3	27° 34'.1	6'.3	17° 03'.7 S	10'.6	
253° 14'.2	29'.3	41° 59'.4	6'.3	14'.3	10'.5	
268° 14'.4	30'.3	56° 24'.7	6'.2	24'.8	10'.4	60'.5
283° 14'.6	31'.2	70° 49'.9	6'.2	35'.2	10'.2	
298° 14'.7	32'.2	85° 15'.1	6'.1	45'.4	10'.1	
313° 14'.9	33'.2	99° 40'.2	6'.2	55'.5	10'.0	60'.4
328° 15'.1	34'.2	114° 05'.4	6'.1	18° 05'.5 S	9'.9	
343° 15'.3	35'.2	128° 30'.5	6'.1	15'.4	9'.7	
358° 15'.5	0° 36'.2 N	142° 55'.6	6'.0	18° 25'.1 S	9'.6	60'.3
13° 15'.7	37'.2	157° 20'.6	6'.0	34'.7	9'.4	
28° 15'.9	38'.1	171° 45'.6	6'.0	44'.1	9'.4	
43° 16'.1	39'.1	186° 10'.6	6'.0	53'.5	9'.2	60'.2
58° 16'.2	40'.1	200° 35'.6	6'.0	19° 02'.7 S	9'.0	
73° 16'.4	41'.1	215° 00'.6	5'.9	11'.7	8'.9	
88° 16'.6	42'.1	229° 25'.5	5'.9	20'.6	8'.8	60'.1
103° 16'.8	43'.1	243° 50'.4	5'.9	29'.4	8'.6	
118° 17'.0	44'.1	258° 15'.3	5'.8	38'.0	8'.5	
133° 17'.2	45'.1	272° 40'.1	5'.9	46'.5	8'.3	60'.0
148° 17'.4	46'.0	287° 05'.0	5'.8	54'.8	8'.2	
163° 17'.6	47'.0	301° 29'.8	5'.8	20° 03'.0 S	8'.1	
SD 16'.1	d 1'.0	SD 16'.7		16'.6		16'.4

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 20	Moonrise 21	Moonrise 22
N 72°	03:17	04:47	05:55	21:26	-	00:27
N 70°	03:37	04:55	05:56	21:07	23:36	-
68°	03:52	05:02	05:57	20:52	23:04	25:32
66°	04:04	05:07	05:58	20:40	22:41	24:46
64°	04:13	05:11	05:59	20:29	22:23	24:16
62°	04:22	05:15	05:59	20:21	22:08	23:53
60°	04:28	05:18	06:00	20:14	21:56	23:35
N 58°	04:34	05:21	06:00	20:07	21:45	23:20
56°	04:39	05:24	06:01	20:02	21:36	23:07
54°	04:44	05:26	06:01	19:57	21:28	22:56
52°	04:48	05:28	06:01	19:52	21:21	22:46
50°	04:51	05:29	06:02	19:48	21:14	22:37
45°	04:59	05:33	06:02	19:39	21:00	22:19
N 40°	05:04	05:36	06:03	19:32	20:49	22:04
35°	05:08	05:38	06:03	19:26	20:39	21:51
30°	05:12	05:39	06:03	19:20	20:31	21:40
20°	05:16	05:42	06:04	19:11	20:16	21:21
N 10°	05:19	05:43	06:04	19:03	20:03	21:05
0°	05:19	05:43	06:04	18:55	19:52	20:50
S 10°	05:19	05:43	06:04	18:48	19:40	20:35
20°	05:16	05:42	06:04	18:40	19:28	20:19
30°	05:12	05:40	06:04	18:31	19:14	20:00
35°	05:09	05:38	06:04	18:26	19:06	19:50
40°	05:05	05:36	06:03	18:20	18:56	19:38
45°	04:59	05:34	06:03	18:13	18:46	19:23
S 50°	04:52	05:30	06:03	18:05	18:33	19:06
52°	04:49	05:29	06:02	18:02	18:27	18:58
54°	04:45	05:27	06:02	17:58	18:21	18:49
56°	04:41	05:25	06:02	17:53	18:13	18:39
58°	04:36	05:22	06:02	17:48	18:05	18:28
S 60°	04:30	05:20	06:01	17:43	17:56	18:14
S 62°	04:23	05:17	06:01	17:37	17:46	17:59

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 20	Moonset 21	Moonset 22
N 72°	18:22	19:31	21:02	04:55	04:24	03:23
N 70°	18:20	19:22	20:42	05:05	04:45	04:15
68°	18:19	19:15	20:26	05:13	05:02	04:49
66°	18:18	19:10	20:14	05:19	05:16	05:13
64°	18:17	19:05	20:04	05:25	05:28	05:32
62°	18:17	19:01	19:55	05:30	05:37	05:48
60°	18:16	18:58	19:48	05:35	05:46	06:01
N 58°	18:15	18:55	19:42	05:38	05:53	06:13
56°	18:15	18:52	19:37	05:42	06:00	06:22
54°	18:15	18:50	19:32	05:45	06:06	06:31
52°	18:14	18:48	19:28	05:48	06:11	06:39
50°	18:14	18:46	19:24	05:51	06:16	06:46
45°	18:13	18:42	19:17	05:56	06:27	07:02
N 40°	18:13	18:40	19:11	06:01	06:36	07:14
35°	18:12	18:37	19:07	06:05	06:43	07:25
30°	18:12	18:36	19:04	06:09	06:50	07:35
20°	18:11	18:33	18:59	06:15	07:02	07:51
N 10°	18:11	18:32	18:56	06:21	07:12	08:06
0°	18:11	18:31	18:55	06:26	07:22	08:19
S 10°	18:10	18:31	18:56	06:31	07:31	08:33
20°	18:10	18:32	18:58	06:37	07:42	08:47
30°	18:10	18:34	19:02	06:43	07:54	09:04
35°	18:10	18:36	19:05	06:47	08:01	09:13
40°	18:11	18:37	19:09	06:51	08:08	09:25
45°	18:11	18:40	19:14	06:56	08:18	09:38
S 50°	18:11	18:43	19:21	07:02	08:29	09:54
52°	18:11	18:45	19:24	07:05	08:34	10:01
54°	18:11	18:46	19:28	07:08	08:40	10:10
56°	18:11	18:48	19:32	07:11	08:46	10:19
58°	18:12	18:51	19:37	07:15	08:53	10:30
S 60°	18:12	18:53	19:43	07:19	09:02	10:43
S 62°	18:12	18:56	19:50	07:24	09:11	10:57

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
20	7 43	7 34	12:08	00:13	12:41	16d 99%
21	7 25	7 16	12:07	01:08	13:37	17d 95%
22	7 07	6 58	12:07	02:05	14:34	18d 89%

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2011 March 23, 24, 25 (Wed, Thur, Fri)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
23 00	180° 08'.4	212° 50'.8	13° 38'.6 S	187° 04'.7	4° 04'.1 S	167° 49'.4	4° 06'.3 N	345° 27'.5	3° 19'.2 S
01	195° 10'.9	227° 50'.3	37'.8	202° 05'.4	03'.3	182° 51'.3	06'.6	0° 30'.2	19'.1
02	210° 13'.4	242° 49'.8	36'.9	217° 06'.0	02'.5	197° 53'.2	06'.8	15° 32'.8	19'.0
03	225° 15'.8	257° 49'.3	36'.0	232° 06'.7	01'.7	212° 55'.1	07'.0	30° 35'.4	19'.0
04	240° 18'.3	272° 48'.8	35'.1	247° 07'.4	00'.9	227° 57'.1	07'.3	45° 38'.1	18'.9
05	255° 20'.8	287° 48'.4	34'.2	262° 08'.0	00'.2	242° 59'.0	07'.5	60° 40'.7	18'.8
06	270° 23'.2	302° 47'.9	33'.4	277° 08'.7	3° 59'.4 S	258° 00'.9	07'.7	75° 43'.3	18'.7
07	285° 25'.7	317° 47'.4	32'.5	292° 09'.4	58'.6	273° 02'.8	08'.0	90° 46'.0	18'.7
08	300° 28'.2	332° 46'.9	31'.6	307° 10'.0	57'.8	288° 04'.7	08'.2	105° 48'.6	18'.6
09	315° 30'.6	347° 46'.4	30'.7	322° 10'.7	57'.0	303° 06'.6	08'.4	120° 51'.2	18'.5
10	330° 33'.1	2° 45'.9	29'.8	337° 11'.3	56'.2	318° 08'.5	08'.7	135° 53'.9	18'.4
11	345° 35'.5	17° 45'.5	28'.9	352° 12'.0	55'.5	333° 10'.4	08'.9	150° 56'.5	18'.4
12	0° 38'.0	32° 45'.0	13° 28'.1 S	7° 12'.7	3° 54'.7 S	348° 12'.3	4° 09'.2 N	165° 59'.1	3° 18'.3 S
13	15° 40'.5	47° 44'.5	27'.2	22° 13'.3	53'.9	3° 14'.2	09'.4	181° 01'.8	18'.2
14	30° 42'.9	62° 44'.0	26'.3	37° 14'.0	53'.1	18° 16'.2	09'.6	196° 04'.4	18'.1
15	45° 45'.4	77° 43'.5	25'.4	52° 14'.7	52'.3	33° 18'.1	09'.9	211° 07'.1	18'.1
16	60° 47'.9	92° 43'.0	24'.5	67° 15'.3	51'.5	48° 20'.0	10'.1	226° 09'.7	18'.0
17	75° 50'.3	107° 42'.6	23'.6	82° 16'.0	50'.7	63° 21'.9	10'.3	241° 12'.3	17'.9
18	90° 52'.8	122° 42'.1	22'.7	97° 16'.7	50'.0	78° 23'.8	10'.6	256° 15'.0	17'.8
19	105° 55'.3	137° 41'.6	21'.9	112° 17'.3	49'.2	93° 25'.7	10'.8	271° 17'.6	17'.8
20	120° 57'.7	152° 41'.1	21'.0	127° 18'.0	48'.4	108° 27'.6	11'.0	286° 20'.2	17'.7
21	136° 00'.2	167° 40'.6	20'.1	142° 18'.7	47'.6	123° 29'.5	11'.3	301° 22'.9	17'.6
22	151° 02'.7	182° 40'.2	19'.2	157° 19'.3	46'.8	138° 31'.4	11'.5	316° 25'.5	17'.5
23	166° 05'.1	197° 39'.7	18'.3	172° 20'.0	46'.0	153° 33'.3	11'.7	331° 28'.1	17'.5
24 00	181° 07'.6	212° 39'.2	13° 17'.4 S	187° 20'.7	3° 45'.2 S	168° 35'.3	4° 12'.0 N	346° 30'.8	3° 17'.4 S
01	196° 10'.0	227° 38'.7	16'.5	202° 21'.3	44'.5	183° 37'.2	12'.2	1° 33'.4	17'.3
02	211° 12'.5	242° 38'.3	15'.6	217° 22'.0	43'.7	198° 39'.1	12'.4	16° 36'.0	17'.2
03	226° 15'.0	257° 37'.8	14'.7	232° 22'.7	42'.9	213° 41'.0	12'.7	31° 38'.7	17'.2
04	241° 17'.4	272° 37'.3	13'.8	247° 23'.3	42'.1	228° 42'.9	12'.9	46° 41'.3	17'.1
05	256° 19'.9	287° 36'.8	12'.9	262° 24'.0	41'.3	243° 44'.8	13'.1	61° 44'.0	17'.0
06	271° 22'.4	302° 36'.4	12'.0	277° 24'.7	40'.5	258° 46'.7	13'.4	76° 46'.6	16'.9
07	286° 24'.8	317° 35'.9	11'.1	292° 25'.3	39'.7	273° 48'.6	13'.6	91° 49'.2	16'.9
08	301° 27'.3	332° 35'.4	10'.2	307° 26'.0	39'.0	288° 50'.5	13'.9	106° 51'.9	16'.8
09	316° 29'.8	347° 34'.9	09'.3	322° 26'.7	38'.2	303° 52'.4	14'.1	121° 54'.5	16'.7
10	331° 32'.2	2° 34'.4	08'.4	337° 27'.3	37'.4	318° 54'.3	14'.3	136° 57'.1	16'.6
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12	1° 37'.2	32° 33'.5	13° 06'.6 S	7° 28'.7	3° 35'.8 S	348° 58'.2	4° 14'.8 N	167° 02'.4	3° 16'.5 S
13	16° 39'.6	47° 33'.0	05'.7	22° 29'.3	35'.0	4° 00'.1	15'.0	182° 05'.1	16'.4
14	31° 42'.1	62° 32'.6	04'.8	37° 30'.0	34'.2	19° 02'.0	15'.3	197° 07'.7	16'.3
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17	76° 49'.5	107° 31'.1	02'.1	82° 32'.0	31'.9	64° 07'.7	16'.0	242° 15'.6	16'.1
18	91° 51'.9	122° 30'.7	01'.2	97° 32'.7	31'.1	79° 09'.6	16'.2	257° 18'.2	16'.0
19	106° 54'.4	137° 30'.2	00'.3	112° 33'.3	30'.3	94° 11'.5	16'.4	272° 20'.9	15'.9
20	121° 56'.9	152° 29'.7	12° 59'.4 S	127° 34'.0	29'.5	109° 13'.4	16'.7	287° 23'.5	15'.9
21	136° 59'.3	167° 29'.2	58'.5	142° 34'.7	28'.7	124° 15'.4	16'.9	302° 26'.1	15'.8
22	152° 01'.8	182° 28'.8	57'.6	157° 35'.3	27'.9	139° 17'.3	17'.1	317° 28'.8	15'.7
23	167° 04'.3	197° 28'.3	56'.7	172° 36'.0	27'.2	154° 19'.2	17'.4	332° 31'.4	15'.6
25 00	182° 06'.7	212° 27'.8	12° 55'.8 S	187° 36'.7	3° 26'.4 S	169° 21'.1	4° 17'.6 N	347° 34'.1	3° 15'.6 S
01	197° 09'.2	227° 27'.4	54'.9	202° 37'.3	25'.6	184° 23'.0	17'.8	2° 36'.7	15'.5
02	212° 11'.7	242° 26'.9	54'.0	217° 38'.0	24'.8	199° 24'.9	18'.1	17° 39'.3	15'.4
03	227° 14'.1	257° 26'.4	53'.0	232° 38'.7	24'.0	214° 26'.8	18'.3	32° 42'.0	15'.3
04	242° 16'.6	272° 26'.0	52'.1	247° 39'.3	23'.2	229° 28'.7	18'.5	47° 44'.6	15'.3
05	257° 19'.0	287° 25'.5	51'.2	262° 40'.0	22'.4	244° 30'.6	18'.8	62° 47'.2	15'.2
06	272° 21'.5	302° 25'.0	50'.3	277° 40'.7	21'.7	259° 32'.5	19'.0	77° 49'.9	15'.1
07	287° 24'.0	317° 24'.5	49'.4	292° 41'.4	20'.9	274° 34'.4	19'.3	92° 52'.5	15'.0
08	302° 26'.4	332° 24'.1	48'.5	307° 42'.0	20'.1	289° 36'.3	19'.5	107° 55'.2	15'.0
09	317° 28'.9	347° 23'.6	47'.6	322° 42'.7	19'.3	304° 38'.3	19'.7	122° 57'.8	14'.9
10	332° 31'.4	2° 23'.1	46'.7	337° 43'.4	18'.5	319° 40'.2	20'.0	138° 00'.4	14'.8
11	347° 33'.8	17° 22'.7	45'.7	352° 44'.0	17'.7	334° 42'.1	20'.2	153° 03'.1	14'.7
12	2° 36'.3	32° 22'.2	12° 44'.8 S	7° 44'.7	3° 16'.9 S	349° 44'.0	4° 20'.4 N	168° 05'.7	3° 14'.7 S
13	17° 38'.8	47° 21'.7	43'.9	22° 45'.4	16'.1	4° 45'.9	20'.7	183° 08'.4	14'.6
14	32° 41'.2	62° 21'.3	43'.0	37° 46'.0	15'.4	19° 47'.8	20'.9	198° 11'.0	14'.5
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17	77° 48'.6	107° 19'.9	40'.2	82° 48'.0	13'.0	64° 53'.5	21'.6	243° 18'.9	14'.3
18	92° 51'.1	122° 19'.4	39'.3	97° 48'.7	12'.2	79° 55'.4	21'.8	258° 21'.5	14'.2
19	107° 53'.5	137° 19'.0	38'.4	112° 49'.4	11'.4	94° 57'.3	22'.1	273° 24'.2	14'.1
20	122° 56'.0	152° 18'.5	37'.5	127° 50'.1	10'.6	109° 59'.3	22'.3	288° 26'.8	14'.0
21	137° 58'.5	167° 18'.0	36'.6	142° 50'.7	09'.8	125° 01'.2	22'.5	303° 29'.5	14'.0
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23	168° 03'.4	197° 17'.1	34'.7	172° 52'.1	08'.3	155° 05'.0	23'.0	333° 34'.7	13'.8
	M.P. 11:50	v -0'.5	d 0'.9	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.8 S
Achernar	335° 28'.4	57° 10'.9 S
Acrux	173° 10'.6	63° 09'.8 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 46'.0	46° 54'.2 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.1	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.9	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.1	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.2	69° 02'.6 S
Avior	234° 18'.4	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.0	7° 24'.4 N
Canopus	263° 56'.8	52° 42'.5 S
Capella	280° 36'.9	46° 00'.6 N
Deneb	49° 32'.9	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 46'.8	51° 28'.9 N
Enif	33° 48'.9	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.7 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.7	60° 25'.6 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.9	34° 22'.6 S
Kochab	137° 18'.9	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.5	69° 46'.1 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.3	26° 16'.9 S
Peacock	53° 22'.0	56° 41'.7 S
Polaris	318° 55'.2	89° 19'.0 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.9	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.4	60° 52'.8 S
Sabik	102° 14'.3	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.0	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.0 S
Vega	80° 40'.1	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	31° 31'.6	09:50
Mars	6° 13'.1	11:30
Jupiter	347° 27'.7	12:44
Saturn	165° 23'.2	00:54

SUN						
GHA	Dec	GHA	v	Dec	d	HP
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193° 17'.9	49'.0	330° 19'.4	5'.8	19'.0	7'.8	
208° 18'.1	50'.0	344° 44'.2	5'.7	26'.8	7'.6	59'.8
223° 18'.3	51'.0	359° 08'.9	5'.8	34'.4	7'.5	
238° 18'.5	52'.0	13° 33'.7	5'.7	41'.9	7'.3	
253° 18'.7	52'.9	27° 58'.4	5'.8	49'.2	7'.2	59'.7
268° 18'.9	53'.9	42° 23'.2	5'.7	56'.4	7'.1	
283° 19'.1	54'.9	56° 47'.9	5'.7	21° 03'.5 S	6'.8	
298° 19'.2	55'.9	71° 12'.6	5'.7	10'.3	6'.8	59'.6
313° 19'.4	56'.9	85° 37'.3	5'.7	17'.1	6'.6	
328° 19'.6	57'.9	100° 02'.0	5'.7	23'.7	6'.4	59'.5
343° 19'.8	58'.9	114° 26'.7	5'.7	30'.1	6'.3	
358° 20'.0	0° 59'.8 N	128° 51'.4	5'.6	21° 36'.4 S	6'.1	59'.5
13° 20'.2	1° 00'.8 N	143° 16'.0	5'.7	42'.5	6'.0	59'.4
28° 20'.4	01'.8	157° 40'.7	5'.7	48'.5	5'.9	
43° 20'.6	02'.8	172° 05'.4	5'.7	54'.4	5'.6	
58° 20'.8	03'.8	186° 30'.1	5'.7	22° 00'.0 S	5'.6	59'.3
73° 20'.9	04'.8	200° 54'.8	5'.7	05'.6	5'.4	
88° 21'.1	05'.8	215° 19'.5	5'.6	11'.0	5'.2	59'.2
103° 21'.3	06'.7	229° 44'.1	5'.7	16'.2	5'.1	
118° 21'.5	07'.7	244° 08'.8	5'.8	21'.3	4'.9	
133° 21'.7	08'.7	258° 33'.6	5'.7	26'.2	4'.7	59'.1
148° 21'.9	09'.7	272° 58'.3	5'.7	30'.9	4'.6	
163° 22'.1	10'.7	287° 23'.0	5'.7	35'.5	4'.5	59'.0
178° 22'.3	1° 11'.7 N	301° 47'.7	5'.8	22° 40'.0 S	4'.3	59'.0
193° 22'.4	12'.7	316° 12'.5	5'.8	44'.3	4'.2	
208° 22'.6	13'.6	330° 37'.3	5'.7	48'.5	4'.0	58'.9
223° 22'.8	14'.6	345° 02'.0	5'.8	52'.5	3'.8	
238° 23'.0	15'.6	359° 26'.8	5'.9	56'.3	3'.7	58'.8
253° 23'.2	16'.6	13° 51'.7	5'.8	23° 00'.0 S	3'.5	
268° 23'.4	17'.6	28° 16'.5	5'.9	03'.5	3'.4	
283° 23'.6	18'.6	42° 41'.4	5'.8	06'.9	3'.3	58'.7
298° 23'.8	19'.5	57° 06'.2	5'.9	10'.2	3'.0	
313° 24'.0	20'.5	71° 31'.1	6'.0	13'.2	3'.0	58'.6
328° 24'.1	21'.5	85° 56'.1	5'.9	16'.2	2'.7	
343° 24'.3	22'.5	100° 21'.0	6'.0	18'.9	2'.6	
358° 24'.5	1° 23'.5 N	114° 46'.0	6'.0	23° 21'.5 S	2'.5	58'.5
13° 24'.7	24'.5	129° 11'.0	6'.1	24'.0	2'.3	
28° 24'.9	25'.5	143° 36'.1	6'.1	26'.3	2'.2	58'.4
43° 25'.1	26'.4	158° 01'.2	6'.1	28'.5	2'.0	
58° 25'.3	27'.4	172° 26'.3	6'.1	30'.5	1'.9	
73° 25'.5	28'.4	186° 51'.4	6'.2	32'.4	1'.7	58'.3
88° 25'.7	29'.4	201° 16'.6	6'.2	34'.1	1'.5	
103° 25'.8	30'.4	215° 41'.8	6'.3	35'.6	1'.4	58'.2
118° 26'.0	31'.4	230° 07'.1	6'.3	37'.0	1'.3	
133° 26'.2	32'.3	244° 32'.4	6'.4	38'.3	1'.1	
148° 26'.4	33'.3	258° 57'.8	6'.3	39'.4	1'.0	58'.1
163° 26'.6	34'.3	273° 23'.1	6'.5	40'.4	0'.8	
178° 26'.8	1° 35'.3 N	287° 48'.6	6'.5	23° 41'.2 S	0'.6	58'.0
193° 27'.0	36'.3	302° 14'.1	6'.5	41'.8	0'.6	
208° 27'.2	37'.3	316° 39'.6	6'.6	42'.4	0'.3	
223° 27'.4	38'.2	331° 05'.2	6'.6	42'.7	0'.3	57'.9
238° 27'.5	39'.2	345° 30'.8	6'.6	43'.0	0'.0	
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268° 27'.9	41'.2	14° 22'.2	6'.7	43'.0	0'.2	
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343° 28'.9	46'.1	86° 31'.6	7'.1	40'.5	0'.9	
358° 29'.1	1° 47'.1 N	100° 57'.7	7'.1	23° 39'.6 S	1'.1	57'.6
13° 29'.2	48'.1	115° 23'.8	7'.2	38'.5	1'.2	57'.5
28° 29'.4	49'.1	129° 50'.0	7'.2	37'.3	1'.3	
43° 29'.6	50'.0	144° 16'.2	7'.3	36'.0	1'.5	
58° 29'.8	51'.0	158° 42'.5	7'.4	34'.5	1'.6	57'.4
73° 30'.0	52'.0	173° 08'.9	7'.4	32'.9	1'.8	
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118° 30'.6	55'.0	216° 28'.3	7'.7	27'.2	2'.1	
133° 30'.8	55'.9	230° 55'.0	7'.7	25'.1	2'.3	57'.2
148° 30'.9	56'.9	245° 21'.7	7'.7	22'.8	2'.5	
163° 31'.1	57'.9	259° 48'.4	7'.9	20'.3	2'.5	57'.1
SD 16'.0	d 1'.0	SD	16'.2	15'.9	15'.7	

MOON						
GHA	v	Dec	d	HP
315° 54'.6	5'.8	20° 11'.1 S	7'.9	59'.9
330° 19'.4	5'.8	19'.0	7'.8	
344° 44'.2	5'.7	26'.8	7'.6	59'.8
359° 08'.9	5'.8	34'.4	7'.5	
13° 33'.7	5'.7	41'.9	7'.3	
27° 58'.4	5'.8	49'.2	7'.2	59'.7
42° 23'.2	5'.7	56'.4	7'.1	
56° 47'.9	5'.7	21° 03'.5 S	6'.8	
71° 12'.6	5'.7	10'.3	6'.8	59'.6
85° 37'.3	5'.7	17'.1	6'.6	
100° 02'.0	5'.7	23'.7	6'.4	59'.5
114° 26'.7	5'.7	30'.1	6'.3	
128° 51'.4	5'.6	21° 36'.4 S	6'.1	59'.5
143° 16'.0	5'.7	42'.5	6'.0	59'.4
157° 40'.7	5'.7	48'.5	5'.9	
172° 05'.4	5'.7	54'.4	5'.6	
186° 30'.1	5'.7	22° 00'.0 S	5'.6	59'.3
200° 54'.8	5'.7	05'.6	5'.4	
215° 19'.5	5'.6	11'.0	5'.2	59'.2
229° 44'.1	5'.7	16'.2	5'.1	
244° 08'.8	5'.8	21'.3	4'.9	
258° 33'.6	5'.7	26'.2	4'.7	59'.1
272° 58'.3	5'.7	30'.9	4'.6	
287° 23'.0	5'.7	35'.5	4'.5	59'.0
301° 47'.7	5'.8	22° 40'.0 S	4'.3	59'.0
316° 12'.5	5'.8	44'.3	4'.2	
330° 37'.3	5'.7	48'.5	4'.0	58'.9
345° 02'.0	5'.8	52'.5	3'.8	
359° 26'.8	5'.9	56'.3	3'.7	58'.8
13° 51'.7	5'.8	23° 00'.0 S	3'.5	
28° 16'.5	5'.9	03'.5	3'.4	
42° 41'.4	5'.8	06'.9	3'.3	58'.7
57° 06'.2	5'.9	10'.2	3'.0	
71° 31'.1	6'.0	13'.2	3'.0	58'.6
85° 56'.1	5'.9	16'.2	2'.7	
100° 21'.0	6'.0	18'.9	2'.6	
114° 46'.0	6'.0	23° 21'.5 S	2'.5	58'.5
129° 11'.0	6'.1	24'.0	2'.3	
143° 36'.1	6'.1	26'.3	2'.2	58'.4
158° 01'.2	6'.1	28'.5	2'.0	
172° 26'.3	6'.1	30'.5	1'.9	
186° 51'.4	6'.2	32'.4	1'.7	58'.3
201° 16'.6	6'.2	34'.1	1'.5	
215° 41'.8	6'.3	35'.6	1'.4	58'.2
230° 07'.1	6'.3	37'.0	1'.3	
244° 32'.4	6'.4	38'.3	1'.1	
258° 57'.8	6'.3	39'.4	1'.0	58'.1
273° 23'.1	6'.5	40'.4	0'.8	
287° 48'.6	6'.5	23° 41'.2 S	0'.6	58'.0
302° 14'.1	6'.5	41'.8	0'.6	
316° 39'.6	6'.6	42'.4	0'.3	
331° 05'.2	6'.6	42'.7	0'.3	57'.9
345° 30'.8	6'.6	43'.0	0'.0	
359° 56'.4	6'.8	43'.0	0'.0	57'.8
14° 22'.2	6'.7	43'.0	0'.2	
28° 47'.9	6'.9	42'.8	0'.4	
43° 13'.8	6'.9	42'.4	0'.5	57'.7
57° 39'.7	6'.9	41'.9	0'.6	
72° 05'.6	7'.0	41'.3	0'.8	57'.6
86° 31'.6	7'.1	40'.5	0'.9	
100° 57'.7	7'.1	23° 39'.6 S	1'.1	57'.6
115° 23'.8	7'.2	38'.5	1'.2	57'.5
129° 50'.0	7'.2	37'.3	1'.3	
144° 16'.2	7'.3	36'.0	1'.5	
158° 42'.5	7'.4	34'.5	1'.6	57'.4
173° 08'.9	7'.4	32'.9	1'.8	
187° 35'.3	7'.5	31'.1	1'.9	57'.3
202° 01'.8	7'.5	29'.2	2'.0	
216° 28'.3	7'.7	27'.2	2'.1	
230° 55'.0	7'.7	25'.1	2'.3	57'.2
245° 21'.7	7'.7	22'.8	2'.5	
259° 48'.4	7'.9	20'.3	2'.5	57'.1
SD	16'.2	15'.9	15'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 23	Moonrise 24	Moonrise 25
N 72°	02:56	04:31	05:40	-	-	-
N 70°	03:19	04:40	05:42	-	-	-
68°	03:36	04:48	05:45	01:32	-	-
66°	03:50	04:55	05:47	00:46	02:50	04:32
64°	04:01	05:00	05:48	00:16	01:59	03:16
62°	04:11	05:05	05:50	-	01:27	02:40
60°	04:18	05:09	05:51	-	01:03	02:14
N 58°	04:25	05:13	05:52	-	00:44	01:53
56°	04:31	05:16	05:53	-	00:29	01:36
54°	04:36	05:18	05:54	-	00:15	01:22
52°	04:41	05:21	05:54	-	00:03	01:09
50°	04:45	05:23	05:55	23:53	-	00:58
45°	04:53	05:27	05:57	23:31	-	00:35
N 40°	04:59	05:31	05:58	23:14	-	00:17
35°	05:04	05:33	05:59	22:59	-	00:01
30°	05:08	05:36	06:00	22:46	23:48	24:43
20°	05:13	05:39	06:01	22:25	23:25	24:20
N 10°	05:17	05:41	06:02	22:06	23:05	24:01
0°	05:18	05:42	06:03	21:48	22:47	23:43
S 10°	05:19	05:43	06:04	21:31	22:28	23:25
20°	05:17	05:43	06:05	21:12	22:08	23:05
30°	05:14	05:42	06:06	20:51	21:46	22:43
35°	05:11	05:41	06:06	20:39	21:32	22:30
40°	05:08	05:39	06:06	20:24	21:17	22:15
45°	05:03	05:38	06:07	20

2011 March 26, 27, 28 (Sat, Sun, Monday)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
26 00	183° 05'.9	212° 16'.6	12° 33'.8 S	187° 52'.7	3° 07'.5 S	170° 06'.9	4° 23'.2 N	348° 37'.4	3° 13'.7 S
01	198° 08'.3	227° 16'.2	32'.9	202° 53'.4	06'.7	185° 08'.8	23'.5	3° 40'.0	13'.7
02	213° 10'.8	242° 15'.7	31'.9	217° 54'.1	05'.9	200° 10'.7	23'.7	18° 42'.6	13'.6
03	228° 13'.3	257° 15'.2	31'.0	232° 54'.7	05'.1	215° 12'.6	23'.9	33° 45'.3	13'.5
04	243° 15'.7	272° 14'.8	30'.1	247° 55'.4	04'.3	230° 14'.5	24'.2	48° 47'.9	13'.4
05	258° 18'.2	287° 14'.3	29'.2	262° 56'.1	03'.5	245° 16'.4	24'.4	63° 50'.6	13'.4
06	273° 20'.6	302° 13'.9	28'.2	277° 56'.8	02'.8	260° 18'.3	24'.7	78° 53'.2	13'.3
07	288° 23'.1	317° 13'.4	27'.3	292° 57'.4	02'.0	275° 20'.2	24'.9	93° 55'.8	13'.2
08	303° 25'.6	332° 12'.9	26'.4	307° 58'.1	01'.2	290° 22'.2	25'.1	108° 58'.5	13'.1
09	318° 28'.0	347° 12'.5	25'.5	322° 58'.8	00'.4	305° 24'.1	25'.4	124° 01'.1	13'.1
10	333° 30'.5	2° 12'.0	24'.5	337° 59'.4	2° 59'.6 S	320° 26'.0	25'.6	139° 03'.8	13'.0
11	348° 33'.0	17° 11'.6	23'.6	353° 00'.1	58'.8	335° 27'.9	25'.8	154° 06'.4	12'.9
12	3° 35'.4	32° 11'.1	12° 22'.7 S	8° 00'.8	2° 58'.0 S	350° 29'.8	4° 26'.1 N	169° 09'.0	3° 12'.8 S
13	18° 37'.9	47° 10'.6	21'.7	23° 01'.4	57'.2	5° 31'.7	26'.3	184° 11'.7	12'.8
14	33° 40'.4	62° 10'.2	20'.8	38° 02'.1	56'.5	20° 33'.6	26'.5	199° 14'.3	12'.7
15	48° 42'.8	77° 09'.7	19'.9	53° 02'.8	55'.7	35° 35'.5	26'.8	214° 17'.0	12'.6
16	63° 45'.3	92° 09'.3	18'.9	68° 03'.5	54'.9	50° 37'.4	27'.0	229° 19'.6	12'.5
17	78° 47'.8	107° 08'.8	18'.0	83° 04'.1	54'.1	65° 39'.3	27'.2	244° 22'.2	12'.4
18	93° 50'.2	122° 08'.4	17'.1	98° 04'.8	53'.3	80° 41'.2	27'.5	259° 24'.9	12'.4
19	108° 52'.7	137° 07'.9	16'.1	113° 05'.5	52'.5	95° 43'.1	27'.7	274° 27'.5	12'.3
20	123° 55'.1	152° 07'.4	15'.2	128° 06'.1	51'.7	110° 45'.0	27'.9	289° 30'.1	12'.2
21	138° 57'.6	167° 07'.0	14'.3	143° 06'.8	50'.9	125° 47'.0	28'.2	304° 32'.8	12'.1
22	154° 00'.1	182° 06'.5	13'.3	158° 07'.5	50'.2	140° 48'.9	28'.4	319° 35'.4	12'.1
23	169° 02'.5	197° 06'.1	12'.4	173° 08'.2	49'.4	155° 50'.8	28'.6	334° 38'.1	12'.0
27 00	184° 05'.0	212° 05'.6	12° 11'.4 S	188° 08'.8	2° 48'.6 S	170° 52'.7	4° 28'.9 N	349° 40'.7	3° 11'.9 S
01	199° 07'.5	227° 05'.2	10'.5	203° 09'.5	47'.8	185° 54'.6	29'.1	4° 43'.3	11'.8
02	214° 09'.9	242° 04'.7	09'.6	218° 10'.2	47'.0	200° 56'.5	29'.3	19° 46'.0	11'.8
03	229° 12'.4	257° 04'.3	08'.6	233° 10'.8	46'.2	215° 58'.4	29'.6	34° 48'.6	11'.7
04	244° 14'.9	272° 03'.8	07'.7	248° 11'.5	45'.4	231° 00'.3	29'.8	49° 51'.3	11'.6
05	259° 17'.3	287° 03'.4	06'.7	263° 12'.2	44'.6	246° 02'.2	30'.1	64° 53'.9	11'.5
06	274° 19'.8	302° 02'.9	05'.8	278° 12'.9	43'.9	261° 04'.1	30'.3	79° 56'.5	11'.5
07	289° 22'.3	317° 02'.4	04'.9	293° 13'.5	43'.1	276° 06'.0	30'.5	94° 59'.2	11'.4
08	304° 24'.7	332° 02'.0	03'.9	308° 14'.2	42'.3	291° 07'.9	30'.8	110° 01'.8	11'.3
09	319° 27'.2	347° 01'.5	03'.0	323° 14'.9	41'.5	306° 09'.8	31'.0	125° 04'.5	11'.2
10	334° 29'.6	2° 01'.1	02'.0	338° 15'.6	40'.7	321° 11'.7	31'.2	140° 07'.1	11'.2
11	349° 32'.1	17° 00'.6	01'.1	353° 16'.2	39'.9	336° 13'.7	31'.5	155° 09'.7	11'.1
12	4° 34'.6	32° 00'.2	12° 00'.1 S	8° 16'.9	2° 39'.1 S	351° 15'.6	4° 31'.7 N	170° 12'.4	3° 11'.0 S
13	19° 37'.0	46° 59'.7	11° 59'.2 S	23° 17'.6	38'.3	6° 17'.5	31'.9	185° 15'.0	10'.9
14	34° 39'.5	61° 59'.3	58'.3	38° 18'.2	37'.5	21° 19'.4	32'.2	200° 17'.7	10'.8
15	49° 42'.0	76° 58'.8	57'.3	53° 18'.9	36'.8	36° 21'.3	32'.4	215° 20'.3	10'.8
16	64° 44'.4	91° 58'.4	56'.4	68° 19'.6	36'.0	51° 23'.2	32'.6	230° 22'.9	10'.7
17	79° 46'.9	106° 57'.9	55'.4	83° 20'.3	35'.2	66° 25'.1	32'.9	245° 25'.6	10'.6
18	94° 49'.4	121° 57'.5	54'.5	98° 20'.9	34'.4	81° 27'.0	33'.1	260° 28'.2	10'.5
19	109° 51'.8	136° 57'.0	53'.5	113° 21'.6	33'.6	96° 28'.9	33'.3	275° 30'.9	10'.5
20	124° 54'.3	151° 56'.6	52'.6	128° 22'.3	32'.8	111° 30'.8	33'.6	290° 33'.5	10'.4
21	139° 56'.7	166° 56'.1	51'.6	143° 23'.0	32'.0	126° 32'.7	33'.8	305° 36'.1	10'.3
22	154° 59'.2	181° 55'.7	50'.7	158° 23'.6	31'.2	141° 34'.6	34'.0	320° 38'.8	10'.2
23	170° 01'.7	196° 55'.2	49'.7	173° 24'.3	30'.5	156° 36'.5	34'.3	335° 41'.4	10'.2
28 00	185° 04'.1	211° 54'.8	11° 48'.8 S	188° 25'.0	2° 29'.7 S	171° 38'.4	4° 34'.5 N	350° 44'.1	3° 10'.1 S
01	200° 06'.6	226° 54'.3	47'.8	203° 25'.7	28'.9	186° 40'.4	34'.7	5° 46'.7	10'.0
02	215° 09'.1	241° 53'.9	46'.9	218° 26'.3	28'.1	201° 42'.3	35'.0	20° 49'.3	09'.9
03	230° 11'.5	256° 53'.5	45'.9	233° 27'.0	27'.3	216° 44'.2	35'.2	35° 52'.0	09'.9
04	245° 14'.0	271° 53'.0	44'.9	248° 27'.7	26'.5	231° 46'.1	35'.5	50° 54'.6	09'.8
05	260° 16'.5	286° 52'.6	44'.0	263° 28'.3	25'.7	246° 48'.0	35'.7	65° 57'.3	09'.7
06	275° 18'.9	301° 52'.1	43'.0	278° 29'.0	24'.9	261° 49'.9	35'.9	80° 59'.9	09'.6
07	290° 21'.4	316° 51'.7	42'.1	293° 29'.7	24'.1	276° 51'.8	36'.2	96° 02'.5	09'.5
08	305° 23'.9	331° 51'.2	41'.1	308° 30'.4	23'.4	291° 53'.7	36'.4	111° 05'.2	09'.5
09	320° 26'.3	346° 50'.8	40'.2	323° 31'.0	22'.6	306° 55'.6	36'.6	126° 07'.8	09'.4
10	335° 28'.8	1° 50'.3	39'.2	338° 31'.7	21'.8	321° 57'.5	36'.9	141° 10'.5	09'.3
11	350° 31'.2	16° 49'.9	38'.2	353° 32'.4	21'.0	336° 59'.4	37'.1	156° 13'.1	09'.2
12	5° 33'.7	31° 49'.4	11° 37'.3 S	8° 33'.1	2° 20'.2 S	352° 01'.3	4° 37'.3 N	171° 15'.7	3° 09'.2 S
13	20° 36'.2	46° 49'.0	36'.3	23° 33'.7	19'.4	7° 03'.2	37'.6	186° 18'.4	09'.1
14	35° 38'.6	61° 48'.6	35'.4	38° 34'.4	18'.6	22° 05'.1	37'.8	201° 21'.0	09'.0
15	50° 41'.1	76° 48'.1	34'.4	53° 35'.1	17'.8	37° 07'.0	38'.0	216° 23'.7	08'.9
16	65° 43'.6	91° 47'.7	33'.4	68° 35'.8	17'.0	52° 09'.0	38'.3	231° 26'.3	08'.9
17	80° 46'.0	106° 47'.2	32'.5	83° 36'.4	16'.3	67° 10'.9	38'.5	246° 28'.9	08'.8
18	95° 48'.5	121° 46'.8	31'.5	98° 37'.1	15'.5	82° 12'.8	38'.7	261° 31'.6	08'.7
19	110° 51'.0	136° 46'.3	30'.6	113° 37'.8	14'.7	97° 14'.7	39'.0	276° 34'.2	08'.6
20	125° 53'.4	151° 45'.9	29'.6	128° 38'.5	13'.9	112° 16'.6	39'.2	291° 36'.9	08'.6
21	140° 55'.9	166° 45'.5	28'.6	143° 39'.1	13'.1	127° 18'.5	39'.4	306° 39'.5	08'.5
22	155° 58'.4	181° 45'.0	27'.7	158° 39'.8	12'.3	142° 20'.4	39'.7	321° 42'.2	08'.4
23	171° 00'.8	196° 44'.6	26'.7	173° 40'.5	11'.5	157° 22'.3	39'.9	336° 44'.8	08'.3
	M.P. 11:38	v -0'.5	d 0'.9	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.8 S
Achernar	335° 28'.4	57° 10'.8 S
Acrux	173° 10'.6	63° 09'.8 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 46'.0	46° 54'.2 S
Alnilam	275° 48'.0	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.1	26° 40'.3 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.9	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.2 N
Atria	107° 31'.1	69° 02'.6 S
Avior	234° 18'.4	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 56'.9	52° 42'.5 S
Capella	280° 36'.9	46° 00'.6 N
Deneb	49° 32'.9	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 46'.8	51° 28'.9 N
Enif	33° 48'.9	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.7 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.7	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.9	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.6	69° 46'.2 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.3	26° 16'.9 S
Peacock	53° 21'.9	56° 41'.7 S
Polaris	318° 55'.9	89° 19'.0 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.8	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.4	60° 52'.8 S
Sabik	102° 14'.3	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.0	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.0 S
Vega	80° 40'.1	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	28° 00'.6	09:52
Mars	4° 03'.8	11:27
Jupiter	346° 47'.7	12:35
Saturn	165° 35'.7	00:41

SUN

GHA	Dec
178° 31'.3	1° 58'.9 N
193° 31'.5	59'.9
208° 31'.7	2° 00'.8 N
223° 31'.9	01'.8
238° 32'.1	02'.8
253° 32'.3	03'.8
268° 32'.5	04'.8
283° 32'.6	05'.8
298° 32'.8	06'.7
313° 33'.0	07'.7
328° 33'.2	08'.7
343° 33'.4	09'.7
358° 33'.6	2° 10'.7 N
13° 33'.8	11'.6
28° 34'.0	12'.6
43° 34'.2	13'.6
58° 34'.3	14'.6
73° 34'.5	15'.6
88° 34'.7	16'.6
103° 34'.9	17'.5
118° 35'.1	18'.5
133° 35'.3	19'.5
148° 35'.5	20'.5
163° 35'.7	21'.5
178° 35'.9	2° 22'.4 N
193° 36'.0	23'.4
208° 36'.2	24'.4
223° 36'.4	25'.4
238° 36'.6	26'.4
253° 36'.8	27'.3
268° 37'.0	28'.3
283° 37'.2	29'.3
298° 37'.4	30'.3
313° 37'.6	31'.3
328° 37'.7	32'.2
343° 37'.9	33'.2
358° 38'.1	2° 34'.2 N
13° 38'.3	35'.2
28° 38'.5	36'.2
43° 38'.7	37'.1
58° 38'.9	38'.1
73° 39'.1	39'.1
88° 39'.3	40'.1
103° 39'.4	41'.0
118° 39'.6	42'.0
133° 39'.8	43'.0
148° 40'.0	44'.0
163° 40'.2	45'.0
178° 40'.4	2° 45'.9 N
193° 40'.6	46'.9
208° 40'.8	47'.9
223° 41'.0	48'.9
238° 41'.1	49'.8
253° 41'.3	50'.8
268° 41'.5	51'.8
283° 41'.7	52'.8
298° 41'.9	53'.8
313° 42'.1	54'.7
328° 42'.3	55'.7
343° 42'.5	56'.7
358° 42'.6	2° 57'.7 N
13° 42'.8	58'.6
28° 43'.0	59'.6
43° 43'.2	3° 00'.6 N
58° 43'.4	01'.6
73° 43'.6	02'.6
88° 43'.8	03'.5
103° 44'.0	04'.5
118° 44'.2	05'.5
133° 44'.3	06'.5
148° 44'.5	07'.4
163° 44'.7	08'.4

SD 16'.0 d 1'.0

MOON

GHA	v	Dec	d	HP
274° 15'.3	7'.9	23° 17'.8 S	2'.7	57'.1
288° 42'.2	7'.9	15'.1	2'.8	
303° 09'.1	8'.1	12'.3	2'.9	57'.0
317° 36'.2	8'.1	09'.4	3'.1	
332° 03'.3	8'.2	06'.3	3'.2	
346° 30'.5	8'.3	03'.1	3'.3	56'.9
0° 57'.8	8'.3	22° 59'.8 S	3'.5	
15° 25'.1	8'.4	56'.3	3'.6	
29° 52'.5	8'.5	52'.7	3'.6	56'.8
44° 20'.0	8'.6	49'.1	3'.9	
58° 47'.6	8'.6	45'.2	3'.9	56'.7
73° 15'.2	8'.7	41'.3	4'.1	
87° 42'.9	8'.8	22° 37'.2 S	4'.1	56'.7
102° 10'.7	8'.9	33'.1	4'.3	56'.6
116° 38'.6	9'.0	28'.8	4'.4	
131° 06'.6	9'.0	24'.4	4'.6	
145° 34'.6	9'.1	19'.8	4'.6	56'.5
160° 02'.7	9'.2	15'.2	4'.8	
174° 30'.9	9'.3	10'.4	4'.8	
188° 59'.2	9'.3	05'.6	5'.0	56'.4
203° 27'.5	9'.5	00'.6	5'.1	
217° 56'.0	9'.5	21° 55'.5 S	5'.2	
232° 24'.5	9'.6	50'.3	5'.4	56'.3
246° 53'.1	9'.7	44'.9	5'.4	
261° 21'.8	9'.7	21° 39'.5 S	5'.5	56'.3
275° 50'.5	9'.9	34'.0	5'.6	56'.2
290° 19'.4	9'.9	28'.4	5'.8	
304° 48'.3	10'.0	22'.6	5'.8	
319° 17'.3	10'.1	16'.8	6'.0	56'.1
333° 46'.4	10'.1	10'.8	6'.0	
348° 15'.5	10'.3	04'.8	6'.2	
2° 44'.8	10'.3	20° 58'.6 S	6'.2	56'.0
17° 14'.1	10'.4	52'.4	6'.4	
31° 43'.5	10'.5	46'.0	6'.4	
46° 13'.0	10'.6	39'.6	6'.6	
60° 42'.6	10'.6	33'.0	6'.6	55'.9
75° 12'.2	10'.8	20° 26'.4 S	6'.8	55'.9
89° 42'.0	10'.8	19'.6	6'.8	
104° 11'.8	10'.9	12'.8	6'.9	55'.8
118° 41'.7	11'.0	05'.9	7'.1	
133° 11'.7	11'.0	19° 58'.8 S	7'.1	
147° 41'.7	11'.2	51'.7	7'.2	55'.7
162° 11'.9	11'.2	44'.5	7'.3	
176° 42'.1	11'.3	37'.2	7'.3	
191° 12'.4	11'.4	29'.9	7'.5	
205° 42'.8	11'.5	22'.4	7'.6	55'.6
220° 13'.3	11'.5	14'.8	7'.6	
234° 43'.8	11'.6	07'.2	7'.7	
249° 14'.4	11'.7	18° 59'.5 S	7'.8	55'.6
263° 45'.1	11'.8	51'.7	7'.9	55'.5
278° 15'.9	11'.9	43'.8	8'.0	
292° 46'.8	11'.9	35'.8	8'.0	
307° 17'.7	12'.0	27'.8	8'.1	55'.4
321° 48'.7	12'.1	19'.7	8'.2	
336° 19'.8	12'.2	11'.5	8'.3	
350° 51'.0	12'.2	03'.2	8'.4	
5° 22'.2	12'.4	17° 54'.8 S	8'.4	55'.3
19° 53'.6	12'.4	46'.4	8'.5	
34° 25'.0	12'.4	37'.9	8'.6	
48° 56'.4	12'.6	29'.3	8'.7	
63° 28'.0	12'.6	17° 20'.6 S	8'.7	55'.2
77° 59'.6	12'.7	11'.9	8'.8	
92° 31'.3	12'.8	03'.1	8'.9	
107° 03'.1	12'.8	16° 54'.2 S	8'.9	
121° 34'.9	12'.9	45'.3	9'.0	55'.1
136° 06'.8	13'.0	36'.3	9'.1	
150° 38'.8	13'.1	27'.2	9'.1	
165° 10'.9	13'.1	18'.1	9'.2	
179° 43'.0	13'.2	08'.9	9'.3	
194° 15'.2	13'.2	15° 59'.6 S	9'.3	55'.0
208° 47'.4	13'.4	50'.3	9'.4	
223° 19'.8	13'.4	40'.9	9'.4	

SD 15'.4 15'.2 15'.1

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 26	Moonrise 27	Moonrise 28
N 72°	02:32	04:13	05:24	-	-	-
N 70°	03:00	04:25	05:29	-	-	05:56
68°	03:20	04:35	05:32	-	05:42	05:15
66°	03:36	04:43	05:35	04:50	04:49	04:47
64°	03:49	04:49	05:38	03:58	04:17	04:25
62°	03:59	04:55	05:40	03:26	03:53	04:08
60°	04:08	05:00	05:42	03:02	03:33	03:53
N 58°	04:16	05:04	05:43	02:43	03:17	03:41
56°	04:22	05:07	05:45	02:27	03:04	03:30
54°	04:28	05:11	05:46	02:14	02:52	03:20
52°	04:33	05:14	05:47	02:02	02:42	03:12
50°	04:38	05:16	05:49	01:51	02:32	03:04
45°	04:47	05:22	05:51	01:29	02:12	02:48
N 40°	04:54	05:26	05:53	01:11	01:56	02:34
35°	05:00	05:29	05:55	00:56	01:43	02:23
30°	05:04	05:32	05:56	00:43	01:31	02:13
20°	05:11	05:36	05:58	00:20	01:11	01:56
N 10°	05:15	05:39	06:00	00:01	00:53	01:41
0°	05:18	05:42	06:02	-	00:36	01:26
S 10°	05:19	05:43	06:04	-	00:20	01:12
20°	05:18	05:44	06:06	-	00:02	00:57
30°	05:16	05:44	06:07	23:41	-	00:39
35°	05:14	05:43	06:08	23:29	-	00:29
40°	05:11	05:42	06:09	23:16	-	00:17
45°	05:07	05:41	06:11	22:59	-	00:03
S 50°	05:02	05:40	06:12	22:39	23:46	24:54
52°	05:00	05:39	06:13	22:29	23:38	24:48
54°	04:57	05:38	06:14	22:18	23:29	24:41
56°	04:54	05:37	06:14	22:06	23:19	24:34
58°	04:50	05:36	06:15	21:52	23:08	24:25
S 60°	04:46	05:35	06:16	21:35	22:54	24:15
S 62°	04:40	05:33	06:17	21:14	22:38	24:04

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 26	Moonset 27	Moonset 28
N 72°	18:49	20:01	21:46	-	-	-
N 70°	18:45	19:49	21:16	-	-	09:34
68°	18:41	19:39	20:55	-	08:05	10:14
66°	18:38	19:30	20:38	07:07	08:57	10:41
64°	18:35	19:24	20:25	07:58	09:29	11:02
62°	18:33	19:18	20:14	08:30	09:53	11:19
60°	18:31	19:13	20:05	08:54	10:11	11:33
N 58°	18:29	19:09	19:57	09:13	10:27	11:44
56°	18:27	19:05	19:50	09:28	10:40	11:55
54°	18:26	19:02	19:44	09:42	10:52	12:04
52°	18:25	18:59	19:39	09:54	11:02	12:12
50°	18:23	18:56	19:35	10:04	11:11	12:19
45°	18:21	18:50	19:25	10:26	11:30	12:34
N 40°	18:19	18:46	19:18	10:43	11:45	12:47
35°	18:17	18:42	19:12	10:58	11:58	12:57
30°	18:15	18:39	19:07	11:11	12:09	13:07
20°	18:13	18:35	19:01	11:33	12:29	13:22
N 10°	18:11	18:32	18:56	11:51	12:45	13:36
0°	18:09	18:29	18:53	12:09	13:01	13:49
S 10°	18:07	18:28	18:52	12:26	13:16	14:02
20°	18:05	18:27	18:53	12:45	13:33	14:16
30°	18:03	18:27	18:55	13:06	13:52	14:31
35°	18:02	18:27	18:57	13:19	14:02	14:40
40°	18:01	18:28	18:59	13:33	14:15	14:50
45°	17:59	18:29	19:03	13:50	14:30	15:02
S 50°	17:58	18:30	19:08	14:11	14:48	15:16
52°	17:57	18:31	19:10	14:21	14:56	15:23
54°	17:56	18:31	19:13	14:32	15:05	15:30
56°	17:56	18:32	19:16	14:45	15:16	15:39
58°	17:55	18:34	19:19	14:59	15:28	15:48
S 60°	17:54	18:35	19:24	15:17	15:42	15:58
S 62°	17:52	18:36	19:29	15:38	15:58	16:11

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
26	5 55	5 46	12:06	05:56	18:23	22d 50%
27	5 37	5 28	12:05	06:49	19:14	23d 40%
28	5 19	5 10	12:05	07:38	20:01	24d 31%

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2011 March 29, 30, 31 (Tue, Wed, Thur)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
29 Tuesday 00	186° 03'.3	211° 44'.1	11° 25'.7 S	188° 41'.2	2° 10'.7 S	172° 24'.2	4° 40'.1 N	351° 47'.4	3° 08'.2 S
01	201° 05'.7	226° 43'.7	24'.8	203° 41'.8	09'.9	187° 26'.1	40'.4	6° 50'.1	08'.2
02	216° 08'.2	241° 43'.3	23'.8	218° 42'.5	09'.2	202° 28'.0	40'.6	21° 52'.7	08'.1
03	231° 10'.7	256° 42'.8	22'.8	233° 43'.2	08'.4	217° 29'.9	40'.8	36° 55'.4	08'.0
04	246° 13'.1	271° 42'.4	21'.9	248° 43'.9	07'.6	232° 31'.8	41'.1	51° 58'.0	07'.9
05	261° 15'.6	286° 41'.9	20'.9	263° 44'.5	06'.8	247° 33'.7	41'.3	67° 00'.6	07'.9
06	276° 18'.1	301° 41'.5	19'.9	278° 45'.2	06'.0	262° 35'.6	41'.5	82° 03'.3	07'.8
07	291° 20'.5	316° 41'.1	19'.0	293° 45'.9	05'.2	277° 37'.5	41'.8	97° 05'.9	07'.7
08	306° 23'.0	331° 40'.6	18'.0	308° 46'.6	04'.4	292° 39'.5	42'.0	112° 08'.6	07'.6
09	321° 25'.5	346° 40'.2	17'.0	323° 47'.2	03'.6	307° 41'.4	42'.3	127° 11'.2	07'.6
10	336° 27'.9	1° 39'.8	16'.0	338° 47'.9	02'.8	322° 43'.3	42'.5	142° 13'.8	07'.5
11	351° 30'.4	16° 39'.3	15'.1	353° 48'.6	02'.1	337° 45'.2	42'.7	157° 16'.5	07'.4
12	6° 32'.8	31° 38'.9	11° 14'.1 S	8° 49'.3	2° 01'.3 S	352° 47'.1	4° 43'.0 N	172° 19'.1	3° 07'.3 S
13	21° 35'.3	46° 38'.4	13'.1	23° 49'.9	00'.5	7° 49'.0	43'.2	187° 21'.8	07'.3
14	36° 37'.8	61° 38'.0	12'.2	38° 50'.6	1° 59'.7 S	22° 50'.9	43'.4	202° 24'.4	07'.2
15	51° 40'.2	76° 37'.6	11'.2	53° 51'.3	58'.9	37° 52'.8	43'.7	217° 27'.1	07'.1
16	66° 42'.7	91° 37'.1	10'.2	68° 52'.0	58'.1	52° 54'.7	43'.9	232° 29'.7	07'.0
17	81° 45'.2	106° 36'.7	09'.2	83° 52'.7	57'.3	67° 56'.6	44'.1	247° 32'.3	06'.9
18	96° 47'.6	121° 36'.3	08'.3	98° 53'.3	56'.5	82° 58'.5	44'.4	262° 35'.0	06'.9
19	111° 50'.1	136° 35'.8	07'.3	113° 54'.0	55'.7	98° 00'.4	44'.6	277° 37'.6	06'.8
20	126° 52'.6	151° 35'.4	06'.3	128° 54'.7	55'.0	113° 02'.3	44'.8	292° 40'.3	06'.7
21	141° 55'.0	166° 35'.0	05'.3	143° 55'.4	54'.2	128° 04'.2	45'.1	307° 42'.9	06'.6
22	156° 57'.5	181° 34'.5	04'.3	158° 56'.0	53'.4	143° 06'.1	45'.3	322° 45'.5	06'.6
23	172° 00'.0	196° 34'.1	03'.4	173° 56'.7	52'.6	158° 08'.0	45'.5	337° 48'.2	06'.5
30 Wednesday 00	187° 02'.4	211° 33'.7	11° 02'.4 S	188° 57'.4	1° 51'.8 S	173° 10'.0	4° 45'.8 N	352° 50'.8	3° 06'.4 S
01	202° 04'.9	226° 33'.2	01'.4	203° 58'.1	51'.0	188° 11'.9	46'.0	7° 53'.5	06'.3
02	217° 07'.3	241° 32'.8	00'.4	218° 58'.7	50'.2	203° 13'.8	46'.2	22° 56'.1	06'.3
03	232° 09'.8	256° 32'.4	10° 59'.4 S	233° 59'.4	49'.4	218° 15'.7	46'.5	37° 58'.8	06'.2
04	247° 12'.3	271° 31'.9	58'.5	249° 00'.1	48'.6	233° 17'.6	46'.7	53° 01'.4	06'.1
05	262° 14'.7	286° 31'.5	57'.5	264° 00'.8	47'.9	248° 19'.5	46'.9	68° 04'.0	06'.0
06	277° 17'.2	301° 31'.1	56'.5	279° 01'.5	47'.1	263° 21'.4	47'.2	83° 06'.7	06'.0
07	292° 19'.7	316° 30'.6	55'.5	294° 02'.1	46'.3	278° 23'.3	47'.4	98° 09'.3	05'.9
08	307° 22'.1	331° 30'.2	54'.5	309° 02'.8	45'.5	293° 25'.2	47'.6	113° 12'.0	05'.8
09	322° 24'.6	346° 29'.8	53'.5	324° 03'.5	44'.7	308° 27'.1	47'.9	128° 14'.6	05'.7
10	337° 27'.1	1° 29'.4	52'.6	339° 04'.2	43'.9	323° 29'.0	48'.1	143° 17'.2	05'.6
11	352° 29'.5	16° 28'.9	51'.6	354° 04'.8	43'.1	338° 30'.9	48'.3	158° 19'.9	05'.6
12	7° 32'.0	31° 28'.5	10° 50'.6 S	9° 05'.5	1° 42'.3 S	353° 32'.8	4° 48'.6 N	173° 22'.5	3° 05'.5 S
13	22° 34'.4	46° 28'.1	49'.6	24° 06'.2	41'.5	8° 34'.7	48'.8	188° 25'.2	05'.4
14	37° 36'.9	61° 27'.6	48'.6	39° 06'.9	40'.8	23° 36'.6	49'.0	203° 27'.8	05'.3
15	52° 39'.4	76° 27'.2	47'.6	54° 07'.6	40'.0	38° 38'.5	49'.3	218° 30'.5	05'.3
16	67° 41'.8	91° 26'.8	46'.6	69° 08'.2	39'.2	53° 40'.4	49'.5	233° 33'.1	05'.2
17	82° 44'.3	106° 26'.4	45'.7	84° 08'.9	38'.4	68° 42'.3	49'.7	248° 35'.7	05'.1
18	97° 46'.8	121° 25'.9	44'.7	99° 09'.6	37'.6	83° 44'.2	50'.0	263° 38'.4	05'.0
19	112° 49'.2	136° 25'.5	43'.7	114° 10'.3	36'.8	98° 46'.2	50'.2	278° 41'.0	05'.0
20	127° 51'.7	151° 25'.1	42'.7	129° 10'.9	36'.0	113° 48'.1	50'.5	293° 43'.7	04'.9
21	142° 54'.2	166° 24'.6	41'.7	144° 11'.6	35'.2	128° 50'.0	50'.7	308° 46'.3	04'.8
22	157° 56'.6	181° 24'.2	40'.7	159° 12'.3	34'.4	143° 51'.9	50'.9	323° 48'.9	04'.7
23	172° 59'.1	196° 23'.8	39'.7	174° 13'.0	33'.7	158° 53'.8	51'.2	338° 51'.6	04'.7
31 Thursday 00	188° 01'.6	211° 23'.4	10° 38'.7 S	189° 13'.7	1° 32'.9 S	173° 55'.7	4° 51'.4 N	353° 54'.2	3° 04'.6 S
01	203° 04'.0	226° 22'.9	37'.7	204° 14'.3	32'.1	188° 57'.6	51'.6	8° 56'.9	04'.5
02	218° 06'.5	241° 22'.5	36'.7	219° 15'.0	31'.3	203° 59'.5	51'.9	23° 59'.5	04'.4
03	233° 08'.9	256° 22'.1	35'.7	234° 15'.7	30'.5	219° 01'.4	52'.1	39° 02'.2	04'.3
04	248° 11'.4	271° 21'.7	34'.7	249° 16'.4	29'.7	234° 03'.3	52'.3	54° 04'.8	04'.3
05	263° 13'.9	286° 21'.2	33'.8	264° 17'.0	28'.9	249° 05'.2	52'.6	69° 07'.4	04'.2
06	278° 16'.3	301° 20'.8	32'.8	279° 17'.7	28'.1	264° 07'.1	52'.8	84° 10'.1	04'.1
07	293° 18'.8	316° 20'.4	31'.8	294° 18'.4	27'.3	279° 09'.0	53'.0	99° 12'.7	04'.0
08	308° 21'.3	331° 20'.0	30'.8	309° 19'.1	26'.6	294° 10'.9	53'.3	114° 15'.4	04'.0
09	323° 23'.7	346° 19'.5	29'.8	324° 19'.8	25'.8	309° 12'.8	53'.5	129° 18'.0	03'.9
10	338° 26'.2	1° 19'.1	28'.8	339° 20'.4	25'.0	324° 14'.7	53'.7	144° 20'.7	03'.8
11	353° 28'.7	16° 18'.7	27'.8	354° 21'.1	24'.2	339° 16'.6	54'.0	159° 23'.3	03'.7
12	8° 31'.1	31° 18'.3	10° 26'.8 S	9° 21'.8	1° 23'.4 S	354° 18'.5	4° 54'.2 N	174° 25'.9	3° 03'.7 S
13	23° 33'.6	46° 17'.9	25'.8	24° 22'.5	22'.6	9° 20'.4	54'.4	189° 28'.6	03'.6
14	38° 36'.1	61° 17'.4	24'.8	39° 23'.2	21'.8	24° 22'.4	54'.7	204° 31'.2	03'.5
15	53° 38'.5	76° 17'.0	23'.8	54° 23'.8	21'.0	39° 24'.3	54'.9	219° 33'.9	03'.4
16	68° 41'.0	91° 16'.6	22'.8	69° 24'.5	20'.2	54° 26'.2	55'.1	234° 36'.5	03'.4
17	83° 43'.4	106° 16'.2	21'.8	84° 25'.2	19'.5	69° 28'.1	55'.4	249° 39'.1	03'.3
18	98° 45'.9	121° 15'.8	20'.8	99° 25'.9	18'.7	84° 30'.0	55'.6	264° 41'.8	03'.2
19	113° 48'.4	136° 15'.3	19'.8	114° 26'.6	17'.9	99° 31'.9	55'.8	279° 44'.4	03'.1
20	128° 50'.8	151° 14'.9	18'.8	129° 27'.2	17'.1	114° 33'.8	56'.1	294° 47'.1	03'.0
21	143° 53'.3	166° 14'.5	17'.8	144° 27'.9	16'.3	129° 35'.7	56'.3	309° 49'.7	03'.0
22	158° 55'.8	181° 14'.1	16'.8	159° 28'.6	15'.5	144° 37'.6	56'.5	324° 52'.4	02'.9
23	173° 58'.2	196° 13'.7	15'.8	174° 29'.3	14'.7	159° 39'.5	56'.8	339° 55'.0	02'.8
	M.P. 11:26	v -0'.4	d 1'.0	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.8 S
Acrux	173° 10'.6	63° 09'.9 S
Adhara	255° 13'.7	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 46'.0	46° 54'.2 S
Alnilam	275° 48'.1	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.1	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.9	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 31'.1	69° 02'.6 S
Avior	234° 18'.5	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 56'.9	52° 42'.5 S
Capella	280° 37'.0	46° 00'.6 N
Deneb	49° 32'.8	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.3 N
Elnath	278° 14'.7	28° 37'.0 N
Eltanin	90° 46'.8	51° 28'.9 N
Enif	33° 48'.9	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.7	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.9	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.6	69° 46'.2 S
Mirfak	308° 43'.0	49° 54'.2 N
Nunki	76° 00'.3	26° 16'.9 S
Peacock	53° 21'.9	56° 41'.7 S
Polaris	318° 56'.6	89° 19'.0 N
Pollux	243° 29'.5	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.8	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.4	60° 52'.8 S
Sabik	102° 14'.2	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 24'.0	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.0 S
Vega	80° 40'.0	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	24° 31'.3	09:54
Mars	1° 55'.0	11:24
Jupiter	346° 07'.5	12:26
Saturn	165° 48'.4	00:29

SUN

GHA	Dec
178° 44'.9	3° 09'.4 N
193° 45'.1	10'.4
208° 45'.3	11'.3
223° 45'.5	12'.3
238° 45'.7	13'.3
253° 45'.8	14'.3
268° 46'.0	15'.2
283° 46'.2	16'.2
298° 46'.4	17'.2
313° 46'.6	18'.2
328° 46'.8	19'.1
343° 47'.0	20'.1
358° 47'.2	3° 21'.1 N
13° 47'.3	22'.1
28° 47'.5	23'.0
43° 47'.7	24'.0
58° 47'.9	25'.0
73° 48'.1	26'.0
88° 48'.3	26'.9
103° 48'.5	27'.9
118° 48'.7	28'.9
133° 48'.9	29'.9
148° 49'.0	30'.8
163° 49'.2	31'.8
178° 49'.4	3° 32'.8 N
193° 49'.6	33'.7
208° 49'.8	34'.7
223° 50'.0	35'.7
238° 50'.2	36'.7
253° 50'.4	37'.6
268° 50'.5	38'.6
283° 50'.7	39'.6
298° 50'.9	40'.6
313° 51'.1	41'.5
328° 51'.3	42'.5
343° 51'.5	43'.5
358° 51'.7	3° 44'.4 N
13° 51'.8	45'.4
28° 52'.0	46'.4
43° 52'.2	47'.4
58° 52'.4	48'.3
73° 52'.6	49'.3
88° 52'.8	50'.3
103° 53'.0	51'.2
118° 53'.2	52'.2
133° 53'.3	53'.2
148° 53'.5	54'.2
163° 53'.7	55'.1
178° 53'.9	3° 56'.1 N
193° 54'.1	57'.1
208° 54'.3	58'.0
223° 54'.5	59'.0
238° 54'.6	00'.0
253° 54'.8	4° 00'.9 N
268° 55'.0	01'.9
283° 55'.2	02'.9
298° 55'.4	03'.9
313° 55'.6	04'.8
328° 55'.8	05'.8
343° 56'.0	06'.8
358° 56'.1	4° 07'.7 N
13° 56'.3	08'.7
28° 56'.5	09'.7
43° 56'.7	10'.6
58° 56'.9	11'.6
73° 57'.1	12'.6
88° 57'.3	13'.5
103° 57'.4	14'.5
118° 57'.6	15'.5
133° 57'.8	16'.4
148° 58'.0	17'.4
163° 58'.2	18'.4
SD 16'.0	d 1'.0

MOON

GHA	v	Dec	d	HP
237° 52'.2	13'.4	15° 31'.5 S	9'.6	55'.0
252° 24'.6	13'.6	21'.9	9'.5	54'.9
266° 57'.2	13'.6	12'.4	9'.7	
281° 29'.8	13'.6	02'.7	9'.7	
296° 02'.4	13'.8	14° 53'.0 S	9'.7	
310° 35'.2	13'.7	43'.3	9'.8	
325° 07'.9	13'.9	33'.5	9'.9	54'.8
339° 40'.8	13'.9	23'.6	9'.9	
354° 13'.7	14'.0	13'.7	10'.0	
8° 46'.7	14'.0	03'.7	10'.0	
23° 19'.7	14'.1	13° 53'.7 S	10'.0	
37° 52'.8	14'.2	43'.7	10'.2	54'.7
52° 26'.0	14'.2	13° 33'.5 S	10'.2	54'.7
66° 59'.2	14'.3	23'.3	10'.2	
81° 32'.5	14'.3	13'.1	10'.3	
96° 05'.8	14'.4	02'.8	10'.3	
110° 39'.2	14'.5	12° 52'.5 S	10'.3	
125° 12'.7	14'.5	42'.2	10'.5	54'.6
139° 46'.2	14'.5	31'.7	10'.4	
154° 19'.7	14'.7	21'.3	10'.5	
168° 53'.4	14'.6	10'.8	10'.6	
183° 27'.0	14'.7	00'.2	10'.6	
198° 00'.7	14'.8	11° 49'.6 S	10'.6	
212° 34'.5	14'.8	39'.0	10'.7	54'.5
227° 08'.3	14'.9	11° 28'.3 S	10'.7	54'.5
241° 42'.2	14'.9	17'.6	10'.8	
256° 16'.1	15'.0	06'.8	10'.8	
270° 50'.1	15'.0	10° 56'.0 S	10'.8	
285° 24'.1	15'.1	45'.2	10'.9	
299° 58'.2	15'.1	34'.3	10'.9	54'.4
314° 32'.3	15'.1	23'.4	10'.9	
329° 06'.4	15'.3	12'.5	11'.0	
343° 40'.7	15'.2	01'.5	11'.0	
358° 14'.9	15'.3	9° 50'.5 S	11'.1	
12° 49'.2	15'.3	39'.4	11'.1	
27° 23'.5	15'.4	28'.3	11'.1	
41° 57'.9	15'.4	9° 17'.2 S	11'.1	54'.3
56° 32'.3	15'.4	06'.1	11'.2	
71° 06'.7	15'.5	8° 54'.9 S	11'.2	
85° 41'.2	15'.6	43'.7	11'.3	
100° 15'.8	15'.5	32'.4	11'.3	
114° 50'.3	15'.6	21'.1	11'.3	
129° 24'.9	15'.7	09'.8	11'.3	
143° 59'.6	15'.6	7° 58'.5 S	11'.3	
158° 34'.2	15'.8	47'.2	11'.4	
173° 09'.0	15'.7	35'.8	11'.4	54'.2
187° 43'.7	15'.8	24'.4	11'.4	
202° 18'.5	15'.8	13'.0	11'.5	
216° 53'.3	15'.8	7° 01'.5 S	11'.5	54'.2
231° 28'.1	15'.9	6° 50'.0 S	11'.5	
246° 03'.0	15'.9	38'.5	11'.5	
260° 37'.9	15'.9	27'.0	11'.5	
275° 12'.8	15'.9	15'.5	11'.6	
289° 47'.7	16'.0	03'.9	11'.6	
304° 22'.7	16'.0	5° 52'.3 S	11'.6	54'.1
318° 57'.7	16'.1	40'.7	11'.6	
333° 32'.8	16'.0	29'.1	11'.6	
348° 07'.8	16'.1	17'.5	11'.7	
2° 42'.9	16'.1	05'.8	11'.7	
17° 18'.0	16'.1	4° 54'.1 S	11'.6	
31° 53'.1	16'.1	4° 42'.5 S	11'.7	54'.1
46° 28'.2	16'.2	30'.8	11'.8	
61° 03'.4	16'.2	19'.0	11'.7	
75° 38'.6	16'.2	07'.3	11'.7	
90° 13'.8	16'.2	3° 55'.6 S	11'.8	
104° 49'.0	16'.2	43'.8	11'.7	
119° 24'.2	16'.3	32'.1	11'.8	
133° 59'.5	16'.3	20'.3	11'.8	54'.0
148° 34'.8	16'.2	08'.5	11'.8	
163° 10'.0	16'.3	2° 56'.7 S	11'.8	
177° 45'.3	16'.4	44'.9	11'.8	
192° 20'.7	16'.3	33'.1	11'.8	
SD	14'.9	14'.8	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 29	Moonrise 30	Moonrise 31
N 72°	02:04	03:56	05:09	05:54	05:21	04:58
N 70°	02:39	04:10	05:15	05:24	05:05	04:50
68°	03:03	04:21	05:19	05:01	04:51	04:43
66°	03:21	04:30	05:24	04:44	04:40	04:37
64°	03:36	04:38	05:27	04:29	04:31	04:32
62°	03:48	04:45	05:30	04:17	04:23	04:28
60°	03:58	04:50	05:33	04:06	04:16	04:24
N 58°	04:06	04:55	05:35	03:57	04:10	04:20
56°	04:14	04:59	05:37	03:49	04:05	04:17
54°	04:20	05:03	05:39	03:42	04:00	04:15
52°	04:25	05:06	05:41	03:36	03:55	04:12
50°	04:30	05:09	05:42	03:30	03:51	04:10
45°	04:41	05:16	05:45	03:17	03:42	04:05
N 40°	04:49	05:21	05:48	03:07	03:35	04:01
35°	04:55	05:25	05:50	02:58	03:29	03:57
30°	05:00	05:28	05:52	02:50	03:23	03:54
20°	05:08	05:34	05:56	02:36	03:14	03:48
N 10°	05:13	05:38	05:59	02:24	03:05	03:44
0°	05:17	05:41	06:01	02:13	02:57	03:39
S 10°	05:18	05:43	06:04	02:02	02:49	03:34
20°	05:19	05:44	06:06	01:50	02:40	03:29
30°	05:18	05:45	06:09	01:36	02:30	03:24
35°	05:16	05:46	06:11	01:28	02:25	03:21
40°	05:14	05:46	06:13	01:18	02:18	03:17
45°	05:11	05:45	06:15	01:07	02:11	03:13
S 50°	05:07	05:45	06:17	00:54	02:01	03:07
52°	05:05	05:44	06:18	00:48	01:57	03:05
54°	05:03	05:44	06:19	00:41	01:53	03:02
56°	05:00	05:43	06:20	00:34	01:47	03:00
58°	04:57	05:43	06:22	00:25	01:41	02:56
S 60°	04:53	05:42	06:23	00:15	01:35	02:53
S 62°	04:49	05:41	06:25	00:04	01:27	02:49

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 29	Moonset 30	Moonset 31
N 72°	19:03	20:17	22:13	11:13	13:15	15:05
N 70°	18:57	20:02	21:36	11:41	13:30	15:11
68°	18:52	19:51	21:10	12:03	13:42	15:16
66°	18:48	19:41	20:51	12:19	13:52	15:20
64°	18:44	19:33	20:36	12:33	14:00	15:24
62°	18:41	19:26	20:24	12:44	14:06	15:27
60°	18:38	19:21	20:14	12:53	14:12	15:30
N 58°	18:36	19:16	20:05	13:02	14:18	15:32
56°	18:33	19:11	19:57	13:09	14:22	15:34
54°	18:31	19:07	19:51	13:16	14:26	15:36
52°	18:30	19:04	19:45	13:21	14:30	15:37
50°	18:28	19:01	19:40	13:27	14:33	15:39
45°	18:25	18:54	19:29	13:38	14:41	15:42
N 40°	18:22	18:49	19:21	13:47	14:47	15:45
35°	18:19	18:45	19:15	13:55	14:52	15:47
30°	18:17	18:41	19:09	14:02	14:56	15:49
20°	18:14	18:36	19:02	14:14	15:04	15:53
N 10°	18:11	18:32	18:56	14:25	15:11	15:56
0°	18:08	18:29	18:53	14:34	15:17	15:59
S 10°	18:05	18:26	18:51	14:44	15:24	16:02
20°	18:02	18:24	18:50	14:54	15:30	16:05
30°	17:59	18:23	18:51	15:06	15:38	16:08
35°	17:58	18:23	18:52	15:13	15:42	16:10
40°	17:56	18:23	18:54	15:20	15:47	16:12
45°	17:54	18:23	18:57	15:29	15:53	16:15
S 50°	17:51	18:24	19:01	15:40	16:00	16:17
52°	17:50	18:24	19:03	15:45	16:03	16:19
54°	17:49	18:24	19:05	15:50	16:06	16:20
56°	17:48	18:25	19:08	15:56	16:10	16:22
58°	17:46	18:25	19:11	16:02	16:14	16:24
S 60°	17:45	18:26	19:14	16:10	16:19	16:26
S 62°	17:43	18:27	19:18	16:18	16:24	16:28

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
29	5 01	4 52	12:05	08:24	20:46	25d 22%
30	4 43	4 34	12:05	09:07	21:28	26d 15%
31	4 25	4 16	12:04	09:49	22:09	27d 9%

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2011 April 1, 2, 3 (Fri, Sat, Sun)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
1 Friday 00	189° 00'.7	211° 13'.2	10° 14'.8 S	189° 30'.0	1° 13'.9 S	174° 41'.4	4° 57'.0 N	354° 57'.6	3° 02'.7 S
01	204° 03'.2	226° 12'.8	13'.8	204° 30'.6	13'.1	189° 43'.3	57'.2	10° 00'.3	02'.7
02	219° 05'.6	241° 12'.4	12'.7	219° 31'.3	12'.4	204° 45'.2	57'.5	25° 02'.9	02'.6
03	234° 08'.1	256° 12'.0	11'.7	234° 32'.0	11'.6	219° 47'.1	57'.7	40° 05'.6	02'.5
04	249° 10'.5	271° 11'.6	10'.7	249° 32'.7	10'.8	234° 49'.0	57'.9	55° 08'.2	02'.4
05	264° 13'.0	286° 11'.1	09'.7	264° 33'.4	10'.0	249° 50'.9	58'.2	70° 10'.9	02'.4
06	279° 15'.5	301° 10'.7	08'.7	279° 34'.0	09'.2	264° 52'.8	58'.4	85° 13'.5	02'.3
07	294° 17'.9	316° 10'.3	07'.7	294° 34'.7	08'.4	279° 54'.7	58'.6	100° 16'.1	02'.2
08	309° 20'.4	331° 09'.9	06'.7	309° 35'.4	07'.6	294° 56'.6	58'.9	115° 18'.8	02'.1
09	324° 22'.9	346° 09'.5	05'.7	324° 36'.1	06'.8	309° 58'.5	59'.1	130° 21'.4	02'.1
10	339° 25'.3	1° 09'.1	04'.7	339° 36'.8	06'.0	325° 00'.4	59'.3	145° 24'.1	02'.0
11	354° 27'.8	16° 08'.7	03'.7	354° 37'.4	05'.3	340° 02'.4	59'.6	160° 26'.7	01'.9
12	9° 30'.3	31° 08'.2	10° 02'.7 S	9° 38'.1	1° 04'.5 S	355° 04'.3	4° 59'.8 N	175° 29'.4	3° 01'.8 S
13	24° 32'.7	46° 07'.8	01'.7	24° 38'.8	03'.7	10° 06'.2	5° 00'.0 N	190° 32'.0	01'.7
14	39° 35'.2	61° 07'.4	00'.6	39° 39'.5	02'.9	25° 08'.1	00'.3	205° 34'.6	01'.7
15	54° 37'.7	76° 07'.0	9° 59'.6 S	54° 40'.2	02'.1	40° 10'.0	00'.5	220° 37'.3	01'.6
16	69° 40'.1	91° 06'.6	58'.6	69° 40'.8	01'.3	55° 11'.9	00'.7	235° 39'.9	01'.5
17	84° 42'.6	106° 06'.2	57'.6	84° 41'.5	00'.5	70° 13'.8	01'.0	250° 42'.6	01'.4
18	99° 45'.0	121° 05'.8	56'.6	99° 42'.2	0° 59'.7 S	85° 15'.7	01'.2	265° 45'.2	01'.4
19	114° 47'.5	136° 05'.3	55'.6	114° 42'.9	58'.9	100° 17'.6	01'.4	280° 47'.9	01'.3
20	129° 50'.0	151° 04'.9	54'.6	129° 43'.6	58'.2	115° 19'.5	01'.7	295° 50'.5	01'.2
21	144° 52'.4	166° 04'.5	53'.5	144° 44'.2	57'.4	130° 21'.4	01'.9	310° 53'.1	01'.1
22	159° 54'.9	181° 04'.1	52'.5	159° 44'.9	56'.6	145° 23'.3	02'.1	325° 55'.8	01'.1
23	174° 57'.4	196° 03'.7	51'.5	174° 45'.6	55'.8	160° 25'.2	02'.4	340° 58'.4	01'.0
2 Saturday 00	189° 59'.8	211° 03'.3	9° 50'.5 S	189° 46'.3	0° 55'.0 S	175° 27'.1	5° 02'.6 N	356° 01'.1	3° 00'.9 S
01	205° 02'.3	226° 02'.9	49'.5	204° 47'.0	54'.2	190° 29'.0	02'.8	11° 03'.7	00'.8
02	220° 04'.8	241° 02'.5	48'.5	219° 47'.7	53'.4	205° 30'.9	03'.1	26° 06'.4	00'.8
03	235° 07'.2	256° 02'.0	47'.4	234° 48'.3	52'.6	220° 32'.8	03'.3	41° 09'.0	00'.7
04	250° 09'.7	271° 01'.6	46'.4	249° 49'.0	51'.8	235° 34'.7	03'.6	56° 11'.6	00'.6
05	265° 12'.1	286° 01'.2	45'.4	264° 49'.7	51'.1	250° 36'.6	03'.8	71° 14'.3	00'.5
06	280° 14'.6	301° 00'.8	44'.4	279° 50'.4	50'.3	265° 38'.5	04'.0	86° 16'.9	00'.5
07	295° 17'.1	316° 00'.4	43'.4	294° 51'.1	49'.5	280° 40'.4	04'.3	101° 19'.6	00'.4
08	310° 19'.5	331° 00'.0	42'.4	309° 51'.7	48'.7	295° 42'.3	04'.5	116° 22'.2	00'.3
09	325° 22'.0	345° 59'.6	41'.3	324° 52'.4	47'.9	310° 44'.2	04'.7	131° 24'.9	00'.2
10	340° 24'.5	0° 59'.2	40'.3	339° 53'.1	47'.1	325° 46'.2	05'.0	146° 27'.5	00'.1
11	355° 26'.9	15° 58'.8	39'.3	354° 53'.8	46'.3	340° 48'.1	05'.2	161° 30'.1	00'.1
12	10° 29'.4	30° 58'.4	9° 38'.3 S	9° 54'.5	0° 45'.5 S	355° 50'.0	5° 05'.4 N	176° 32'.8	3° 00'.0 S
13	25° 31'.9	45° 57'.9	37'.2	24° 55'.1	44'.8	10° 51'.9	05'.7	191° 35'.4	2° 59'.9 S
14	40° 34'.3	60° 57'.5	36'.2	39° 55'.8	44'.0	25° 53'.8	05'.9	206° 38'.1	59'.8
15	55° 36'.8	75° 57'.1	35'.2	54° 56'.5	43'.2	40° 55'.7	06'.1	221° 40'.7	59'.8
16	70° 39'.3	90° 56'.7	34'.2	69° 57'.2	42'.4	55° 57'.6	06'.4	236° 43'.4	59'.7
17	85° 41'.7	105° 56'.3	33'.1	84° 57'.9	41'.6	70° 59'.5	06'.6	251° 46'.0	59'.6
18	100° 44'.2	120° 55'.9	32'.1	99° 58'.6	40'.8	86° 01'.4	06'.8	266° 48'.6	59'.5
19	115° 46'.6	135° 55'.5	31'.1	114° 59'.2	40'.0	101° 03'.3	07'.1	281° 51'.3	59'.5
20	130° 49'.1	150° 55'.1	30'.1	129° 59'.9	39'.2	116° 05'.2	07'.3	296° 53'.9	59'.4
21	145° 51'.6	165° 54'.7	29'.0	145° 00'.6	38'.4	131° 07'.1	07'.5	311° 56'.6	59'.3
22	160° 54'.0	180° 54'.3	28'.0	160° 01'.3	37'.7	146° 09'.0	07'.8	326° 59'.2	59'.2
23	175° 56'.5	195° 53'.9	27'.0	175° 02'.0	36'.9	161° 10'.9	08'.0	342° 01'.9	59'.2
3 Sunday 00	190° 59'.0	210° 53'.5	9° 26'.0 S	190° 02'.7	0° 36'.1 S	176° 12'.8	5° 08'.2 N	357° 04'.5	2° 59'.1 S
01	206° 01'.4	225° 53'.1	24'.9	205° 03'.3	35'.3	191° 14'.7	08'.5	12° 07'.1	59'.0
02	221° 03'.9	240° 52'.7	23'.9	220° 04'.0	34'.5	206° 16'.6	08'.7	27° 09'.8	58'.9
03	236° 06'.4	255° 52'.3	22'.9	235° 04'.7	33'.7	221° 18'.5	08'.9	42° 12'.4	58'.8
04	251° 08'.8	270° 51'.9	21'.8	250° 05'.4	32'.9	236° 20'.4	09'.2	57° 15'.1	58'.8
05	266° 11'.3	285° 51'.5	20'.8	265° 06'.1	32'.1	251° 22'.3	09'.4	72° 17'.7	58'.7
06	281° 13'.7	300° 51'.1	19'.8	280° 06'.8	31'.4	266° 24'.2	09'.6	87° 20'.4	58'.6
07	296° 16'.2	315° 50'.7	18'.8	295° 07'.4	30'.6	281° 26'.1	09'.9	102° 23'.0	58'.5
08	311° 18'.7	330° 50'.3	17'.7	310° 08'.1	29'.8	296° 28'.0	10'.1	117° 25'.7	58'.5
09	326° 21'.1	345° 49'.8	16'.7	325° 08'.8	29'.0	311° 29'.9	10'.3	132° 28'.3	58'.4
10	341° 23'.6	0° 49'.4	15'.7	340° 09'.5	28'.2	326° 31'.8	10'.6	147° 30'.9	58'.3
11	356° 26'.1	15° 49'.0	14'.6	355° 10'.2	27'.4	341° 33'.8	10'.8	162° 33'.6	58'.2
12	11° 28'.5	30° 48'.6	9° 13'.6 S	10° 10'.8	0° 26'.6 S	356° 35'.7	5° 11'.0 N	177° 36'.2	2° 58'.2 S
13	26° 31'.0	45° 48'.2	12'.6	25° 11'.5	25'.8	11° 37'.6	11'.3	192° 38'.9	58'.1
14	41° 33'.5	60° 47'.8	11'.5	40° 12'.2	25'.0	26° 39'.5	11'.5	207° 41'.5	58'.0
15	56° 35'.9	75° 47'.4	10'.5	55° 12'.9	24'.3	41° 41'.4	11'.7	222° 44'.2	57'.9
16	71° 38'.4	90° 47'.0	09'.5	70° 13'.6	23'.5	56° 43'.3	12'.0	237° 46'.8	57'.9
17	86° 40'.9	105° 46'.6	08'.4	85° 14'.3	22'.7	71° 45'.2	12'.2	252° 49'.4	57'.8
18	101° 43'.3	120° 46'.2	07'.4	100° 14'.9	21'.9	86° 47'.1	12'.4	267° 52'.1	57'.7
19	116° 45'.8	135° 45'.8	06'.3	115° 15'.6	21'.1	101° 49'.0	12'.7	282° 54'.7	57'.6
20	131° 48'.2	150° 45'.4	05'.3	130° 16'.3	20'.3	116° 50'.9	12'.9	297° 57'.4	57'.6
21	146° 50'.7	165° 45'.0	04'.3	145° 17'.0	19'.5	131° 52'.8	13'.1	313° 00'.0	57'.5
22	161° 53'.2	180° 44'.6	03'.2	160° 17'.7	18'.7	146° 54'.7	13'.4	328° 02'.7	57'.4
23	176° 55'.6	195° 44'.2	02'.2	175° 18'.4	18'.0	161° 56'.6	13'.6	343° 05'.3	57'.3
	M.P. 11:14	v -0'.4	d 1'.0	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.8 S
Acrux	173° 10'.6	63° 09'.9 S
Adhara	255° 13'.8	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.7 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 46'.0	46° 54'.2 S
Alnilam	275° 48'.1	1° 11'.9 S
Alphard	217° 57'.4	8° 42'.7 S
Alphecca	126° 12'.1	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.9	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 31'.1	69° 02'.6 S
Avior	234° 18'.5	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 56'.9	52° 42'.5 S
Capella	280° 37'.0	46° 00'.6 N
Deneb	49° 32'.8	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.7	51° 28'.9 N
Enif	33° 48'.9	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.9	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.6	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.2 N
Nunki	76° 00'.3	26° 16'.9 S
Peacock	53° 21'.9	56° 41'.7 S
Polaris	318° 57'.4	89° 19'.0 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.8	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.4	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.4 S
Schedar	349° 43'.0	56° 36'.0 N
Shaula	96° 23'.9	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.1 S
Vega	80° 40'.0	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	21° 03'.5	09:56
Mars	359° 46'.5	11:20
Jupiter	345° 27'.3	12:17
Saturn	166° 01'.2	00:16

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 58'.4	4° 19'.3 N	206° 56'.0	16'.3	2° 21'.3 S	11'.9	54'.0
193° 58'.6	20'.3	221° 31'.3	16'.3	09'.4	11'.8	
208° 58'.7	21'.3	236° 06'.6	16'.4	1° 57'.6 S	11'.8	
223° 58'.9	22'.2	250° 42'.0	16'.4	45'.8	11'.9	
238° 59'.1	23'.2	265° 17'.4	16'.3	33'.9	11'.8	
253° 59'.3	24'.2	279° 52'.7	16'.4	22'.1	11'.9	
268° 59'.5	25'.1	294° 28'.1	16'.4	10'.2	11'.8	
283° 59'.7	26'.1	309° 03'.5	16'.4	0° 58'.4 S	11'.9	
298° 59'.9	27'.1	323° 38'.9	16'.4	46'.5	11'.8	
314° 00'.0	28'.0	338° 14'.3	16'.4	34'.7	11'.9	
329° 00'.2	29'.0	352° 49'.7	16'.4	22'.8	11'.9	
344° 00'.4	30'.0	7° 25'.1	16'.4	10'.9	11'.8	
359° 00'.6	4° 30'.9 N	22° 00'.5	16'.4	0° 00'.9 N	11'.9	54'.0
14° 00'.8	31'.9	36° 35'.9	16'.4	12'.8	11'.8	
29° 01'.0	32'.9	51° 11'.3	16'.4	24'.6	11'.9	
44° 01'.1	33'.8	65° 46'.7	16'.4	36'.5	11'.8	53'.9
59° 01'.3	34'.8	80° 22'.1	16'.4	48'.3	11'.9	
74° 01'.5	35'.8	94° 57'.5	16'.4	1° 00'.2 N	11'.8	
89° 01'.7	36'.7	109° 32'.9	16'.4	12'.0	11'.8	
104° 01'.9	37'.7	124° 08'.3	16'.4	23'.8	11'.9	
119° 02'.1	38'.7	138° 43'.7	16'.3	35'.7	11'.8	
134° 02'.3	39'.6	153° 19'.0	16'.4	47'.5	11'.8	
149° 02'.4	40'.6	167° 54'.4	16'.4	59'.3	11'.8	
164° 02'.6	41'.5	182° 29'.8	16'.4	2° 11'.1 N	11'.8	
179° 02'.8	4° 42'.5 N	197° 05'.2	16'.3	2° 22'.9 N	11'.8	53'.9
194° 03'.0	43'.5	211° 40'.5	16'.4	34'.7	11'.8	
209° 03'.2	44'.4	226° 15'.9	16'.3	46'.5	11'.8	
224° 03'.4	45'.4	240° 51'.2	16'.4	58'.3	11'.7	
239° 03'.5	46'.4	255° 26'.6	16'.3	3° 10'.0 N	11'.8	
254° 03'.7	47'.3	270° 01'.9	16'.3	21'.8	11'.7	
269° 03'.9	48'.3	284° 37'.2	16'.3	33'.5	11'.7	
284° 04'.1	49'.3	299° 12'.5	16'.3	45'.2	11'.7	
299° 04'.3	50'.2	313° 47'.8	16'.3	56'.9	11'.7	
314° 04'.5	51'.2	328° 23'.1	16'.2	4° 08'.6 N	11'.7	
329° 04'.7	52'.1	342° 58'.3	16'.3	20'.3	11'.6	
344° 04'.8	53'.1	357° 33'.6	16'.2	31'.9	11'.7	
359° 05'.0	4° 54'.1 N	12° 08'.8	16'.2	4° 43'.6 N	11'.6	53'.9
14° 05'.2	55'.0	26° 44'.0	16'.2	55'.2	11'.6	
29° 05'.4	56'.0	41° 19'.2	16'.1	5° 06'.8 N	11'.6	
44° 05'.6	57'.0	55° 54'.3	16'.2	18'.4	11'.6	
59° 05'.8	57'.9	70° 29'.5	16'.1	30'.0	11'.5	
74° 05'.9	58'.9	85° 04'.6	16'.1	41'.5	11'.5	
89° 06'.1	59'.8	99° 39'.7	16'.1	53'.0	11'.5	
104° 06'.3	5° 00'.8 N	114° 14'.8	16'.1	6° 04'.5 N	11'.5	
119° 06'.5	01'.8	128° 49'.9	16'.0	16'.0	11'.5	
134° 06'.7	02'.7	143° 24'.9	16'.1	27'.5	11'.4	
149° 06'.9	03'.7	158° 00'.0	16'.0	38'.9	11'.4	
164° 07'.0	04'.6	172° 35'.0	15'.9	50'.3	11'.4	
179° 07'.2	5° 05'.6 N	187° 09'.9	16'.0	7° 01'.7 N	11'.4	53'.9
194° 07'.4	06'.6	201° 44'.9	15'.9	13'.1	11'.3	
209° 07'.6	07'.5	216° 19'.8	15'.9	24'.4	11'.3	
224° 07'.8	08'.5	230° 54'.7	15'.9	35'.7	11'.3	
239° 08'.0	09'.4	245° 29'.6	15'.8	47'.0	11'.2	
254° 08'.1	10'.4	260° 04'.4	15'.8	58'.2	11'.3	54'.0
269° 08'.3	11'.4	274° 39'.2	15'.8	8° 09'.5 N	11'.2	
284° 08'.5	12'.3	289° 14'.0	15'.8	20'.7	11'.1	
299° 08'.7	13'.3	303° 48'.8	15'.7	31'.8	11'.1	
314° 08'.9	14'.2	318° 23'.5	15'.7	42'.9	11'.1	
329° 09'.0	15'.2	332° 58'.2	15'.6	54'.0	11'.1	
344° 09'.2	16'.1	347° 32'.8	15'.6	9° 05'.1 N	11'.0	
359° 09'.4	5° 17'.1 N	2° 07'.4	15'.6	9° 16'.1 N	11'.0	54'.0
14° 09'.6	18'.1	16° 42'.0	15'.6	27'.1	11'.0	
29° 09'.8	19'.0	31° 16'.6	15'.5	38'.1	10'.9	
44° 10'.0	20'.0	45° 51'.1	15'.5	49'.0	10'.9	
59° 10'.1	20'.9	60° 25'.6	15'.4	59'.9	10'.8	
74° 10'.3	21'.9	75° 00'.0	15'.4	10° 10'.7 N	10'.8	
89° 10'.5	22'.9	89° 34'.4	15'.4	21'.5	10'.8	
104° 10'.7	23'.8	104° 08'.8	15'.3	32'.3	10'.7	
119° 10'.9	24'.8	118° 43'.1	15'.3	43'.0	10'.7	
134° 11'.1	25'.7	133° 17'.4	15'.3	53'.7	10'.7	
149° 11'.2	26'.7	147° 51'.7	15'.2	11° 04'.4 N	10'.6	
164° 11'.4	27'.6	162° 25'.9	15'.2	15'.0	10'.5	
SD 16'.0	d 1'.0	SD	14'.7	14'.7	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 1	Moonrise 2	Moonrise 3
N 72°	01:30	03:37	04:53	04:39	04:20	04:00
N 70°	02:16	03:54	05:00	04:37	04:24	04:11
68°	02:45	04:07	05:07	04:35	04:28	04:20
66°	03:06	04:18	05:12	04:34	04:30	04:27
64°	03:23	04:27	05:16	04:33	04:33	04:34
62°	03:36	04:34	05:20	04:31	04:35	04:39
60°	03:47	04:41	05:24	04:31	04:37	04:44
N 58°	03:56	04:46	05:27	04:30	04:39	04:49
56°	04:05	04:51	05:29	04:29	04:40	04:52
54°	04:12	04:55	05:31	04:28	04:42	04:56
52°	04:18	04:59	05:34	04:28	04:43	04:59
50°	04:23	05:03	05:36	04:27	04:44	05:02
45°	04:35	05:10	05:40	04:26	04:47	05:08
N 40°	04:44	05:16	05:43	04:25	04:49	05:13
35°	04:51	05:21	05:46	04:24	04:51	05:18
30°	04:56	05:25	05:49	04:23	04:52	05:22
20°	05:05	05:31	05:53	04:22	04:55	05:29
N 10°	05:11	05:36	05:57	04:21	04:58	05:35
0°	05:16	05:40	06:00	04:20	05:00	05:41
S 10°	05:18	05:43	06:04	04:19	05:03	05:47
20°	05:20	05:45	06:07	04:18	05:05	05:54
30°	05:19	05:47	06:11	04:16	05:08	06:01
35°	05:19	05:48	06:13	04:15	05:10	06:05
40°	05:17	05:49	06:16	04:15	05:12	06:10
45°	05:15	05:49	06:18	04:14	05:14	06:15
S 50°	05:12	05:49	06:22	04:12	05:17	06:22
52°	05:10	05:49	06:23	04:12	05:19	06:25
54°	05:08	05:49	06:25	04:11	05:20	06:29
56°	05:06	05:49	06:26	04:11	05:21	06:33
58°	05:04	05:49	06:28	04:10	05:23	06:37
S 60°	05:01	05:49	06:31	04:09	05:25	06:42
S 62°	04:57	05:49	06:33	04:08	05:27	06:47

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 1	Moonset 2	Moonset 3
N 72°	19:18	20:34	22:50	16:51	18:37	20:28
N 70°	19:10	20:17	21:58	16:50	18:28	20:10
68°	19:03	20:03	21:27	16:48	18:21	19:55
66°	18:57	19:52	21:05	16:48	18:15	19:44
64°	18:53	19:43	20:48	16:47	18:10	19:34
62°	18:49	19:35	20:34	16:46	18:06	19:26
60°	18:45	19:28	20:23	16:46	18:02	19:19
N 58°	18:42	19:23	20:13	16:45	17:59	19:13
56°	18:39	19:18	20:05	16:45	17:56	19:07
54°	18:37	19:13	19:57	16:44	17:53	19:02
52°	18:35	19:09	19:51	16:44	17:51	18:58
50°	18:33	19:06	19:45	16:44	17:49	18:54
45°	18:28	18:58	19:34	16:43	17:44	18:45
N 40°	18:25	18:52	19:25	16:42	17:40	18:38
35°	18:22	18:47	19:17	16:42	17:37	18:32
30°	18:19	18:43	19:11	16:41	17:34	18:26
20°	18:14	18:37	19:02	16:41	17:29	18:17
N 10°	18:11	18:32	18:56	16:40	17:24	18:09
0°	18:07	18:28	18:52	16:39	17:20	18:01
S 10°	18:03	18:25	18:49	16:39	17:16	17:54
20°	18:00	18:22	18:47	16:38	17:11	17:46
30°	17:56	18:20	18:47	16:37	17:06	17:37
35°	17:54	18:19	18:48	16:37	17:03	17:31
40°	17:51	18:18	18:49	16:36	17:00	17:25
45°	17:48	18:18	18:51	16:35	16:56	17:18
S 50°	17:45	18:17	18:54	16:35	16:52	17:10
52°	17:43	18:17	18:56	16:34	16:50	17:06
54°	17:42	18:17	18:58	16:34	16:47	17:02
56°	17:40	18:17	19:00	16:33	16:45	16:58
58°	17:38	18:17	19:02	16:33	16:42	16:52
S 60°	17:36	18:17	19:05	16:32	16:39	16:47
S 62°	17:33	18:17	19:09	16:32	16:36	16:40

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
1	4 07	3 58	12:04	10:29	22:50	28d 4%
2	3 49	3 40	12:04	11:10	23:31	29d 1%
3	3 31	3 23	12:03	11:51	24:12	30d 0%

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2011 April 4, 5, 6 (Mon, Tue, Wed)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.3	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
4 Monday 00	191° 58'.1	210° 43'.8	9° 01'.2 S	190° 19'.1	0° 17'.2 S	176° 58'.5	5° 13'.8 N	358° 07'.9	2° 57'.3 S
01	207° 00'.6	225° 43'.4	00'.1	205° 19'.7	16'.4	192° 00'.4	14'.1	13° 10'.6	57'.2
02	222° 03'.0	240° 43'.0	8° 59'.1 S	220° 20'.4	15'.6	207° 02'.3	14'.3	28° 13'.2	57'.1
03	237° 05'.5	255° 42'.6	58'.0	235° 21'.1	14'.8	222° 04'.2	14'.5	43° 15'.9	57'.0
04	252° 08'.0	270° 42'.3	57'.0	250° 21'.8	14'.0	237° 06'.1	14'.8	58° 18'.5	56'.9
05	267° 10'.4	285° 41'.9	56'.0	265° 22'.5	13'.2	252° 08'.0	15'.0	73° 21'.2	56'.9
06	282° 12'.9	300° 41'.5	54'.9	280° 23'.2	12'.4	267° 09'.9	15'.2	88° 23'.8	56'.8
07	297° 15'.3	315° 41'.1	53'.9	295° 23'.8	11'.7	282° 11'.8	15'.5	103° 26'.4	56'.7
08	312° 17'.8	330° 40'.7	52'.8	310° 24'.5	10'.9	297° 13'.7	15'.7	118° 29'.1	56'.6
09	327° 20'.3	345° 40'.3	51'.8	325° 25'.2	10'.1	312° 15'.6	15'.9	133° 31'.7	56'.6
10	342° 22'.7	0° 39'.9	50'.7	340° 25'.9	09'.3	327° 17'.5	16'.2	148° 34'.4	56'.5
11	357° 25'.2	15° 39'.5	49'.7	355° 26'.6	08'.5	342° 19'.4	16'.4	163° 37'.0	56'.4
12	12° 27'.7	30° 39'.1	8° 48'.7 S	10° 27'.3	0° 07'.7 S	357° 21'.3	5° 16'.6 N	178° 39'.7	2° 56'.3 S
13	27° 30'.1	45° 38'.7	47'.6	25° 27'.9	06'.9	12° 23'.2	16'.8	193° 42'.3	56'.3
14	42° 32'.6	60° 38'.3	46'.6	40° 28'.6	06'.1	27° 25'.1	17'.1	208° 44'.9	56'.2
15	57° 35'.1	75° 37'.9	45'.5	55° 29'.3	05'.4	42° 27'.1	17'.3	223° 47'.6	56'.1
16	72° 37'.5	90° 37'.5	44'.5	70° 30'.0	04'.6	57° 29'.0	17'.5	238° 50'.2	56'.0
17	87° 40'.0	105° 37'.1	43'.4	85° 30'.7	03'.8	72° 30'.9	17'.8	253° 52'.9	56'.0
18	102° 42'.5	120° 36'.7	42'.4	100° 31'.4	03'.0	87° 32'.8	18'.0	268° 55'.5	55'.9
19	117° 44'.9	135° 36'.3	41'.3	115° 32'.1	02'.2	102° 34'.7	18'.2	283° 58'.2	55'.8
20	132° 47'.4	150° 35'.9	40'.3	130° 32'.7	01'.4	117° 36'.6	18'.5	299° 00'.8	55'.7
21	147° 49'.8	165° 35'.5	39'.2	145° 33'.4	00'.6	132° 38'.5	18'.7	314° 03'.5	55'.7
22	162° 52'.3	180° 35'.1	38'.2	160° 34'.1	00'.2	147° 40'.4	18'.9	329° 06'.1	55'.6
23	177° 54'.8	195° 34'.8	37'.1	175° 34'.8	00'.9	162° 42'.3	19'.2	344° 08'.7	55'.5
5 Tuesday 00	192° 57'.2	210° 34'.4	8° 36'.1 S	190° 35'.5	0° 01'.7 N	177° 44'.2	5° 19'.4 N	359° 11'.4	2° 55'.4 S
01	207° 59'.7	225° 34'.0	35'.0	205° 36'.2	02'.5	192° 46'.1	19'.6	14° 14'.0	55'.4
02	223° 02'.2	240° 33'.6	34'.0	220° 36'.8	03'.3	207° 48'.0	19'.9	29° 16'.7	55'.3
03	238° 04'.6	255° 33'.2	32'.9	235° 37'.5	04'.1	222° 49'.9	20'.1	44° 19'.3	55'.2
04	253° 07'.1	270° 32'.8	31'.9	250° 38'.2	04'.9	237° 51'.8	20'.3	59° 22'.0	55'.1
05	268° 09'.6	285° 32'.4	30'.8	265° 38'.9	05'.7	252° 53'.7	20'.6	74° 24'.6	55'.1
06	283° 12'.0	300° 32'.0	29'.8	280° 39'.6	06'.5	267° 55'.6	20'.8	89° 27'.2	55'.0
07	298° 14'.5	315° 31'.6	28'.7	295° 40'.3	07'.2	282° 57'.5	21'.0	104° 29'.9	54'.9
08	313° 17'.0	330° 31'.2	27'.7	310° 41'.0	08'.0	297° 59'.4	21'.3	119° 32'.5	54'.8
09	328° 19'.4	345° 30'.8	26'.6	325° 41'.6	08'.8	313° 01'.3	21'.5	134° 35'.2	54'.7
10	343° 21'.9	0° 30'.5	25'.6	340° 42'.3	09'.6	328° 03'.2	21'.7	149° 37'.8	54'.7
11	358° 24'.3	15° 30'.1	24'.5	355° 43'.0	10'.4	343° 05'.1	22'.0	164° 40'.5	54'.6
12	13° 26'.8	30° 29'.7	8° 23'.5 S	10° 43'.7	0° 11'.2 N	358° 07'.0	5° 22'.2 N	179° 43'.1	2° 54'.5 S
13	28° 29'.3	45° 29'.3	22'.4	25° 44'.4	12'.0	13° 08'.9	22'.4	194° 45'.7	54'.4
14	43° 31'.7	60° 28'.9	21'.3	40° 45'.1	12'.8	28° 10'.8	22'.7	209° 48'.4	54'.4
15	58° 34'.2	75° 28'.5	20'.3	55° 45'.8	13'.5	43° 12'.7	22'.9	224° 51'.0	54'.3
16	73° 36'.7	90° 28'.1	19'.2	70° 46'.4	14'.3	58° 14'.6	23'.1	239° 53'.7	54'.2
17	88° 39'.1	105° 27'.7	18'.2	85° 47'.1	15'.1	73° 16'.5	23'.4	254° 56'.3	54'.1
18	103° 41'.6	120° 27'.3	17'.1	100° 47'.8	15'.9	88° 18'.4	23'.6	269° 59'.0	54'.1
19	118° 44'.1	135° 27'.0	16'.1	115° 48'.5	16'.7	103° 20'.3	23'.8	285° 01'.6	54'.0
20	133° 46'.5	150° 26'.6	15'.0	130° 49'.2	17'.5	118° 22'.2	24'.1	300° 04'.2	53'.9
21	148° 49'.0	165° 26'.2	13'.9	145° 49'.9	18'.3	133° 24'.2	24'.3	315° 06'.9	53'.8
22	163° 51'.4	180° 25'.8	12'.9	160° 50'.6	19'.0	148° 26'.1	24'.5	330° 09'.5	53'.8
23	178° 53'.9	195° 25'.4	11'.8	175° 51'.2	19'.8	163° 28'.0	24'.8	345° 12'.2	53'.7
6 Wednesday 00	193° 56'.4	210° 25'.0	8° 10'.8 S	190° 51'.9	0° 20'.6 N	178° 29'.9	5° 25'.0 N	0° 14'.8	2° 53'.6 S
01	208° 58'.8	225° 24'.6	09'.7	205° 52'.6	21'.4	193° 31'.8	25'.2	15° 17'.5	53'.5
02	224° 01'.3	240° 24'.3	08'.7	220° 53'.3	22'.2	208° 33'.7	25'.5	30° 20'.1	53'.5
03	239° 03'.8	255° 23'.9	07'.6	235° 54'.0	23'.0	223° 35'.6	25'.7	45° 22'.7	53'.4
04	254° 06'.2	270° 23'.5	06'.5	250° 54'.7	23'.8	238° 37'.5	25'.9	60° 25'.4	53'.3
05	269° 08'.7	285° 23'.1	05'.5	265° 55'.4	24'.5	253° 39'.4	26'.2	75° 28'.0	53'.2
06	284° 11'.2	300° 22'.7	04'.4	280° 56'.1	25'.3	268° 41'.3	26'.4	90° 30'.7	53'.2
07	299° 13'.6	315° 22'.3	03'.3	295° 56'.7	26'.1	283° 43'.2	26'.6	105° 33'.3	53'.1
08	314° 16'.1	330° 21'.9	02'.3	310° 57'.4	26'.9	298° 45'.1	26'.9	120° 36'.0	53'.0
09	329° 18'.6	345° 21'.6	01'.2	325° 58'.1	27'.7	313° 47'.0	27'.1	135° 38'.6	52'.9
10	344° 21'.0	0° 21'.2	00'.2	340° 58'.8	28'.5	328° 48'.9	27'.3	150° 41'.3	52'.9
11	359° 23'.5	15° 20'.8	7° 59'.1 S	355° 59'.5	29'.3	343° 50'.8	27'.6	165° 43'.9	52'.8
12	14° 25'.9	30° 20'.4	7° 58'.0 S	11° 00'.2	0° 30'.1 N	358° 52'.7	5° 27'.8 N	180° 46'.5	2° 52'.7 S
13	29° 28'.4	45° 20'.0	57'.0	26° 00'.9	30'.8	13° 54'.6	28'.0	195° 49'.2	52'.6
14	44° 30'.9	60° 19'.6	55'.9	41° 01'.5	31'.6	28° 56'.5	28'.2	210° 51'.8	52'.6
15	59° 33'.3	75° 19'.3	54'.8	56° 02'.2	32'.4	43° 58'.4	28'.5	225° 54'.5	52'.5
16	74° 35'.8	90° 18'.9	53'.8	71° 02'.9	33'.2	59° 00'.3	28'.7	240° 57'.1	52'.4
17	89° 38'.3	105° 18'.5	52'.7	86° 03'.6	34'.0	74° 02'.2	28'.9	255° 59'.8	52'.3
18	104° 40'.7	120° 18'.1	51'.6	101° 04'.3	34'.8	89° 04'.1	29'.2	271° 02'.4	52'.3
19	119° 43'.2	135° 17'.7	50'.6	116° 05'.0	35'.6	104° 06'.0	29'.4	286° 05'.0	52'.2
20	134° 45'.7	150° 17'.4	49'.5	131° 05'.7	36'.3	119° 07'.9	29'.6	301° 07'.7	52'.1
21	149° 48'.1	165° 17'.0	48'.4	146° 06'.4	37'.1	134° 09'.8	29'.9	316° 10'.3	52'.0
22	164° 50'.6	180° 16'.6	47'.4	161° 07'.0	37'.9	149° 11'.7	30'.1	331° 13'.0	52'.0
23	179° 53'.1	195° 16'.2	46'.3	176° 07'.7	38'.7	164° 13'.6	30'.3	346° 15'.6	51'.9
	M.P. 11:02	v -0'.4	d 1'.1	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.8 S
Acrux	173° 10'.6	63° 09'.9 S
Adhara	255° 13'.8	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 46'.0	46° 54'.2 S
Alnilam	275° 48'.1	1° 11'.9 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.8	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.7 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 31'.0	69° 02'.6 S
Avior	234° 18'.5	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 56'.9	52° 42'.5 S
Capella	280° 37'.0	46° 00'.6 N
Deneb	49° 32'.8	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.7	51° 29'.0 N
Enif	33° 48'.9	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.8	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.7	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.2	26° 16'.9 S
Peacock	53° 21'.8	56° 41'.6 S
Polaris	318° 57'.9	89° 19'.0 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.8	12° 32'.9 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.3	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.4 S
Schedar	349° 43'.0	56° 35'.9 N
Shaula	96° 23'.9	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.1 S
Vega	80° 40'.0	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	17° 37'.1	09:58
Mars	357° 38'.2	11:17
Jupiter	344° 46'.9	12:08
Saturn	166° 14'.1	00:03

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 11'.6	5° 28'.6 N	177° 00'.1	15'.1	11° 25'.5 N	10'.6	54'.0
194° 11'.8	29'.5	191° 34'.2	15'.1	36'.1	10'.4	
209° 12'.0	30'.5	206° 08'.3	15'.1	46'.5	10'.5	54'.1
224° 12'.1	31'.5	220° 42'.4	15'.0	57'.0	10'.4	
239° 12'.3	32'.4	235° 16'.4	14'.9	12° 07'.4 N	10'.3	
254° 12'.5	33'.4	249° 50'.3	14'.9	17'.7	10'.3	
269° 12'.7	34'.3	264° 24'.2	14'.9	28'.0	10'.2	
284° 12'.9	35'.3	278° 58'.1	14'.9	38'.2	10'.2	
299° 13'.0	36'.2	293° 32'.0	14'.7	48'.4	10'.2	
314° 13'.2	37'.2	308° 05'.7	14'.8	58'.6	10'.1	
329° 13'.4	38'.1	322° 39'.5	14'.7	13° 08'.7 N	10'.0	
344° 13'.6	39'.1	337° 13'.2	14'.6	18'.7	10'.0	
359° 13'.8	5° 40'.1 N	351° 46'.8	14'.6	13° 28'.7 N	9'.9	54'.1
14° 13'.9	41'.0	6° 20'.4	14'.6	38'.6	9'.9	
29° 14'.1	42'.0	20° 54'.0	14'.5	48'.5	9'.9	
44° 14'.3	42'.9	35° 27'.5	14'.4	58'.4	9'.7	
59° 14'.5	43'.9	50° 00'.9	14'.4	14° 08'.1 N	9'.8	54'.2
74° 14'.7	44'.8	64° 34'.3	14'.4	17'.9	9'.6	
89° 14'.9	45'.8	79° 07'.7	14'.3	27'.5	9'.6	
104° 15'.0	46'.7	93° 41'.0	14'.2	37'.1	9'.6	
119° 15'.2	47'.7	108° 14'.2	14'.2	46'.7	9'.5	
134° 15'.4	48'.6	122° 47'.4	14'.2	56'.2	9'.4	
149° 15'.6	49'.6	137° 20'.6	14'.1	15° 05'.6 N	9'.4	
164° 15'.8	50'.5	151° 53'.7	14'.0	15'.0	9'.3	
179° 15'.9	5° 51'.5 N	166° 26'.7	14'.0	15° 24'.3 N	9'.2	54'.2
194° 16'.1	52'.4	180° 59'.7	13'.9	33'.5	9'.2	
209° 16'.3	53'.4	195° 32'.6	13'.9	42'.7	9'.1	
224° 16'.5	54'.3	210° 05'.5	13'.8	51'.8	9'.1	54'.3
239° 16'.7	55'.3	224° 38'.3	13'.8	16° 00'.9 N	9'.0	
254° 16'.8	56'.2	239° 11'.1	13'.7	09'.9	8'.9	
269° 17'.0	57'.2	253° 43'.8	13'.7	18'.8	8'.8	
284° 17'.2	58'.2	268° 16'.5	13'.6	27'.6	8'.8	
299° 17'.4	59'.1	282° 49'.1	13'.6	36'.4	8'.7	
314° 17'.5	6° 00'.1 N	297° 21'.7	13'.5	45'.1	8'.7	
329° 17'.7	01'.0	311° 54'.2	13'.4	53'.8	8'.6	
344° 17'.9	02'.0	326° 26'.6	13'.4	17° 02'.4 N	8'.5	
359° 18'.1	6° 02'.9 N	340° 59'.0	13'.3	17° 10'.9 N	8'.4	54'.3
14° 18'.3	03'.9	355° 31'.3	13'.3	19'.3	8'.4	54'.4
29° 18'.4	04'.8	10° 03'.6	13'.2	27'.7	8'.3	
44° 18'.6	05'.8	24° 35'.8	13'.1	36'.0	8'.2	
59° 18'.8	06'.7	39° 07'.9	13'.1	44'.2	8'.1	
74° 19'.0	07'.7	53° 40'.0	13'.1	52'.3	8'.1	
89° 19'.2	08'.6	68° 12'.1	13'.0	18° 00'.4 N	8'.0	
104° 19'.3	09'.5	82° 44'.1	12'.9	08'.4	7'.9	
119° 19'.5	10'.5	97° 16'.0	12'.9	16'.3	7'.8	
134° 19'.7	11'.4	111° 47'.9	12'.8	24'.1	7'.8	54'.5
149° 19'.9	12'.4	126° 19'.7	12'.7	31'.9	7'.7	
164° 20'.0	13'.3	140° 51'.4	12'.7	39'.6	7'.6	
179° 20'.2	6° 14'.3 N	155° 23'.1	12'.6	18° 47'.2 N	7'.5	54'.5
194° 20'.4	15'.2	169° 54'.7	12'.6	54'.7	7'.4	
209° 20'.6	16'.2	184° 26'.3	12'.5	19° 02'.1 N	7'.4	
224° 20'.8	17'.1	198° 57'.8	12'.5	09'.5	7'.2	
239° 20'.9	18'.1	213° 29'.3	12'.4	16'.7	7'.2	54'.6
254° 21'.1	19'.0	228° 00'.7	12'.3	23'.9	7'.1	
269° 21'.3	20'.0	242° 32'.0	12'.3	31'.0	7'.0	
284° 21'.5	20'.9	257° 03'.3	12'.2	38'.0	6'.9	
299° 21'.6	21'.9	271° 34'.5	12'.2	44'.9	6'.9	
314° 21'.8	22'.8	286° 05'.7	12'.1	51'.8	6'.7	
329° 22'.0	23'.8	300° 36'.8	12'.0	58'.5	6'.7	
344° 22'.2	24'.7	315° 07'.8	12'.0	20° 05'.2 N	6'.5	54'.7
359° 22'.4	6° 25'.6 N	329° 38'.8	11'.9	20° 11'.7 N	6'.5	54'.7
14° 22'.5	26'.6	344° 09'.7	11'.9	18'.2	6'.4	
29° 22'.7	27'.5	358° 40'.6	11'.8	24'.6	6'.3	
44° 22'.9	28'.5	13° 11'.4	11'.7	30'.9	6'.2	
59° 23'.1	29'.4	27° 42'.1	11'.7	37'.1	6'.1	
74° 23'.2	30'.4	42° 12'.8	11'.6	43'.2	6'.0	
89° 23'.4	31'.3	56° 43'.4	11'.6	49'.2	5'.9	54'.8
104° 23'.6	32'.3	71° 14'.0	11'.5	55'.1	5'.8	
119° 23'.8	33'.2	85° 44'.5	11'.5	21° 00'.9 N	5'.7	
134° 23'.9	34'.1	100° 15'.0	11'.3	06'.6	5'.7	
149° 24'.1	35'.1	114° 45'.3	11'.4	12'.3	5'.5	
164° 24'.3	36'.0	129° 15'.7	11'.3	17'.8	5'.4	
SD 16'.0	d 0'.9	SD	14'.7	14'.8	14'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 4	Moonrise 5	Moonrise 6
N 72°	00:31	03:18	04:37	03:35	02:58	-
N 70°	01:49	03:38	04:46	03:56	03:35	02:57
68°	02:25	03:53	04:54	04:12	04:02	03:48
66°	02:50	04:05	05:00	04:25	04:22	04:21
64°	03:09	04:15	05:06	04:35	04:38	04:44
62°	03:24	04:24	05:10	04:45	04:52	05:03
60°	03:36	04:31	05:15	04:53	05:04	05:19
N 58°	03:47	04:37	05:18	05:00	05:14	05:32
56°	03:56	04:43	05:21	05:06	05:22	05:44
54°	04:03	04:48	05:24	05:12	05:30	05:54
52°	04:10	04:52	05:27	05:17	05:37	06:03
50°	04:16	04:56	05:29	05:21	05:44	06:11
45°	04:29	05:04	05:34	05:31	05:58	06:28
N 40°	04:38	05:11	05:38	05:40	06:09	06:42
35°	04:46	05:16	05:42	05:47	06:19	06:54
30°	04:53	05:21	05:45	05:53	06:27	07:05
20°	05:03	05:28	05:51	06:04	06:42	07:23
N 10°	05:10	05:34	05:55	06:14	06:55	07:39
0°	05:15	05:39	06:00	06:23	07:08	07:54
S 10°	05:18	05:43	06:04	06:33	07:20	08:09
20°	05:20	05:46	06:08	06:43	07:33	08:25
30°	05:21	05:49	06:13	06:54	07:48	08:44
35°	05:21	05:50	06:16	07:01	07:57	08:55
40°	05:20	05:51	06:19	07:08	08:08	09:07
45°	05:19	05:53	06:22	07:17	08:20	09:22
S 50°	05:16	05:54	06:26	07:28	08:34	09:40
52°	05:15	05:54	06:28	07:33	08:41	09:49
54°	05:14	05:55	06:30	07:38	08:49	09:58
56°	05:12	05:55	06:32	07:45	08:57	10:09
58°	05:10	05:56	06:35	07:52	09:07	10:22
S 60°	05:08	05:56	06:38	07:59	09:18	10:37
S 62°	05:05	05:57	06:41	08:08	09:31	10:54

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 4	Moonset 5	Moonset 6
N 72°	19:32	20:52	-	22:36	-	-
N 70°	19:22	20:32	22:25	22:00	-	00:13
68°	19:14	20:16	21:46	21:35	23:23	25:33
66°	19:07	20:03	21:20	21:16	22:52	24:31
64°	19:02	19:53	21:00	21:00	22:29	23:57
62°	18:57	19:44	20:45	20:48	22:11	23:32
60°	18:53	19:36	20:32	20:37	21:55	23:12
N 58°	18:49	19:30	20:21	20:28	21:43	22:56
56°	18:46	19:24	20:12	20:19	21:32	22:42
54°	18:43	19:19	20:04	20:12	21:22	22:31
52°	18:40	19:15	19:57	20:06	21:14	22:20
50°	18:38	19:11	19:51	20:00	21:06	22:11
45°	18:32	19:02	19:38	19:47	20:50	21:51
N 40°	18:28	18:55	19:28	19:37	20:36	21:35
35°	18:24	18:50	19:20	19:28	20:25	21:22
30°	18:21	18:45	19:13	19:20	20:15	21:10
20°	18:15	18:37	19:03	19:07	19:58	20:51
N 10°	18:10	18:32	18:56	18:55	19:43	20:33
0°	18:06	18:27	18:51	18:44	19:30	20:17
S 10°	18:02	18:23	18:47	18:34	19:16	20:01
20°	17:57	18:19	18:45	18:22	19:01	19:44
30°	17:52	18:16	18:44	18:09	18:45	19:24
35°	17:50	18:15	18:44	18:01	18:35	19:13
40°	17:46	18:13	18:45	17:53	18:24	19:00
45°	17:43	18:12	18:46	17:43	18:11	18:44
S 50°	17:39	18:11	18:48	17:31	17:55	18:25
52°	17:37	18:10	18:49	17:25	17:48	18:16
54°	17:34	18:10	18:51	17:19	17:40	18:06
56°	17:32	18:09	18:52	17:12	17:31	17:55
58°	17:30	18:09	18:54	17:05	17:20	17:42
S 60°	17:27	18:08	18:56	16:56	17:09	17:27
S 62°	17:23	18:08	18:59	16:46	16:55	17:09

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
4	3 14	3 05	12:03	12:34	00:12	1d 1%
5	2 57	2 48	12:03	13:18	00:56	2d 3%
6	2 39	2 31	12:03	14:05	01:42	3d 8%

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2011 April 7, 8, 9 (Thur, Fri, Saturday)

GMT	ARIES	VENUS -4.0		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
7 Thursday									
00	194° 55'.5	210° 15'.8	7° 45'.2 S	191° 08'.4	0° 39'.5 N	179° 15'.5	5° 30'.6 N	1° 18'.3	2° 51'.8 S
01	209° 58'.0	225° 15'.5	44'.1	206° 09'.1	40'.3	194° 17'.4	30'.8	16° 20'.9	51'.7
02	225° 00'.4	240° 15'.1	43'.1	221° 09'.8	41'.1	209° 19'.3	31'.0	31° 23'.5	51'.7
03	240° 02'.9	255° 14'.7	42'.0	236° 10'.5	41'.8	224° 21'.2	31'.3	46° 26'.2	51'.6
04	255° 05'.4	270° 14'.3	40'.9	251° 11'.2	42'.6	239° 23'.1	31'.5	61° 28'.8	51'.5
05	270° 07'.8	285° 13'.9	39'.9	266° 11'.9	43'.4	254° 25'.1	31'.7	76° 31'.5	51'.4
06	285° 10'.3	300° 13'.6	38'.8	281° 12'.5	44'.2	269° 27'.0	32'.0	91° 34'.1	51'.4
07	300° 12'.8	315° 13'.2	37'.7	296° 13'.2	45'.0	284° 28'.9	32'.2	106° 36'.8	51'.3
08	315° 15'.2	330° 12'.8	36'.6	311° 13'.9	45'.8	299° 30'.8	32'.4	121° 39'.4	51'.2
09	330° 17'.7	345° 12'.4	35'.6	326° 14'.6	46'.5	314° 32'.7	32'.7	136° 42'.0	51'.1
10	345° 20'.2	0° 12'.0	34'.5	341° 15'.3	47'.3	329° 34'.6	32'.9	151° 44'.7	51'.1
11	0° 22'.6	15° 11'.7	33'.4	356° 16'.0	48'.1	344° 36'.5	33'.1	166° 47'.3	51'.0
12	15° 25'.1	30° 11'.3	7° 32'.4 S	11° 16'.7	0° 48'.9 N	359° 38'.4	5° 33'.4 N	181° 50'.0	2° 50'.9 S
13	30° 27'.5	45° 10'.9	31'.3	26° 17'.4	49'.7	14° 40'.3	33'.6	196° 52'.6	50'.8
14	45° 30'.0	60° 10'.5	30'.2	41° 18'.0	50'.5	29° 42'.2	33'.8	211° 55'.3	50'.8
15	60° 32'.5	75° 10'.2	29'.1	56° 18'.7	51'.3	44° 44'.1	34'.1	226° 57'.9	50'.7
16	75° 34'.9	90° 09'.8	28'.1	71° 19'.4	52'.0	59° 46'.0	34'.3	242° 00'.5	50'.6
17	90° 37'.4	105° 09'.4	27'.0	86° 20'.1	52'.8	74° 47'.9	34'.5	257° 03'.2	50'.5
18	105° 39'.9	120° 09'.0	25'.9	101° 20'.8	53'.6	89° 49'.8	34'.7	272° 05'.8	50'.5
19	120° 42'.3	135° 08'.7	24'.8	116° 21'.5	54'.4	104° 51'.7	35'.0	287° 08'.5	50'.4
20	135° 44'.8	150° 08'.3	23'.8	131° 22'.2	55'.2	119° 53'.6	35'.2	302° 11'.1	50'.3
21	150° 47'.3	165° 07'.9	22'.7	146° 22'.9	56'.0	134° 55'.5	35'.4	317° 13'.8	50'.2
22	165° 49'.7	180° 07'.5	21'.6	161° 23'.5	56'.8	149° 57'.4	35'.7	332° 16'.4	50'.2
23	180° 52'.2	195° 07'.2	20'.5	176° 24'.2	57'.5	164° 59'.3	35'.9	347° 19'.0	50'.1
8 Friday									
00	195° 54'.7	210° 06'.8	7° 19'.4 S	191° 24'.9	0° 58'.3 N	180° 01'.2	5° 36'.1 N	2° 21'.7	2° 50'.0 S
01	210° 57'.1	225° 06'.4	18'.4	206° 25'.6	59'.1	195° 03'.1	36'.4	17° 24'.3	49'.9
02	225° 59'.6	240° 06'.0	17'.3	221° 26'.3	59'.9	210° 05'.0	36'.6	32° 27'.0	49'.9
03	241° 02'.0	255° 05'.7	16'.2	236° 27'.0	1° 00'.7 N	225° 06'.9	36'.8	47° 29'.6	49'.8
04	256° 04'.5	270° 05'.3	15'.1	251° 27'.7	01'.5	240° 08'.8	37'.1	62° 32'.3	49'.7
05	271° 07'.0	285° 04'.9	14'.0	266° 28'.4	02'.2	255° 10'.7	37'.3	77° 34'.9	49'.6
06	286° 09'.4	300° 04'.5	13'.0	281° 29'.1	03'.0	270° 12'.6	37'.5	92° 37'.5	49'.6
07	301° 11'.9	315° 04'.2	11'.9	296° 29'.7	03'.8	285° 14'.5	37'.8	107° 40'.2	49'.5
08	316° 14'.4	330° 03'.8	10'.8	311° 30'.4	04'.6	300° 16'.4	38'.0	122° 42'.8	49'.4
09	331° 16'.8	345° 03'.4	09'.7	326° 31'.1	05'.4	315° 18'.3	38'.2	137° 45'.5	49'.3
10	346° 19'.3	0° 03'.1	08'.6	341° 31'.8	06'.2	330° 20'.2	38'.5	152° 48'.1	49'.3
11	1° 21'.8	15° 02'.7	07'.6	356° 32'.5	06'.9	345° 22'.1	38'.7	167° 50'.8	49'.2
12	16° 24'.2	30° 02'.3	7° 06'.5 S	11° 33'.2	1° 07'.7 N	0° 24'.0	5° 38'.9 N	182° 53'.4	2° 49'.1 S
13	31° 26'.7	45° 01'.9	05'.4	26° 33'.9	08'.5	15° 25'.9	39'.2	197° 56'.0	49'.0
14	46° 29'.2	60° 01'.6	04'.3	41° 34'.6	09'.3	30° 27'.8	39'.4	212° 58'.7	49'.0
15	61° 31'.6	75° 01'.2	03'.2	56° 35'.2	10'.1	45° 29'.8	39'.6	228° 01'.3	48'.9
16	76° 34'.1	90° 00'.8	02'.1	71° 35'.9	10'.9	60° 31'.7	39'.8	243° 04'.0	48'.8
17	91° 36'.5	105° 00'.5	01'.0	86° 36'.6	11'.6	75° 33'.6	40'.1	258° 06'.6	48'.7
18	106° 39'.0	120° 00'.1	00'.0	101° 37'.3	12'.4	90° 35'.5	40'.3	273° 09'.3	48'.7
19	121° 41'.5	134° 59'.7	6° 58'.9 S	116° 38'.0	13'.2	105° 37'.4	40'.5	288° 11'.9	48'.6
20	136° 43'.9	149° 59'.3	57'.8	131° 38'.7	14'.0	120° 39'.3	40'.8	303° 14'.5	48'.5
21	151° 46'.4	164° 59'.0	56'.7	146° 39'.4	14'.8	135° 41'.2	41'.0	318° 17'.2	48'.4
22	166° 48'.9	179° 58'.6	55'.6	161° 40'.1	15'.6	150° 43'.1	41'.2	333° 19'.8	48'.4
23	181° 51'.3	194° 58'.2	54'.5	176° 40'.8	16'.4	165° 45'.0	41'.5	348° 22'.5	48'.3
9 Saturday									
00	196° 53'.8	209° 57'.9	6° 53'.4 S	191° 41'.4	1° 17'.1 N	180° 46'.9	5° 41'.7 N	3° 25'.1	2° 48'.2 S
01	211° 56'.3	224° 57'.5	52'.4	206° 42'.1	17'.9	195° 48'.8	41'.9	18° 27'.8	48'.1
02	226° 58'.7	239° 57'.1	51'.3	221° 42'.8	18'.7	210° 50'.7	42'.2	33° 30'.4	48'.1
03	242° 01'.2	254° 56'.8	50'.2	236° 43'.5	19'.5	225° 52'.6	42'.4	48° 33'.0	48'.0
04	257° 03'.6	269° 56'.4	49'.1	251° 44'.2	20'.3	240° 54'.5	42'.6	63° 35'.7	47'.9
05	272° 06'.1	284° 56'.0	48'.0	266° 44'.9	21'.0	255° 56'.4	42'.9	78° 38'.3	47'.8
06	287° 08'.6	299° 55'.7	46'.9	281° 45'.6	21'.8	270° 58'.3	43'.1	93° 41'.0	47'.8
07	302° 11'.0	314° 55'.3	45'.8	296° 46'.3	22'.6	286° 00'.2	43'.3	108° 43'.6	47'.7
08	317° 13'.5	329° 54'.9	44'.7	311° 47'.0	23'.4	301° 02'.1	43'.5	123° 46'.2	47'.6
09	332° 16'.0	344° 54'.6	43'.6	326° 47'.7	24'.2	316° 04'.0	43'.8	138° 48'.9	47'.5
10	347° 18'.4	359° 54'.2	42'.6	341° 48'.3	25'.0	331° 05'.9	44'.0	153° 51'.5	47'.5
11	2° 20'.9	14° 53'.8	41'.5	356° 49'.0	25'.7	346° 07'.8	44'.2	168° 54'.2	47'.4
12	17° 23'.4	29° 53'.5	6° 40'.4 S	11° 49'.7	1° 26'.5 N	1° 09'.7	5° 44'.5 N	183° 56'.8	2° 47'.3 S
13	32° 25'.8	44° 53'.1	39'.3	26° 50'.4	27'.3	16° 11'.6	44'.7	198° 59'.5	47'.2
14	47° 28'.3	59° 52'.7	38'.2	41° 51'.1	28'.1	31° 13'.5	44'.9	214° 02'.1	47'.2
15	62° 30'.8	74° 52'.4	37'.1	56° 51'.8	28'.9	46° 15'.4	45'.2	229° 04'.7	47'.1
16	77° 33'.2	89° 52'.0	36'.0	71° 52'.5	29'.7	61° 17'.3	45'.4	244° 07'.4	47'.0
17	92° 35'.7	104° 51'.6	34'.9	86° 53'.2	30'.4	76° 19'.2	45'.6	259° 10'.0	47'.0
18	107° 38'.1	119° 51'.3	33'.8	101° 53'.9	31'.2	91° 21'.1	45'.9	274° 12'.7	46'.9
19	122° 40'.6	134° 50'.9	32'.7	116° 54'.5	32'.0	106° 23'.0	46'.1	289° 15'.3	46'.8
20	137° 43'.1	149° 50'.5	31'.6	131° 55'.2	32'.8	121° 24'.9	46'.3	304° 18'.0	46'.7
21	152° 45'.5	164° 50'.2	30'.5	146° 55'.9	33'.6	136° 26'.8	46'.6	319° 20'.6	46'.7
22	167° 48'.0	179° 49'.8	29'.4	161° 56'.6	34'.4	151° 28'.7	46'.8	334° 23'.2	46'.6
23	182° 50'.5	194° 49'.4	28'.3	176° 57'.3	35'.1	166° 30'.6	47'.0	349° 25'.9	46'.5
	M.P. 10:51	v -0'.4	d 1'.1	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.8 S
Acrux	173° 10'.5	63° 09'.9 S
Adhara	255° 13'.8	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 45'.9	46° 54'.2 S
Alnilam	275° 48'.1	1° 11'.9 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.8	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.6 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 31'.0	69° 02'.7 S
Avior	234° 18'.6	59° 33'.1 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 57'.0	52° 42'.5 S
Capella	280° 37'.0	46° 00'.6 N
Deneb	49° 32'.8	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.7	51° 29'.0 N
Enif	33° 48'.9	9° 55'.5 N
Fomalhaut	15° 26'.0	29° 33'.7 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.8	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.7	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.2	26° 16'.9 S
Peacock	53° 21'.8	56° 41'.6 S
Polaris	318° 58'.3	89° 18'.9 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.3	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.4 S
Schedar	349° 43'.0	56° 35'.9 N
Shaula	96° 23'.9	37° 06'.6 S
Sirius	258° 35'.1	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.4	43° 29'.1 S
Vega	80° 40'.0	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	14° 12'.1	10:00
Mars	355° 30'.3	11:14
Jupiter	344° 06'.6	11:58
Saturn	166° 27'.0	23:46

SUN

GHA	Dec
179° 24'.5	6° 37'.0 N
194° 24'.7	37'.9
209° 24'.8	38'.9
224° 25'.0	39'.8
239° 25'.2	40'.7
254° 25'.4	41'.7
269° 25'.5	42'.6
284° 25'.7	43'.6
299° 25'.9	44'.5
314° 26'.1	45'.5
329° 26'.2	46'.4
344° 26'.4	47'.3
359° 26'.6	6° 48'.3 N
14° 26'.8	49'.2
29° 26'.9	50'.2
44° 27'.1	51'.1
59° 27'.3	52'.0
74° 27'.5	53'.0
89° 27'.6	53'.9
104° 27'.8	54'.9
119° 28'.0	55'.8
134° 28'.2	56'.7
149° 28'.3	57'.7
164° 28'.5	58'.6
179° 28'.7	6° 59'.5 N
194° 28'.8	7° 00'.5 N
209° 29'.0	01'.4
224° 29'.2	02'.4
239° 29'.4	03'.3
254° 29'.5	04'.2
269° 29'.7	05'.2
284° 29'.9	06'.1
299° 30'.1	07'.0
314° 30'.2	08'.0
329° 30'.4	08'.9
344° 30'.6	09'.9
359° 30'.8	7° 10'.8 N
14° 30'.9	11'.7
29° 31'.1	12'.7
44° 31'.3	13'.6
59° 31'.4	14'.5
74° 31'.6	15'.5
89° 31'.8	16'.4
104° 32'.0	17'.3
119° 32'.1	18'.3
134° 32'.3	19'.2
149° 32'.5	20'.1
164° 32'.6	21'.1
179° 32'.8	7° 22'.0 N
194° 33'.0	22'.9
209° 33'.2	23'.9
224° 33'.3	24'.8
239° 33'.5	25'.7
254° 33'.7	26'.7
269° 33'.8	27'.6
284° 34'.0	28'.5
299° 34'.2	29'.5
314° 34'.4	30'.4
329° 34'.5	31'.3
344° 34'.7	32'.3
359° 34'.9	7° 33'.2 N
14° 35'.0	34'.1
29° 35'.2	35'.0
44° 35'.4	36'.0
59° 35'.5	36'.9
74° 35'.7	37'.8
89° 35'.9	38'.8
104° 36'.1	39'.7
119° 36'.2	40'.6
134° 36'.4	41'.5
149° 36'.6	42'.5
164° 36'.7	43'.4
SD 16'.0	d 0'.9

MOON

GHA	v	Dec	d	HP
143° 46'.0	11'.2	21° 23'.2 N	5'.3	54'.9
158° 16'.2	11'.2	28'.5	5'.3	
172° 46'.4	11'.1	33'.8	5'.1	
187° 16'.5	11'.0	38'.9	5'.0	
201° 46'.5	11'.0	43'.9	4'.9	
216° 16'.5	11'.0	48'.8	4'.8	
230° 46'.5	10'.9	53'.6	4'.7	55'.0
245° 16'.4	10'.8	58'.3	4'.6	
259° 46'.2	10'.8	22° 02'.9 N	4'.5	
274° 16'.0	10'.7	07'.4	4'.4	
288° 45'.7	10'.7	11'.8	4'.3	
303° 15'.4	10'.6	16'.1	4'.2	55'.1
317° 45'.0	10'.6	22° 20'.3 N	4'.1	55'.1
332° 14'.6	10'.5	24'.4	3'.9	
346° 44'.1	10'.5	28'.3	3'.9	
1° 13'.6	10'.4	32'.2	3'.7	
15° 43'.0	10'.3	35'.9	3'.7	55'.2
30° 12'.3	10'.3	39'.6	3'.5	
44° 41'.6	10'.3	43'.1	3'.4	
59° 10'.9	10'.2	46'.5	3'.3	
73° 40'.1	10'.2	49'.8	3'.2	
88° 09'.3	10'.1	53'.0	3'.0	55'.3
102° 38'.4	10'.1	56'.0	3'.0	
117° 07'.5	10'.0	59'.0	2'.8	
131° 36'.5	10'.0	23° 01'.8 N	2'.7	55'.3
146° 05'.5	9'.9	04'.5	2'.6	
160° 34'.4	9'.9	07'.1	2'.5	55'.4
175° 03'.3	9'.9	09'.6	2'.4	
189° 32'.2	9'.8	12'.0	2'.3	
204° 01'.0	9'.7	14'.3	2'.1	
218° 29'.7	9'.7	16'.4	2'.0	
232° 58'.4	9'.7	18'.4	1'.9	55'.5
247° 27'.1	9'.7	20'.3	1'.8	
261° 55'.8	9'.6	22'.1	1'.6	
276° 24'.4	9'.5	23'.7	1'.6	
290° 52'.9	9'.5	25'.3	1'.4	55'.6
305° 21'.4	9'.5	23° 26'.7 N	1'.3	55'.6
319° 49'.9	9'.5	28'.0	1'.2	
334° 18'.4	9'.4	29'.2	1'.0	
348° 46'.8	9'.3	30'.2	0'.9	55'.7
3° 15'.1	9'.4	31'.1	0'.8	
17° 43'.5	9'.3	31'.9	0'.7	
32° 11'.8	9'.3	32'.6	0'.6	
46° 40'.1	9'.2	33'.2	0'.4	55'.8
61° 08'.3	9'.2	33'.6	0'.3	
75° 36'.5	9'.2	33'.9	0'.2	
90° 04'.7	9'.2	34'.1	0'.0	
104° 32'.9	9'.1	34'.1	0'.0	55'.9
119° 01'.0	9'.1	23° 34'.1 N	0'.2	55'.9
133° 29'.1	9'.0	33'.9	0'.4	
147° 57'.1	9'.1	33'.5	0'.4	
162° 25'.2	9'.0	33'.1	0'.6	56'.0
176° 53'.2	9'.0	32'.5	0'.7	
191° 21'.2	9'.0	31'.8	0'.8	
205° 49'.2	8'.9	31'.0	1'.0	
220° 17'.1	8'.9	30'.0	1'.1	56'.1
234° 45'.0	8'.9	28'.9	1'.2	
249° 12'.9	8'.9	27'.7	1'.3	
263° 40'.8	8'.9	26'.4	1'.5	
278° 08'.7	8'.8	24'.9	1'.6	56'.2
292° 36'.5	8'.9	23° 23'.3 N	1'.7	56'.2
307° 04'.4	8'.8	21'.6	1'.9	
321° 32'.2	8'.8	19'.7	2'.0	56'.3
336° 00'.0	8'.8	17'.7	2'.1	
350° 27'.8	8'.7	15'.6	2'.2	
4° 55'.5	8'.8	13'.4	2'.4	
19° 23'.3	8'.7	11'.0	2'.5	56'.4
33° 51'.0	8'.8	08'.5	2'.7	
48° 18'.8	8'.7	05'.8	2'.7	
62° 46'.5	8'.7	03'.1	2'.9	56'.5
77° 14'.2	8'.7	00'.2	3'.0	
91° 41'.9	8'.7	22° 57'.2 N	3'.2	
SD 15'.0		15'.1	15'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 7	Moonrise 8	Moonrise 9
N 72°	-	02:58	04:21	-	-	-
N 70°	01:15	03:21	04:32	-	-	-
68°	02:03	03:38	04:41	03:19	-	-
66°	02:33	03:52	04:49	04:21	04:29	05:09
64°	02:54	04:04	04:55	04:56	05:20	06:07
62°	03:11	04:13	05:01	05:21	05:51	06:40
60°	03:25	04:21	05:05	05:41	06:15	07:05
N 58°	03:37	04:28	05:10	05:58	06:34	07:25
56°	03:46	04:35	05:13	06:12	06:50	07:41
54°	03:55	04:40	05:17	06:24	07:04	07:55
52°	04:02	04:45	05:20	06:35	07:16	08:07
50°	04:09	04:49	05:23	06:44	07:26	08:18
45°	04:23	04:59	05:29	07:05	07:48	08:40
N 40°	04:33	05:06	05:34	07:21	08:06	08:58
35°	04:42	05:12	05:38	07:35	08:21	09:14
30°	04:49	05:17	05:42	07:47	08:34	09:27
20°	05:00	05:26	05:48	08:08	08:56	09:49
N 10°	05:08	05:32	05:54	08:26	09:16	10:09
0°	05:14	05:38	05:59	08:43	09:34	10:27
S 10°	05:18	05:43	06:04	09:00	09:52	10:45
20°	05:21	05:47	06:09	09:18	10:12	11:04
30°	05:23	05:51	06:15	09:39	10:34	11:27
35°	05:23	05:52	06:18	09:52	10:47	11:40
40°	05:23	05:54	06:22	10:06	11:02	11:55
45°	05:22	05:56	06:26	10:23	11:21	12:13
S 50°	05:21	05:58	06:31	10:44	11:43	12:36
52°	05:20	05:59	06:33	10:54	11:54	12:46
54°	05:19	06:00	06:36	11:05	12:06	12:59
56°	05:18	06:01	06:38	11:18	12:20	13:13
58°	05:17	06:02	06:42	11:33	12:37	13:29
S 60°	05:15	06:03	06:45	11:51	12:57	13:48
S 62°	05:13	06:04	06:49	12:14	13:22	14:13

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 7	Moonset 8	Moonset 9
N 72°	19:47	21:12	-	-	-	-
N 70°	19:35	20:47	23:03	-	-	-
68°	19:25	20:29	22:08	01:33	-	-
66°	19:17	20:15	21:36	00:31	02:08	03:18
64°	19:11	20:03	21:13	-	01:18	02:20
62°	19:05	19:53	20:56	-	00:46	01:46
60°	19:00	19:44	20:41	-	00:23	01:22
N 58°	18:56	19:37	20:30	-	00:04	01:02
56°	18:52	19:31	20:19	23:48	-	00:46
54°	18:48	19:25	20:11	23:35	-	00:32
52°	18:45	19:20	20:03	23:23	-	00:19
50°	18:42	19:16	19:56	23:13	-	00:09
45°	18:36	19:06	19:42	22:51	23:46	24:36
N 40°	18:31	18:59	19:31	22:33	23:28	24:18
35°	18:27	18:52	19:23	22:18	23:13	24:04
30°	18:23	18:47	19:16	22:06	23:00	23:51
20°	18:16	18:38	19:04	21:44	22:37	23:29
N 10°	18:10	18:32	18:56	21:25	22:17	23:10
0°	18:05	18:26	18:50	21:07	21:59	22:52
S 10°	18:00	18:21	18:46	20:50	21:41	22:35
20°	17:55	18:17	18:43	20:31	21:21	22:16
30°	17:49	18:13	18:41	20:09	20:59	21:53
35°	17:46	18:11	18:40	19:56	20:45	21:40
40°	17:42	18:09	18:40	19:41	20:30	21:26
45°	17:37	18:07	18:41	19:24	20:12	21:08
S 50°	17:32	18:05	18:42	19:02	19:49	20:45
52°	17:30	18:04	18:43	18:52	19:38	20:35
54°	17:27	18:03	18:44	18:41	19:26	20:23
56°	17:24	18:02	18:45	18:27	19:12	20:09
58°	17:21	18:01	18:46	18:12	18:55	19:53
S 60°	17:18	18:00	18:48	17:54	18:35	19:34
S 62°	17:14	17:58	18:49	17:31	18:10	19:09

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
7	2 22	2 14	12:02	14:55	02:30	4d 14%
8	2 06	1 57	12:02	15:47	03:20	5d 21%
9	1 49	1 41	12:02	16:40	04:13	6d 30%

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2011 April 10, 11, 12 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
10 Sunday 00	197° 52'.9	209° 49'.1	6° 27'.2 S	191° 58'.0	1° 35'.9 N	181° 32'.5	5° 47'.2 N	4° 28'.5	2° 46'.4 S
01	212° 55'.4	224° 48'.7	26'.2	206° 58'.7	36'.7	196° 34'.4	47'.5	19° 31'.2	46'.4
02	227° 57'.9	239° 48'.3	25'.1	221° 59'.4	37'.5	211° 36'.3	47'.7	34° 33'.8	46'.3
03	243° 00'.3	254° 48'.0	24'.0	237° 00'.1	38'.3	226° 38'.3	47'.9	49° 36'.4	46'.2
04	258° 02'.8	269° 47'.6	22'.9	252° 00'.8	39'.0	241° 40'.2	48'.2	64° 39'.1	46'.1
05	273° 05'.3	284° 47'.3	21'.8	267° 01'.4	39'.8	256° 42'.1	48'.4	79° 41'.7	46'.1
06	288° 07'.7	299° 46'.9	20'.7	282° 02'.1	40'.6	271° 44'.0	48'.6	94° 44'.4	46'.0
07	303° 10'.2	314° 46'.5	19'.6	297° 02'.8	41'.4	286° 45'.9	48'.9	109° 47'.0	45'.9
08	318° 12'.6	329° 46'.2	18'.5	312° 03'.5	42'.2	301° 47'.8	49'.1	124° 49'.7	45'.8
09	333° 15'.1	344° 45'.8	17'.4	327° 04'.2	43'.0	316° 49'.7	49'.3	139° 52'.3	45'.8
10	348° 17'.6	359° 45'.4	16'.3	342° 04'.9	43'.7	331° 51'.6	49'.6	154° 54'.9	45'.7
11	3° 20'.0	14° 45'.1	15'.2	357° 05'.6	44'.5	346° 53'.5	49'.8	169° 57'.6	45'.6
12	18° 22'.5	29° 44'.7	6° 14'.1 S	12° 06'.3	1° 45'.3 N	1° 55'.4	5° 50'.0 N	185° 00'.2	2° 45'.5 S
13	33° 25'.0	44° 44'.4	13'.0	27° 07'.0	46'.1	16° 57'.3	50'.2	200° 02'.9	45'.5
14	48° 27'.4	59° 44'.0	11'.9	42° 07'.7	46'.9	31° 59'.2	50'.5	215° 05'.5	45'.4
15	63° 29'.9	74° 43'.6	10'.8	57° 08'.4	47'.6	47° 01'.1	50'.7	230° 08'.1	45'.3
16	78° 32'.4	89° 43'.3	09'.7	72° 09'.0	48'.4	62° 03'.0	50'.9	245° 10'.8	45'.3
17	93° 34'.8	104° 42'.9	08'.6	87° 09'.7	49'.2	77° 04'.9	51'.2	260° 13'.4	45'.2
18	108° 37'.3	119° 42'.6	07'.5	102° 10'.4	50'.0	92° 06'.8	51'.4	275° 16'.1	45'.1
19	123° 39'.8	134° 42'.2	06'.4	117° 11'.1	50'.8	107° 08'.7	51'.6	290° 18'.7	45'.0
20	138° 42'.2	149° 41'.8	05'.3	132° 11'.8	51'.5	122° 10'.6	51'.9	305° 21'.4	45'.0
21	153° 44'.7	164° 41'.5	04'.2	147° 12'.5	52'.3	137° 12'.5	52'.1	320° 24'.0	44'.9
22	168° 47'.1	179° 41'.1	03'.1	162° 13'.2	53'.1	152° 14'.4	52'.3	335° 26'.6	44'.8
23	183° 49'.6	194° 40'.8	02'.0	177° 13'.9	53'.9	167° 16'.3	52'.6	350° 29'.3	44'.7
11 Monday 00	198° 52'.1	209° 40'.4	6° 00'.9 S	192° 14'.6	1° 54'.7 N	182° 18'.2	5° 52'.8 N	5° 31'.9	2° 44'.7 S
01	213° 54'.5	224° 40'.0	5° 59'.8 S	207° 15'.3	55'.5	197° 20'.1	53'.0	20° 34'.6	44'.6
02	228° 57'.0	239° 39'.7	58'.7	222° 15'.9	56'.2	212° 22'.0	53'.2	35° 37'.2	44'.5
03	243° 59'.5	254° 39'.3	57'.5	237° 16'.6	57'.0	227° 23'.9	53'.5	50° 39'.8	44'.4
04	259° 01'.9	269° 39'.0	56'.4	252° 17'.3	57'.8	242° 25'.8	53'.7	65° 42'.5	44'.4
05	274° 04'.4	284° 38'.6	55'.3	267° 18'.0	58'.6	257° 27'.7	53'.9	80° 45'.1	44'.3
06	289° 06'.9	299° 38'.2	54'.2	282° 18'.7	59'.4	272° 29'.6	54'.2	95° 47'.8	44'.2
07	304° 09'.3	314° 37'.9	53'.1	297° 19'.4	2° 00'.1 N	287° 31'.5	54'.4	110° 50'.4	44'.2
08	319° 11'.8	329° 37'.5	52'.0	312° 20'.1	00'.9	302° 33'.4	54'.6	125° 53'.1	44'.1
09	334° 14'.2	344° 37'.2	50'.9	327° 20'.8	01'.7	317° 35'.3	54'.9	140° 55'.7	44'.0
10	349° 16'.7	359° 36'.8	49'.8	342° 21'.5	02'.5	332° 37'.2	55'.1	155° 58'.3	43'.9
11	4° 19'.2	14° 36'.5	48'.7	357° 22'.2	03'.3	347° 39'.1	55'.3	171° 01'.0	43'.9
12	19° 21'.6	29° 36'.1	5° 47'.6 S	12° 22'.9	2° 04'.0 N	2° 41'.0	5° 55'.5 N	186° 03'.6	2° 43'.8 S
13	34° 24'.1	44° 35'.7	46'.5	27° 23'.5	04'.8	17° 43'.0	55'.8	201° 06'.3	43'.7
14	49° 26'.6	59° 35'.4	45'.4	42° 24'.2	05'.6	32° 44'.9	56'.0	216° 08'.9	43'.6
15	64° 29'.0	74° 35'.0	44'.3	57° 24'.9	06'.4	47° 46'.8	56'.2	231° 11'.5	43'.6
16	79° 31'.5	89° 34'.7	43'.2	72° 25'.6	07'.2	62° 48'.7	56'.5	246° 14'.2	43'.5
17	94° 34'.0	104° 34'.3	42'.1	87° 26'.3	07'.9	77° 50'.6	56'.7	261° 16'.8	43'.4
18	109° 36'.4	119° 34'.0	40'.9	102° 27'.0	08'.7	92° 52'.5	56'.9	276° 19'.5	43'.3
19	124° 38'.9	134° 33'.6	39'.8	117° 27'.7	09'.5	107° 54'.4	57'.2	291° 22'.1	43'.3
20	139° 41'.4	149° 33'.3	38'.7	132° 28'.4	10'.3	122° 56'.3	57'.4	306° 24'.7	43'.2
21	154° 43'.8	164° 32'.9	37'.6	147° 29'.1	11'.0	137° 58'.2	57'.6	321° 27'.4	43'.1
22	169° 46'.3	179° 32'.5	36'.5	162° 29'.8	11'.8	153° 00'.1	57'.8	336° 30'.0	43'.1
23	184° 48'.7	194° 32'.2	35'.4	177° 30'.5	12'.6	168° 02'.0	58'.1	351° 32'.7	43'.0
12 Tuesday 00	199° 51'.2	209° 31'.8	5° 34'.3 S	192° 31'.2	2° 13'.4 N	183° 03'.9	5° 58'.3 N	6° 35'.3	2° 42'.9 S
01	214° 53'.7	224° 31'.5	33'.2	207° 31'.8	14'.2	198° 05'.8	58'.5	21° 37'.9	42'.8
02	229° 56'.1	239° 31'.1	32'.1	222° 32'.5	14'.9	213° 07'.7	58'.8	36° 40'.6	42'.8
03	244° 58'.6	254° 30'.8	31'.0	237° 33'.2	15'.7	228° 09'.6	59'.0	51° 43'.2	42'.7
04	260° 01'.1	269° 30'.4	29'.8	252° 33'.9	16'.5	243° 11'.5	59'.2	66° 45'.9	42'.6
05	275° 03'.5	284° 30'.1	28'.7	267° 34'.6	17'.3	258° 13'.4	59'.5	81° 48'.5	42'.5
06	290° 06'.0	299° 29'.7	27'.6	282° 35'.3	18'.1	273° 15'.3	59'.7	96° 51'.2	42'.5
07	305° 08'.5	314° 29'.4	26'.5	297° 36'.0	18'.8	288° 17'.2	59'.9	111° 53'.8	42'.4
08	320° 10'.9	329° 29'.0	25'.4	312° 36'.7	19'.6	303° 19'.1	6° 00'.1 N	126° 56'.4	42'.3
09	335° 13'.4	344° 28'.7	24'.3	327° 37'.4	20'.4	318° 21'.0	00'.4	141° 59'.1	42'.3
10	350° 15'.9	359° 28'.3	23'.2	342° 38'.1	21'.2	333° 22'.9	00'.6	157° 01'.7	42'.2
11	5° 18'.3	14° 27'.9	22'.1	357° 38'.8	22'.0	348° 24'.8	00'.8	172° 04'.4	42'.1
12	20° 20'.8	29° 27'.6	5° 20'.9 S	12° 39'.4	2° 22'.7 N	3° 26'.7	6° 01'.1 N	187° 07'.0	2° 42'.0 S
13	35° 23'.2	44° 27'.2	19'.8	27° 40'.1	23'.5	18° 28'.6	01'.3	202° 09'.6	42'.0
14	50° 25'.7	59° 26'.9	18'.7	42° 40'.8	24'.3	33° 30'.5	01'.5	217° 12'.3	41'.9
15	65° 28'.2	74° 26'.5	17'.6	57° 41'.5	25'.1	48° 32'.4	01'.8	232° 14'.9	41'.8
16	80° 30'.6	89° 26'.2	16'.5	72° 42'.2	25'.8	63° 34'.3	02'.0	247° 17'.6	41'.7
17	95° 33'.1	104° 25'.8	15'.4	87° 42'.9	26'.6	78° 36'.2	02'.2	262° 20'.2	41'.7
18	110° 35'.6	119° 25'.5	14'.2	102° 43'.6	27'.4	93° 38'.1	02'.4	277° 22'.8	41'.6
19	125° 38'.0	134° 25'.1	13'.1	117° 44'.3	28'.2	108° 40'.0	02'.7	292° 25'.5	41'.5
20	140° 40'.5	149° 24'.8	12'.0	132° 45'.0	29'.0	123° 41'.9	02'.9	307° 28'.1	41'.5
21	155° 43'.0	164° 24'.4	10'.9	147° 45'.7	29'.7	138° 43'.8	03'.1	322° 30'.8	41'.4
22	170° 45'.4	179° 24'.1	09'.8	162° 46'.4	30'.5	153° 45'.7	03'.4	337° 33'.4	41'.3
23	185° 47'.9	194° 23'.7	08'.7	177° 47'.1	31'.3	168° 47'.7	03'.6	352° 36'.0	41'.2
	M.P. 10:39	v -0'.4	d 1'.1	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.8 S
Acrux	173° 10'.5	63° 09'.9 S
Adhara	255° 13'.8	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 45'.9	46° 54'.2 S
Alnilam	275° 48'.1	1° 11'.9 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.8	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 30'.9	69° 02'.7 S
Avior	234° 18'.6	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 57'.0	52° 42'.5 S
Capella	280° 37'.0	46° 00'.6 N
Deneb	49° 32'.7	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.8	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.7	51° 29'.0 N
Enif	33° 48'.8	9° 55'.5 N
Fomalhaut	15° 25'.9	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.8	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.3 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.7 S
Miaplacidus	221° 39'.7	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.2	26° 16'.9 S
Peacock	53° 21'.8	56° 41'.6 S
Polaris	318° 58'.6	89° 18'.9 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.3	5° 11'.6 N
Rasalhague	96° 07'.7	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.3	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.4 S
Schedar	349° 43'.0	56° 35'.9 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.5	43° 29'.1 S
Vega	80° 39'.9	38° 47'.4 N
Zuben'ubi	137° 06'.9	16° 05'.5 S

	SHA	Mer.Pass.
Venus	10° 48'.3	10:02
Mars	353° 22'.5	11:11
Jupiter	343° 26'.1	11:49
Saturn	166° 39'.8	23:34

SUN

GHA	Dec
179° 36'.9	7° 44'.3 N
194° 37'.1	45'.3
209° 37'.2	46'.2
224° 37'.4	47'.1
239° 37'.6	48'.0
254° 37'.7	49'.0
269° 37'.9	49'.9
284° 38'.1	50'.8
299° 38'.3	51'.7
314° 38'.4	52'.7
329° 38'.6	53'.6
344° 38'.8	54'.5
359° 38'.9	7° 55'.4 N
14° 39'.1	56'.4
29° 39'.3	57'.3
44° 39'.4	58'.2
59° 39'.6	59'.1
74° 39'.8	8° 00'.1 N
89° 39'.9	01'.0
104° 40'.1	01'.9
119° 40'.3	02'.8
134° 40'.4	03'.8
149° 40'.6	04'.7
164° 40'.8	05'.6
179° 40'.9	8° 06'.5 N
194° 41'.1	07'.4
209° 41'.3	08'.4
224° 41'.4	09'.3
239° 41'.6	10'.2
254° 41'.8	11'.1
269° 41'.9	12'.1
284° 42'.1	13'.0
299° 42'.3	13'.9
314° 42'.4	14'.8
329° 42'.6	15'.7
344° 42'.8	16'.7
359° 42'.9	8° 17'.6 N
14° 43'.1	18'.5
29° 43'.2	19'.4
44° 43'.4	20'.3
59° 43'.6	21'.2
74° 43'.7	22'.2
89° 43'.9	23'.1
104° 44'.1	24'.0
119° 44'.2	24'.9
134° 44'.4	25'.8
149° 44'.6	26'.7
164° 44'.7	27'.7
179° 44'.9	8° 28'.6 N
194° 45'.1	29'.5
209° 45'.2	30'.4
224° 45'.4	31'.3
239° 45'.5	32'.2
254° 45'.7	33'.2
269° 45'.9	34'.1
284° 46'.0	35'.0
299° 46'.2	35'.9
314° 46'.4	36'.8
329° 46'.5	37'.7
344° 46'.7	38'.6
359° 46'.8	8° 39'.6 N
14° 47'.0	40'.5
29° 47'.2	41'.4
44° 47'.3	42'.3
59° 47'.5	43'.2
74° 47'.7	44'.1
89° 47'.8	45'.0
104° 48'.0	45'.9
119° 48'.1	46'.9
134° 48'.3	47'.8
149° 48'.5	48'.7
164° 48'.6	49'.6

SD 16'.0 d 0'.9

MOON

GHA	v	Dec	d	HP
106° 09'.6	8'.7	22° 54'.0 N	3'.3	56'.5
120° 37'.3	8'.7	50'.7	3'.4	56'.6
135° 05'.0	8'.6	47'.3	3'.5	
149° 32'.6	8'.7	43'.8	3'.7	
164° 00'.3	8'.7	40'.1	3'.8	56'.7
178° 28'.0	8'.6	36'.3	3'.9	
192° 55'.6	8'.7	32'.4	4'.1	
207° 23'.3	8'.7	28'.3	4'.2	56'.8
221° 51'.0	8'.6	24'.1	4'.3	
236° 18'.6	8'.7	19'.8	4'.4	
250° 46'.3	8'.6	15'.4	4'.6	
265° 13'.9	8'.7	10'.8	4'.7	56'.9
279° 41'.6	8'.7	22° 06'.1 N	4'.8	56'.9
294° 09'.3	8'.6	01'.3	5'.0	
308° 36'.9	8'.7	21° 56'.3 N	5'.1	57'.0
323° 04'.6	8'.7	51'.2	5'.2	
337° 32'.3	8'.6	46'.0	5'.3	
351° 59'.9	8'.7	40'.7	5'.5	57'.1
6° 27'.6	8'.7	35'.2	5'.6	
20° 55'.3	8'.7	29'.6	5'.7	
35° 23'.0	8'.7	23'.9	5'.8	57'.2
49° 50'.7	8'.7	18'.1	6'.0	
64° 18'.4	8'.7	12'.1	6'.1	
78° 46'.1	8'.7	06'.0	6'.2	57'.3
93° 13'.8	8'.8	20° 59'.8 N	6'.4	57'.3
107° 41'.6	8'.7	53'.4	6'.4	
122° 09'.3	8'.8	47'.0	6'.6	57'.4
136° 37'.1	8'.7	40'.4	6'.7	
151° 04'.8	8'.8	33'.7	6'.9	
165° 32'.6	8'.8	26'.8	6'.9	57'.5
180° 00'.4	8'.8	19'.9	7'.1	
194° 28'.2	8'.8	12'.8	7'.2	
208° 56'.0	8'.8	05'.6	7'.3	57'.6
223° 23'.8	8'.9	19° 58'.3 N	7'.5	
237° 51'.7	8'.8	50'.8	7'.6	
252° 19'.5	8'.9	43'.2	7'.6	57'.7
266° 47'.4	8'.9	19° 35'.6 N	7'.9	57'.7
281° 15'.3	8'.8	27'.7	7'.9	
295° 43'.1	9'.0	19'.8	8'.0	57'.8
310° 11'.1	8'.9	11'.8	8'.2	
324° 39'.0	8'.9	03'.6	8'.3	
339° 06'.9	9'.0	18° 55'.3 N	8'.4	57'.9
353° 34'.9	8'.9	46'.9	8'.5	
8° 02'.8	9'.0	38'.4	8'.6	
22° 30'.8	9'.0	29'.8	8'.7	58'.0
36° 58'.8	9'.0	21'.1	8'.9	
51° 26'.8	9'.1	12'.2	8'.9	
65° 54'.9	9'.0	03'.3	9'.1	58'.1
80° 22'.9	9'.1	17° 54'.2 N	9'.2	58'.1
94° 51'.0	9'.1	45'.0	9'.3	58'.2
109° 19'.1	9'.1	35'.7	9'.4	
123° 47'.2	9'.1	26'.3	9'.6	
138° 15'.3	9'.1	16'.7	9'.6	58'.3
152° 43'.4	9'.2	07'.1	9'.7	
167° 11'.6	9'.2	16° 57'.4 N	9'.9	
181° 39'.8	9'.2	47'.5	9'.9	58'.4
196° 08'.0	9'.2	37'.6	10'.1	
210° 36'.2	9'.2	27'.5	10'.1	
225° 04'.4	9'.2	17'.4	10'.3	58'.5
239° 32'.6	9'.3	07'.1	10'.4	
254° 00'.9	9'.2	15° 56'.7 N	10'.5	58'.5
268° 29'.1	9'.3	46'.2	10'.5	58'.6
282° 57'.4	9'.3	35'.7	10'.7	
297° 25'.7	9'.4	25'.0	10'.8	58'.7
311° 54'.1	9'.3	14'.2	10'.9	
326° 22'.4	9'.3	03'.3	11'.0	
340° 50'.7	9'.4	14° 52'.3 N	11'.0	58'.8
355° 19'.1	9'.4	41'.3	11'.2	
9° 47'.5	9'.4	30'.1	11'.3	
24° 15'.9	9'.4	18'.8	11'.3	58'.9
38° 44'.3	9'.4	07'.5	11'.5	
53° 12'.7	9'.5	13° 56'.0 N	11'.5	

SD 15'.5 15'.7 16'.0

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 10	Moonrise 11	Moonrise 12
N 72°	-	02:35	04:04	-	-	08:38
N 70°	-	03:03	04:17	-	-	09:26
68°	01:37	03:23	04:28	-	07:47	09:56
66°	02:14	03:39	04:37	06:39	08:28	10:19
64°	02:39	03:52	04:45	07:22	08:55	10:37
62°	02:58	04:03	04:51	07:51	09:17	10:51
60°	03:13	04:12	04:57	08:12	09:34	11:03
N 58°	03:26	04:20	05:01	08:30	09:48	11:14
56°	03:37	04:26	05:06	08:45	10:00	11:23
54°	03:46	04:33	05:10	08:58	10:11	11:31
52°	03:55	04:38	05:13	09:09	10:21	11:38
50°	04:02	04:43	05:16	09:19	10:29	11:45
45°	04:17	04:53	05:23	09:40	10:47	11:58
N 40°	04:28	05:01	05:29	09:57	11:02	12:10
35°	04:38	05:08	05:34	10:11	11:14	12:19
30°	04:45	05:14	05:38	10:24	11:25	12:28
20°	04:57	05:23	05:46	10:45	11:43	12:42
N 10°	05:06	05:31	05:52	11:03	11:59	12:55
0°	05:13	05:37	05:58	11:20	12:14	13:07
S 10°	05:18	05:42	06:04	11:37	12:29	13:19
20°	05:22	05:47	06:10	11:56	12:45	13:31
30°	05:25	05:52	06:16	12:17	13:03	13:46
35°	05:25	05:55	06:20	12:29	13:13	13:54
40°	05:26	05:57	06:25	12:43	13:25	14:03
45°	05:26	06:00	06:30	13:00	13:40	14:14
S 50°	05:25	06:03	06:35	13:20	13:57	14:27
52°	05:25	06:04	06:38	13:30	14:05	14:34
54°	05:25	06:06	06:41	13:41	14:14	14:40
56°	05:24	06:07	06:44	13:53	14:24	14:48
58°	05:23	06:08	06:48	14:08	14:36	14:56
S 60°	05:22	06:10	06:52	14:24	14:49	15:06
S 62°	05:21	06:12	06:57	14:45	15:05	15:17

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 10	Moonset 11	Moonset 12
N 72°	20:02	21:33	-	-	-	05:27
N 70°	19:48	21:04	-	-	-	04:38
68°	19:37	20:43	22:34	-	04:24	04:06
66°	19:27	20:26	21:54	03:39	03:43	03:42
64°	19:20	20:13	21:27	02:56	03:14	03:24
62°	19:13	20:02	21:07	02:27	02:53	03:08
60°	19:07	19:53	20:51	02:05	02:35	02:55
N 58°	19:02	19:44	20:38	01:47	02:20	02:44
56°	18:58	19:37	20:27	01:32	02:07	02:34
54°	18:54	19:31	20:18	01:19	01:56	02:26
52°	18:50	19:26	20:09	01:07	01:46	02:18
50°	18:47	19:21	20:02	00:57	01:37	02:11
45°	18:40	19:10	19:47	00:36	01:19	01:56
N 40°	18:34	19:02	19:35	00:18	01:03	01:43
35°	18:29	18:55	19:25	00:04	00:50	01:33
30°	18:25	18:49	19:18	-	00:39	01:23
20°	18:17	18:39	19:05	-	00:19	01:07
N 10°	18:10	18:32	18:56	-	00:02	00:53
0°	18:04	18:25	18:50	23:46	-	00:39
S 10°	17:59	18:20	18:44	23:30	-	00:26
20°	17:52	18:15	18:40	23:13	-	00:11
30°	17:45	18:10	18:37	22:52	23:55	24:59
35°	17:42	18:07	18:36	22:41	23:45	24:51
40°	17:37	18:04	18:36	22:27	23:34	24:43
45°	17:32	18:02	18:36	22:11	23:20	24:33
S 50°	17:26	17:58	18:36	21:51	23:04	24:22
52°	17:23	17:57	18:36	21:42	22:56	24:16
54°	17:20	17:56	18:37	21:31	22:48	24:10
56°	17:17	17:54	18:37	21:19	22:38	24:03
58°	17:13	17:53	18:38	21:05	22:27	23:56
S 60°	17:09	17:51	18:39	20:49	22:15	23:47
S 62°	17:04	17:49	18:40	20:28	22:00	23:37

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
10	1 33	1 25	12:01	17:33	05:06	7d 40%
11	1 17	1 09	12:01	18:27	06:00	8d 50%
12	1 01	0 53	12:01	19:19	06:53	9d 61%

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2011 April 13, 14, 15 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
13 00	200° 50'.4	209° 23'.4	5° 07'.5 S	192° 47'.8	2° 32'.1 N	183° 49'.6	6° 03'.8 N	7° 38'.7	2° 41'.2 S
01	215° 52'.8	224° 23'.0	06'.4	207° 48'.4	32'.8	198° 51'.5	04'.1	22° 41'.3	41'.1
02	230° 55'.3	239° 22'.7	05'.3	222° 49'.1	33'.6	213° 53'.4	04'.3	37° 44'.0	41'.0
03	245° 57'.7	254° 22'.3	04'.2	237° 49'.8	34'.4	228° 55'.3	04'.5	52° 46'.6	40'.9
04	261° 00'.2	269° 22'.0	03'.1	252° 50'.5	35'.2	243° 57'.2	04'.7	67° 49'.2	40'.9
05	276° 02'.7	284° 21'.6	02'.0	267° 51'.2	35'.9	258° 59'.1	05'.0	82° 51'.9	40'.8
06	291° 05'.1	299° 21'.3	00'.8	282° 51'.9	36'.7	274° 01'.0	05'.2	97° 54'.5	40'.7
07	306° 07'.6	314° 20'.9	4° 59'.7 S	297° 52'.6	37'.5	289° 02'.9	05'.4	112° 57'.2	40'.7
08	321° 10'.1	329° 20'.6	58'.6	312° 53'.3	38'.3	304° 04'.8	05'.7	127° 59'.8	40'.6
09	336° 12'.5	344° 20'.2	57'.5	327° 54'.0	39'.1	319° 06'.7	05'.9	143° 02'.4	40'.5
10	351° 15'.0	359° 19'.9	56'.4	342° 54'.7	39'.8	334° 08'.6	06'.1	158° 05'.1	40'.4
11	6° 17'.5	14° 19'.5	55'.2	357° 55'.4	40'.6	349° 10'.5	06'.3	173° 07'.7	40'.4
12	21° 19'.9	29° 19'.2	4° 54'.1 S	12° 56'.1	2° 41'.4 N	4° 12'.4	6° 06'.6 N	188° 10'.4	2° 40'.3 S
13	36° 22'.4	44° 18'.8	53'.0	27° 56'.7	42'.2	19° 14'.3	06'.8	203° 13'.0	40'.2
14	51° 24'.8	59° 18'.5	51'.9	42° 57'.4	42'.9	34° 16'.2	07'.0	218° 15'.6	40'.2
15	66° 27'.3	74° 18'.1	50'.7	57° 58'.1	43'.7	49° 18'.1	07'.3	233° 18'.3	40'.1
16	81° 29'.8	89° 17'.8	49'.6	72° 58'.8	44'.5	64° 20'.0	07'.5	248° 20'.9	40'.0
17	96° 32'.2	104° 17'.5	48'.5	87° 59'.5	45'.3	79° 21'.9	07'.7	263° 23'.6	39'.9
18	111° 34'.7	119° 17'.1	47'.4	103° 00'.2	46'.0	94° 23'.8	08'.0	278° 26'.2	39'.9
19	126° 37'.2	134° 16'.8	46'.3	118° 00'.9	46'.8	109° 25'.7	08'.2	293° 28'.8	39'.8
20	141° 39'.6	149° 16'.4	45'.1	133° 01'.6	47'.6	124° 27'.6	08'.4	308° 31'.5	39'.7
21	156° 42'.1	164° 16'.1	44'.0	148° 02'.3	48'.4	139° 29'.5	08'.6	323° 34'.1	39'.6
22	171° 44'.6	179° 15'.7	42'.9	163° 03'.0	49'.1	154° 31'.4	08'.9	338° 36'.7	39'.6
23	186° 47'.0	194° 15'.4	41'.8	178° 03'.7	49'.9	169° 33'.3	09'.1	353° 39'.4	39'.5
14 00	201° 49'.5	209° 15'.0	4° 40'.6 S	193° 04'.4	2° 50'.7 N	184° 35'.2	6° 09'.3 N	8° 42'.0	2° 39'.4 S
01	216° 52'.0	224° 14'.7	39'.5	208° 05'.1	51'.5	199° 37'.1	09'.6	23° 44'.7	39'.4
02	231° 54'.4	239° 14'.3	38'.4	223° 05'.8	52'.3	214° 39'.0	09'.8	38° 47'.3	39'.3
03	246° 56'.9	254° 14'.0	37'.3	238° 06'.4	53'.0	229° 40'.9	10'.0	53° 49'.9	39'.2
04	261° 59'.3	269° 13'.6	36'.1	253° 07'.1	53'.8	244° 42'.8	10'.2	68° 52'.6	39'.1
05	277° 01'.8	284° 13'.3	35'.0	268° 07'.8	54'.6	259° 44'.7	10'.5	83° 55'.2	39'.1
06	292° 04'.3	299° 12'.9	33'.9	283° 08'.5	55'.4	274° 46'.6	10'.7	98° 57'.9	39'.0
07	307° 06'.7	314° 12'.6	32'.8	298° 09'.2	56'.1	289° 48'.6	10'.9	114° 00'.5	38'.9
08	322° 09'.2	329° 12'.3	31'.6	313° 09'.9	56'.9	304° 50'.5	11'.2	129° 03'.1	38'.9
09	337° 11'.7	344° 11'.9	30'.5	328° 10'.6	57'.7	319° 52'.4	11'.4	144° 05'.8	38'.8
10	352° 14'.1	359° 11'.6	29'.4	343° 11'.3	58'.5	334° 54'.3	11'.6	159° 08'.4	38'.7
11	7° 16'.6	14° 11'.2	28'.3	358° 12'.0	59'.2	349° 56'.2	11'.8	174° 11'.1	38'.6
12	22° 19'.1	29° 10'.9	4° 27'.1 S	13° 12'.7	3° 00'.0 N	4° 58'.1	6° 12'.1 N	189° 13'.7	2° 38'.6 S
13	37° 21'.5	44° 10'.5	26'.0	28° 13'.4	00'.8	20° 00'.0	12'.3	204° 16'.3	38'.5
14	52° 24'.0	59° 10'.2	24'.9	43° 14'.1	01'.5	35° 01'.9	12'.5	219° 19'.0	38'.4
15	67° 26'.4	74° 09'.8	23'.7	58° 14'.8	02'.3	50° 03'.8	12'.8	234° 21'.6	38'.4
16	82° 28'.9	89° 09'.5	22'.6	73° 15'.4	03'.1	65° 05'.7	13'.0	249° 24'.2	38'.3
17	97° 31'.4	104° 09'.2	21'.5	88° 16'.1	03'.9	80° 07'.6	13'.2	264° 26'.9	38'.2
18	112° 33'.8	119° 08'.8	20'.4	103° 16'.8	04'.6	95° 09'.5	13'.4	279° 29'.5	38'.1
19	127° 36'.3	134° 08'.5	19'.2	118° 17'.5	05'.4	110° 11'.4	13'.7	294° 32'.2	38'.1
20	142° 38'.8	149° 08'.1	18'.1	133° 18'.2	06'.2	125° 13'.3	13'.9	309° 34'.8	38'.0
21	157° 41'.2	164° 07'.8	17'.0	148° 18'.9	07'.0	140° 15'.2	14'.1	324° 37'.4	37'.9
22	172° 43'.7	179° 07'.4	15'.8	163° 19'.6	07'.7	155° 17'.1	14'.4	339° 40'.1	37'.9
23	187° 46'.2	194° 07'.1	14'.7	178° 20'.3	08'.5	170° 19'.0	14'.6	354° 42'.7	37'.8
15 00	202° 48'.6	209° 06'.8	4° 13'.6 S	193° 21'.0	3° 09'.3 N	185° 20'.9	6° 14'.8 N	9° 45'.4	2° 37'.7 S
01	217° 51'.1	224° 06'.4	12'.5	208° 21'.7	10'.1	200° 22'.8	15'.0	24° 48'.0	37'.6
02	232° 53'.6	239° 06'.1	11'.3	223° 22'.4	10'.8	215° 24'.7	15'.3	39° 50'.6	37'.6
03	247° 56'.0	254° 05'.7	10'.2	238° 23'.1	11'.6	230° 26'.6	15'.5	54° 53'.3	37'.5
04	262° 58'.5	269° 05'.4	09'.1	253° 23'.8	12'.4	245° 28'.5	15'.7	69° 55'.9	37'.4
05	278° 00'.9	284° 05'.0	07'.9	268° 24'.5	13'.2	260° 30'.4	16'.0	84° 58'.5	37'.4
06	293° 03'.4	299° 04'.7	06'.8	283° 25'.1	13'.9	275° 32'.3	16'.2	100° 01'.2	37'.3
07	308° 05'.9	314° 04'.4	05'.7	298° 25'.8	14'.7	290° 34'.2	16'.4	115° 03'.8	37'.2
08	323° 08'.3	329° 04'.0	04'.5	313° 26'.5	15'.5	305° 36'.1	16'.6	130° 06'.5	37'.1
09	338° 10'.8	344° 03'.7	03'.4	328° 27'.2	16'.3	320° 38'.0	16'.9	145° 09'.1	37'.1
10	353° 13'.3	359° 03'.3	02'.3	343° 27'.9	17'.0	335° 39'.9	17'.1	160° 11'.7	37'.0
11	8° 15'.7	14° 03'.0	01'.1	358° 28'.6	17'.8	350° 41'.8	17'.3	175° 14'.4	36'.9
12	23° 18'.2	29° 02'.6	4° 00'.0 S	13° 29'.3	3° 18'.6 N	5° 43'.8	6° 17'.6 N	190° 17'.0	2° 36'.9 S
13	38° 20'.7	44° 02'.3	3° 58'.9 S	28° 30'.0	19'.3	20° 45'.7	17'.8	205° 19'.6	36'.8
14	53° 23'.1	59° 02'.0	57'.7	43° 30'.7	20'.1	35° 47'.6	18'.0	220° 22'.3	36'.7
15	68° 25'.6	74° 01'.6	56'.6	58° 31'.4	20'.9	50° 49'.5	18'.2	235° 24'.9	36'.6
16	83° 28'.1	89° 01'.3	55'.5	73° 32'.1	21'.7	65° 51'.4	18'.5	250° 27'.6	36'.6
17	98° 30'.5	104° 00'.9	54'.3	88° 32'.8	22'.4	80° 53'.3	18'.7	265° 30'.2	36'.5
18	113° 33'.0	119° 00'.6	53'.2	103° 33'.5	23'.2	95° 55'.2	18'.9	280° 32'.8	36'.4
19	128° 35'.4	134° 00'.3	52'.1	118° 34'.2	24'.0	110° 57'.1	19'.2	295° 35'.5	36'.4
20	143° 37'.9	148° 59'.9	50'.9	133° 34'.9	24'.7	125° 59'.0	19'.4	310° 38'.1	36'.3
21	158° 40'.4	163° 59'.6	49'.8	148° 35'.5	25'.5	141° 00'.9	19'.6	325° 40'.7	36'.2
22	173° 42'.8	178° 59'.2	48'.7	163° 36'.2	26'.3	156° 02'.8	19'.8	340° 43'.4	36'.2
23	188° 45'.3	193° 58'.9	47'.5	178° 36'.9	27'.1	171° 04'.7	20'.1	355° 46'.0	36'.1
	M.P. 10:27	v -0'.3	d 1'.1	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.7 S
Acrux	173° 10'.6	63° 09'.9 S
Adhara	255° 13'.8	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.6	49° 15'.2 N
Alnair	27° 45'.9	46° 54'.2 S
Alnilam	275° 48'.1	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.8	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 30'.8	69° 02'.7 S
Avior	234° 18'.6	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 57'.0	52° 42'.5 S
Capella	280° 37'.0	46° 00'.6 N
Deneb	49° 32'.7	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.3 N
Diphda	348° 57'.7	17° 55'.5 S
Dubhe	193° 52'.9	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.6	51° 29'.0 N
Enif	33° 48'.8	9° 55'.6 N
Fomalhaut	15° 25'.9	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.7 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.7	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.4 N
Markab	13° 40'.2	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.7 S
Miaplacidus	221° 39'.8	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.2	26° 16'.9 S
Peacock	53° 21'.7	56° 41'.6 S
Polaris	318° 59'.0	89° 18'.9 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.7	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.7	8° 11'.5 S
Rigil Kent	139° 53'.3	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.4 S
Schedar	349° 43'.0	56° 35'.9 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.5	43° 29'.1 S
Vega	80° 39'.9	38° 47'.4 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	7° 25'.5	10:03
Mars	351° 14'.9	11:07
Jupiter	342° 45'.7	11:40
Saturn	166° 52'.5	23:21

SUN

GHA	Dec
179° 48'.8	8° 50'.5 N
194° 48'.9	51'.4
209° 49'.1	52'.3
224° 49'.3	53'.2
239° 49'.4	54'.1
254° 49'.6	55'.0
269° 49'.7	56'.0
284° 49'.9	56'.9
299° 50'.1	57'.8
314° 50'.2	58'.7
329° 50'.4	59'.6
344° 50'.5	9° 00'.5 N
359° 50'.7	9° 01'.4 N
14° 50'.9	02'.3
29° 51'.0	03'.2
44° 51'.2	04'.1
59° 51'.3	05'.0
74° 51'.5	05'.9
89° 51'.7	06'.8
104° 51'.8	07'.7
119° 52'.0	08'.6
134° 52'.1	09'.5
149° 52'.3	10'.5
164° 52'.4	11'.4
179° 52'.6	9° 12'.3 N
194° 52'.8	13'.2
209° 52'.9	14'.1
224° 53'.1	15'.0
239° 53'.2	15'.9
254° 53'.4	16'.8
269° 53'.5	17'.7
284° 53'.7	18'.6
299° 53'.9	19'.5
314° 54'.0	20'.4
329° 54'.2	21'.3
344° 54'.3	22'.2
359° 54'.5	9° 23'.1 N
14° 54'.6	24'.0
29° 54'.8	24'.9
44° 54'.9	25'.8
59° 55'.1	26'.7
74° 55'.3	27'.6
89° 55'.4	28'.5
104° 55'.6	29'.4
119° 55'.7	30'.3
134° 55'.9	31'.2
149° 56'.0	32'.1
164° 56'.2	33'.0
179° 56'.3	9° 33'.9 N
194° 56'.5	34'.8
209° 56'.6	35'.7
224° 56'.8	36'.6
239° 57'.0	37'.5
254° 57'.1	38'.4
269° 57'.3	39'.2
284° 57'.4	40'.1
299° 57'.6	41'.0
314° 57'.7	41'.9
329° 57'.9	42'.8
344° 58'.0	43'.7
359° 58'.2	9° 44'.6 N
14° 58'.3	45'.5
29° 58'.5	46'.4
44° 58'.6	47'.3
59° 58'.8	48'.2
74° 58'.9	49'.1
89° 59'.1	50'.0
104° 59'.2	50'.9
119° 59'.4	51'.8
134° 59'.5	52'.6
149° 59'.7	53'.5
164° 59'.8	54'.4
SD 15'.9	d 0'.9

MOON

GHA	v	Dec	d	HP
67° 41'.2	9'.4	13° 44'.5 N	11'.7	59'.0
82° 09'.6	9'.5	32'.8	11'.7	
96° 38'.1	9'.5	21'.1	11'.8	
111° 06'.6	9'.5	09'.3	11'.9	59'.1
125° 35'.1	9'.5	12° 57'.4 N	12'.0	
140° 03'.6	9'.5	45'.4	12'.1	
154° 32'.1	9'.5	33'.3	12'.2	59'.2
169° 00'.6	9'.6	21'.1	12'.3	
183° 29'.2	9'.5	08'.8	12'.3	
197° 57'.7	9'.6	11° 56'.5 N	12'.4	59'.3
212° 26'.3	9'.6	44'.1	12'.5	
226° 54'.9	9'.6	31'.6	12'.6	59'.4
241° 23'.5	9'.5	11° 19'.0 N	12'.7	59'.4
255° 52'.0	9'.6	06'.3	12'.7	
270° 20'.6	9'.7	10° 53'.6 N	12'.8	59'.5
284° 49'.3	9'.6	40'.8	12'.9	
299° 17'.9	9'.6	27'.9	13'.0	
313° 46'.5	9'.6	14'.9	13'.0	59'.6
328° 15'.1	9'.7	01'.9	13'.1	
342° 43'.8	9'.6	9° 48'.8 N	13'.2	
357° 12'.4	9'.6	35'.6	13'.3	59'.7
11° 41'.0	9'.7	22'.3	13'.3	
26° 09'.7	9'.6	09'.0	13'.4	
40° 38'.3	9'.7	8° 55'.6 N	13'.5	59'.8
55° 07'.0	9'.6	8° 42'.1 N	13'.5	59'.8
69° 35'.6	9'.7	28'.6	13'.6	
84° 04'.3	9'.7	15'.0	13'.6	
98° 33'.0	9'.6	01'.4	13'.7	59'.9
113° 01'.6	9'.7	7° 47'.7 N	13'.8	
127° 30'.3	9'.6	33'.9	13'.8	
141° 58'.9	9'.7	20'.1	13'.9	60'.0
156° 27'.6	9'.6	06'.2	14'.0	
170° 56'.2	9'.7	6° 52'.2 N	14'.0	
185° 24'.9	9'.6	38'.2	14'.0	60'.1
199° 53'.5	9'.6	24'.2	14'.1	
214° 22'.1	9'.7	10'.1	14'.2	
228° 50'.8	9'.6	5° 55'.9 N	14'.2	60'.2
243° 19'.4	9'.6	41'.7	14'.2	
257° 48'.0	9'.6	27'.5	14'.3	
272° 16'.6	9'.6	13'.2	14'.3	
286° 45'.2	9'.6	4° 58'.9 N	14'.4	60'.3
301° 13'.8	9'.6	44'.5	14'.4	
315° 42'.4	9'.6	30'.1	14'.5	
330° 11'.0	9'.5	15'.6	14'.5	60'.4
344° 39'.5	9'.6	01'.1	14'.5	
359° 08'.1	9'.5	3° 46'.6 N	14'.6	
13° 36'.6	9'.5	32'.0	14'.6	
28° 05'.1	9'.5	17'.4	14'.7	60'.5
42° 33'.6	9'.5	3° 02'.7 N	14'.6	60'.5
57° 02'.1	9'.5	2° 48'.1 N	14'.7	
71° 30'.6	9'.4	33'.4	14'.8	
85° 59'.0	9'.4	18'.6	14'.7	60'.6
100° 27'.4	9'.5	03'.9	14'.8	
114° 55'.9	9'.3	1° 49'.1 N	14'.8	
129° 24'.2	9'.4	34'.3	14'.8	
143° 52'.6	9'.4	19'.5	14'.9	60'.7
158° 21'.0	9'.3	04'.6	14'.8	
172° 49'.3	9'.3	0° 49'.8 N	14'.9	
187° 17'.6	9'.3	34'.9	14'.9	
201° 45'.9	9'.2	20'.0	14'.9	
216° 14'.1	9'.3	0° 05'.1 N	14'.9	60'.8
230° 42'.4	9'.2	0° 09'.8 S	15'.0	
245° 10'.6	9'.1	24'.8	14'.9	
259° 38'.7	9'.2	39'.7	14'.9	
274° 06'.9	9'.1	54'.6	15'.0	60'.9
288° 35'.0	9'.1	1° 09'.6 S	14'.9	
303° 03'.1	9'.0	24'.5	15'.0	
317° 31'.1	9'.1	39'.5	14'.9	
331° 59'.2	9'.0	54'.4	15'.0	
346° 27'.2	8'.9	2° 09'.4 S	14'.9	
0° 55'.1	9'.0	24'.3	15'.0	61'.0
15° 23'.1	8'.8	39'.3	14'.9	
SD	16'.2	16'.4	16'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 13	Moonrise 14	Moonrise 15
N 72°	-	02:11	03:47	11:21	13:41	15:57
N 70°	-	02:44	04:03	11:42	13:49	15:55
68°	01:02	03:07	04:15	11:57	13:56	15:54
66°	01:52	03:25	04:25	12:10	14:01	15:53
64°	02:22	03:40	04:34	12:20	14:06	15:52
62°	02:44	03:52	04:41	12:29	14:09	15:51
60°	03:02	04:02	04:48	12:37	14:13	15:51
N 58°	03:16	04:11	04:53	12:44	14:16	15:50
56°	03:28	04:18	04:58	12:49	14:18	15:50
54°	03:38	04:25	05:03	12:55	14:21	15:49
52°	03:47	04:31	05:07	12:59	14:23	15:49
50°	03:55	04:36	05:10	13:04	14:25	15:48
45°	04:11	04:47	05:18	13:13	14:29	15:48
N 40°	04:23	04:57	05:24	13:20	14:33	15:47
35°	04:33	05:04	05:30	13:27	14:36	15:46
30°	04:42	05:10	05:35	13:33	14:39	15:46
20°	04:55	05:21	05:43	13:43	14:43	15:45
N 10°	05:04	05:29	05:50	13:51	14:47	15:44
0°	05:12	05:36	05:57	13:59	14:51	15:44
S 10°	05:18	05:42	06:04	14:07	14:55	15:43
20°	05:23	05:48	06:10	14:16	14:59	15:42
30°	05:26	05:54	06:18	14:26	15:04	15:42
35°	05:28	05:57	06:23	14:31	15:07	15:41
40°	05:29	06:00	06:28	14:37	15:10	15:41
45°	05:30	06:04	06:33	14:45	15:13	15:40
S 50°	05:30	06:07	06:40	14:54	15:17	15:40
52°	05:30	06:09	06:43	14:58	15:19	15:40
54°	05:30	06:11	06:47	15:02	15:21	15:39
56°	05:30	06:13	06:50	15:07	15:23	15:39
58°	05:29	06:15	06:55	15:12	15:26	15:39
S 60°	05:29	06:17	06:59	15:18	15:29	15:38
S 62°	05:28	06:19	07:05	15:25	15:32	15:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 13	Moonset 14	Moonset 15
N 72°	20:17	21:57	-	04:34	04:05	03:42
N 70°	20:01	21:22	-	04:12	03:54	03:39
68°	19:48	20:57	23:14	03:55	03:45	03:37
66°	19:38	20:39	22:15	03:40	03:38	03:35
64°	19:29	20:24	21:43	03:29	03:32	03:34
62°	19:21	20:11	21:20	03:19	03:26	03:32
60°	19:15	20:01	21:02	03:10	03:21	03:31
N 58°	19:09	19:52	20:47	03:02	03:17	03:30
56°	19:04	19:44	20:35	02:55	03:13	03:29
54°	18:59	19:37	20:25	02:49	03:10	03:28
52°	18:55	19:31	20:16	02:44	03:06	03:27
50°	18:52	19:26	20:08	02:39	03:04	03:26
45°	18:44	19:14	19:51	02:28	02:57	03:25
N 40°	18:37	19:05	19:39	02:19	02:52	03:23
35°	18:31	18:57	19:28	02:11	02:47	03:22
30°	18:26	18:51	19:20	02:04	02:43	03:21
20°	18:18	18:40	19:07	01:52	02:36	03:19
N 10°	18:10	18:32	18:57	01:42	02:30	03:18
0°	18:04	18:25	18:49	01:32	02:24	03:16
S 10°	17:57	18:18	18:43	01:22	02:18	03:14
20°	17:50	18:12	18:38	01:11	02:11	03:12
30°	17:42	18:06	18:34	00:59	02:04	03:10
35°	17:38	18:03	18:33	00:51	02:00	03:09
40°	17:33	18:00	18:31	00:43	01:55	03:08
45°	17:27	17:56	18:30	00:33	01:49	03:06
S 50°	17:20	17:53	18:30	00:22	01:42	03:04
52°	17:17	17:51	18:30	00:16	01:39	03:03
54°	17:13	17:49	18:30	00:10	01:35	03:02
56°	17:09	17:47	18:30	00:03	01:31	03:01
58°	17:05	17:45	18:30	-	01:27	03:00
S 60°	17:00	17:43	18:31	-	01:22	02:59
S 62°	16:55	17:40	18:31	-	01:16	02:57

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
13	0 45	0 38	12:01	20:12	07:46	10d 72%
14	0 30	0 22	12:00	21:04	08:38	11d 81%
15	0 15	0 08	12:00	21:56	09:30	12d 90%

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2011 April 16, 17, 18 (Sat, Sun, Mon)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
16 00	203° 47'.8	208° 58'.6	3° 46'.4 S	193° 37'.6	3° 27'.8 N	186° 06'.6	6° 20'.3 N	10° 48'.7	2° 36'.0 S
01	218° 50'.2	223° 58'.2	45'.3	208° 38'.3	28'.6	201° 08'.5	20'.5	25° 51'.3	35'.9
02	233° 52'.7	238° 57'.9	44'.1	223° 39'.0	29'.4	216° 10'.4	20'.7	40° 53'.9	35'.9
03	248° 55'.2	253° 57'.5	43'.0	238° 39'.7	30'.1	231° 12'.3	21'.0	55° 56'.6	35'.8
04	263° 57'.6	268° 57'.2	41'.8	253° 40'.4	30'.9	246° 14'.2	21'.2	70° 59'.2	35'.7
05	279° 00'.1	283° 56'.9	40'.7	268° 41'.1	31'.7	261° 16'.1	21'.4	86° 01'.8	35'.7
06	294° 02'.5	298° 56'.5	39'.6	283° 41'.8	32'.5	276° 18'.0	21'.7	101° 04'.5	35'.6
07	309° 05'.0	313° 56'.2	38'.4	298° 42'.5	33'.2	291° 19'.9	21'.9	116° 07'.1	35'.5
08	324° 07'.5	328° 55'.9	37'.3	313° 43'.2	34'.0	306° 21'.8	22'.1	131° 09'.8	35'.4
09	339° 09'.9	343° 55'.5	36'.2	328° 43'.9	34'.8	321° 23'.7	22'.3	146° 12'.4	35'.4
10	354° 12'.4	358° 55'.2	35'.0	343° 44'.6	35'.5	336° 25'.6	22'.6	161° 15'.0	35'.3
11	9° 14'.9	13° 54'.8	33'.9	358° 45'.2	36'.3	351° 27'.5	22'.8	176° 17'.7	35'.2
12	24° 17'.3	28° 54'.5	3° 32'.7 S	13° 45'.9	3° 37'.1 N	6° 29'.4	6° 23'.0 N	191° 20'.3	2° 35'.2 S
13	39° 19'.8	43° 54'.2	31'.6	28° 46'.6	37'.9	21° 31'.3	23'.3	206° 22'.9	35'.1
14	54° 22'.3	58° 53'.8	30'.5	43° 47'.3	38'.6	36° 33'.2	23'.5	221° 25'.6	35'.0
15	69° 24'.7	73° 53'.5	29'.3	58° 48'.0	39'.4	51° 35'.2	23'.7	236° 28'.2	35'.0
16	84° 27'.2	88° 53'.1	28'.2	73° 48'.7	40'.2	66° 37'.1	23'.9	251° 30'.8	34'.9
17	99° 29'.7	103° 52'.8	27'.1	88° 49'.4	40'.9	81° 39'.0	24'.2	266° 33'.5	34'.8
18	114° 32'.1	118° 52'.5	25'.9	103° 50'.1	41'.7	96° 40'.9	24'.4	281° 36'.1	34'.7
19	129° 34'.6	133° 52'.1	24'.8	118° 50'.8	42'.5	111° 42'.8	24'.6	296° 38'.8	34'.7
20	144° 37'.0	148° 51'.8	23'.6	133° 51'.5	43'.2	126° 44'.7	24'.8	311° 41'.4	34'.6
21	159° 39'.5	163° 51'.5	22'.5	148° 52'.2	44'.0	141° 46'.6	25'.1	326° 44'.0	34'.5
22	174° 42'.0	178° 51'.1	21'.4	163° 52'.9	44'.8	156° 48'.5	25'.3	341° 46'.7	34'.5
23	189° 44'.4	193° 50'.8	20'.2	178° 53'.6	45'.6	171° 50'.4	25'.5	356° 49'.3	34'.4
17 00	204° 46'.9	208° 50'.4	3° 19'.1 S	193° 54'.3	3° 46'.3 N	186° 52'.3	6° 25'.8 N	11° 51'.9	2° 34'.3 S
01	219° 49'.4	223° 50'.1	17'.9	208° 55'.0	47'.1	201° 54'.2	26'.0	26° 54'.6	34'.3
02	234° 51'.8	238° 49'.8	16'.8	223° 55'.7	47'.9	216° 56'.1	26'.2	41° 57'.2	34'.2
03	249° 54'.3	253° 49'.4	15'.6	238° 56'.3	48'.6	231° 58'.0	26'.4	56° 59'.8	34'.1
04	264° 56'.8	268° 49'.1	14'.5	253° 57'.0	49'.4	246° 59'.9	26'.7	72° 02'.5	34'.0
05	279° 59'.2	283° 48'.8	13'.4	268° 57'.7	50'.2	262° 01'.8	26'.9	87° 05'.1	34'.0
06	295° 01'.7	298° 48'.4	12'.2	283° 58'.4	50'.9	277° 03'.7	27'.1	102° 07'.8	33'.9
07	310° 04'.1	313° 48'.1	11'.1	298° 59'.1	51'.7	292° 05'.6	27'.3	117° 10'.4	33'.8
08	325° 06'.6	328° 47'.8	09'.9	313° 59'.8	52'.5	307° 07'.5	27'.6	132° 13'.0	33'.8
09	340° 09'.1	343° 47'.4	08'.8	329° 00'.5	53'.2	322° 09'.4	27'.8	147° 15'.7	33'.7
10	355° 11'.5	358° 47'.1	07'.7	344° 01'.2	54'.0	337° 11'.3	28'.0	162° 18'.3	33'.6
11	10° 14'.0	13° 46'.7	06'.5	359° 01'.9	54'.8	352° 13'.2	28'.3	177° 20'.9	33'.6
12	25° 16'.5	28° 46'.4	3° 05'.4 S	14° 02'.6	3° 55'.6 N	7° 15'.1	6° 28'.5 N	192° 23'.6	2° 33'.5 S
13	40° 18'.9	43° 46'.1	04'.2	29° 03'.3	56'.3	22° 17'.0	28'.7	207° 26'.2	33'.4
14	55° 21'.4	58° 45'.7	03'.1	44° 04'.0	57'.1	37° 18'.9	28'.9	222° 28'.8	33'.3
15	70° 23'.9	73° 45'.4	01'.9	59° 04'.7	57'.9	52° 20'.8	29'.2	237° 31'.5	33'.3
16	85° 26'.3	88° 45'.1	00'.8	74° 05'.4	58'.6	67° 22'.8	29'.4	252° 34'.1	33'.2
17	100° 28'.8	103° 44'.7	2° 59'.6 S	89° 06'.1	59'.4	82° 24'.7	29'.6	267° 36'.7	33'.1
18	115° 31'.3	118° 44'.4	58'.5	104° 06'.7	4° 00'.2 N	97° 26'.6	29'.8	282° 39'.4	33'.1
19	130° 33'.7	133° 44'.1	57'.4	119° 07'.4	00'.9	112° 28'.5	30'.1	297° 42'.0	33'.0
20	145° 36'.2	148° 43'.7	56'.2	134° 08'.1	01'.7	127° 30'.4	30'.3	312° 44'.6	32'.9
21	160° 38'.6	163° 43'.4	55'.1	149° 08'.8	02'.5	142° 32'.3	30'.5	327° 47'.3	32'.9
22	175° 41'.1	178° 43'.1	53'.9	164° 09'.5	03'.2	157° 34'.2	30'.7	342° 49'.9	32'.8
23	190° 43'.6	193° 42'.7	52'.8	179° 10'.2	04'.0	172° 36'.1	31'.0	357° 52'.6	32'.7
18 00	205° 46'.0	208° 42'.4	2° 51'.6 S	194° 10'.9	4° 04'.8 N	187° 38'.0	6° 31'.2 N	12° 55'.2	2° 32'.7 S
01	220° 48'.5	223° 42'.1	50'.5	209° 11'.6	05'.5	202° 39'.9	31'.4	27° 57'.8	32'.6
02	235° 51'.0	238° 41'.7	49'.3	224° 12'.3	06'.3	217° 41'.8	31'.7	43° 00'.5	32'.5
03	250° 53'.4	253° 41'.4	48'.2	239° 13'.0	07'.1	232° 43'.7	31'.9	58° 03'.1	32'.4
04	265° 55'.9	268° 41'.1	47'.0	254° 13'.7	07'.8	247° 45'.6	32'.1	73° 05'.7	32'.4
05	280° 58'.4	283° 40'.7	45'.9	269° 14'.4	08'.6	262° 47'.5	32'.3	88° 08'.4	32'.3
06	296° 00'.8	298° 40'.4	44'.8	284° 15'.1	09'.4	277° 49'.4	32'.6	103° 11'.0	32'.2
07	311° 03'.3	313° 40'.1	43'.6	299° 15'.8	10'.1	292° 51'.3	32'.8	118° 13'.6	32'.2
08	326° 05'.7	328° 39'.7	42'.5	314° 16'.5	10'.9	307° 53'.2	33'.0	133° 16'.3	32'.1
09	341° 08'.2	343° 39'.4	41'.3	329° 17'.1	11'.7	322° 55'.1	33'.2	148° 18'.9	32'.0
10	356° 10'.7	358° 39'.1	40'.2	344° 17'.8	12'.4	337° 57'.0	33'.5	163° 21'.5	32'.0
11	11° 13'.1	13° 38'.7	39'.0	359° 18'.5	13'.2	352° 58'.9	33'.7	178° 24'.2	31'.9
12	26° 15'.6	28° 38'.4	2° 37'.9 S	14° 19'.2	4° 14'.0 N	8° 00'.8	6° 33'.9 N	193° 26'.8	2° 31'.8 S
13	41° 18'.1	43° 38'.1	36'.7	29° 19'.9	14'.7	23° 02'.7	34'.1	208° 29'.4	31'.8
14	56° 20'.5	58° 37'.7	35'.6	44° 20'.6	15'.5	38° 04'.6	34'.4	223° 32'.1	31'.7
15	71° 23'.0	73° 37'.4	34'.4	59° 21'.3	16'.3	53° 06'.6	34'.6	238° 34'.7	31'.6
16	86° 25'.5	88° 37'.1	33'.3	74° 22'.0	17'.0	68° 08'.5	34'.8	253° 37'.3	31'.5
17	101° 27'.9	103° 36'.7	32'.1	89° 22'.7	17'.8	83° 10'.4	35'.0	268° 40'.0	31'.5
18	116° 30'.4	118° 36'.4	31'.0	104° 23'.4	18'.6	98° 12'.3	35'.3	283° 42'.6	31'.4
19	131° 32'.9	133° 36'.1	29'.8	119° 24'.1	19'.3	113° 14'.2	35'.5	298° 45'.2	31'.3
20	146° 35'.3	148° 35'.7	28'.7	134° 24'.8	20'.1	128° 16'.1	35'.7	313° 47'.9	31'.3
21	161° 37'.8	163° 35'.4	27'.5	149° 25'.5	20'.9	143° 18'.0	36'.0	328° 50'.5	31'.2
22	176° 40'.2	178° 35'.1	26'.4	164° 26'.2	21'.6	158° 19'.9	36'.2	343° 53'.1	31'.1
23	191° 42'.7	193° 34'.7	25'.2	179° 26'.9	22'.4	173° 21'.8	36'.4	358° 55'.8	31'.1
	M.P. 10:15	v -0'.3	d 1'.1	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.7 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.8	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.6	49° 15'.3 N
Alnair	27° 45'.9	46° 54'.1 S
Alnilam	275° 48'.1	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.8	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 30'.8	69° 02'.7 S
Avior	234° 18'.6	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.1	7° 24'.4 N
Canopus	263° 57'.1	52° 42'.5 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.7	45° 19'.0 N
Denebola	182° 34'.9	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.5 S
Dubhe	193° 53'.0	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.6	51° 29'.0 N
Enif	33° 48'.8	9° 55'.6 N
Fomalhaut	15° 25'.9	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.8 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.8 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.7	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.4 N
Markab	13° 40'.1	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.1	36° 25'.7 S
Miaplacidus	221° 39'.8	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.1	26° 16'.9 S
Peacock	53° 21'.7	56° 41'.6 S
Polaris	318° 59'.3	89° 18'.9 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.7	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.3	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.4 S
Schedar	349° 43'.0	56° 35'.9 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.5	43° 29'.1 S
Vega	80° 39'.9	38° 47'.4 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	4° 03'.5	10:05
Mars	349° 07'.4	11:04
Jupiter	342° 05'.4	11:31
Saturn	167° 05'.0	23:08

SUN

GHA	Dec
180° 00'.0	9° 55'.3 N
195° 00'.1	56'.2
210° 00'.3	57'.1
225° 00'.4	58'.0
240° 00'.6	58'.9
255° 00'.7	59'.8
270° 00'.9	10° 00'.7 N
285° 01'.0	01'.5
300° 01'.2	02'.4
315° 01'.3	03'.3
330° 01'.5	04'.2
345° 01'.6	05'.1
0° 01'.8	10° 06'.0 N
15° 01'.9	06'.9
30° 02'.1	07'.8
45° 02'.2	08'.6
60° 02'.4	09'.5
75° 02'.5	10'.4
90° 02'.7	11'.3
105° 02'.8	12'.2
120° 03'.0	13'.1
135° 03'.1	14'.0
150° 03'.3	14'.8
165° 03'.4	15'.7
180° 03'.6	10° 16'.6 N
195° 03'.7	17'.5
210° 03'.9	18'.4
225° 04'.0	19'.3
240° 04'.2	20'.1
255° 04'.3	21'.0
270° 04'.4	21'.9
285° 04'.6	22'.8
300° 04'.7	23'.7
315° 04'.9	24'.5
330° 05'.0	25'.4
345° 05'.2	26'.3
0° 05'.3	10° 27'.2 N
15° 05'.5	28'.1
30° 05'.6	28'.9
45° 05'.8	29'.8
60° 05'.9	30'.7
75° 06'.0	31'.6
90° 06'.2	32'.5
105° 06'.3	33'.3
120° 06'.5	34'.2
135° 06'.6	35'.1
150° 06'.8	36'.0
165° 06'.9	36'.8
180° 07'.0	10° 37'.7 N
195° 07'.2	38'.6
210° 07'.3	39'.5
225° 07'.5	40'.3
240° 07'.6	41'.2
255° 07'.8	42'.1
270° 07'.9	43'.0
285° 08'.0	43'.8
300° 08'.2	44'.7
315° 08'.3	45'.6
330° 08'.5	46'.5
345° 08'.6	47'.3
0° 08'.8	10° 48'.2 N
15° 08'.9	49'.1
30° 09'.0	50'.0
45° 09'.2	50'.8
60° 09'.3	51'.7
75° 09'.5	52'.6
90° 09'.6	53'.4
105° 09'.7	54'.3
120° 09'.9	55'.2
135° 10'.0	56'.1
150° 10'.2	56'.9
165° 10'.3	57'.8
SD 15'.9	d 0'.9

MOON

GHA	v	Dec	d	HP
29° 50'.9	8'.9	2° 54'.2 S	14'.9	61'.0
44° 18'.8	8'.8	3° 09'.1 S	15'.0	
58° 46'.6	8'.8	24'.1	14'.9	
73° 14'.4	8'.8	39'.0	14'.8	
87° 42'.2	8'.7	53'.8	14'.9	61'.1
102° 09'.9	8'.6	4° 08'.7 S	14'.9	
116° 37'.5	8'.7	23'.6	14'.8	
131° 05'.2	8'.5	38'.4	14'.8	
145° 32'.7	8'.6	53'.2	14'.8	
160° 00'.3	8'.5	5° 08'.0 S	14'.7	
174° 27'.8	8'.5	22'.7	14'.8	
188° 55'.3	8'.4	37'.5	14'.7	
203° 22'.7	8'.4	5° 52'.2 S	14'.6	61'.1
217° 50'.1	8'.3	6° 06'.8 S	14'.7	61'.2
232° 17'.4	8'.3	21'.5	14'.6	
246° 44'.7	8'.2	36'.1	14'.5	
261° 11'.9	8'.2	50'.6	14'.6	
275° 39'.1	8'.2	7° 05'.2 S	14'.5	
290° 06'.3	8'.1	19'.7	14'.4	
304° 33'.4	8'.0	34'.1	14'.4	
319° 00'.4	8'.0	48'.5	14'.4	
333° 27'.4	8'.0	8° 02'.9 S	14'.3	
347° 54'.4	7'.9	17'.2	14'.2	
2° 21'.3	7'.8	31'.4	14'.2	
16° 48'.1	7'.8	8° 45'.6 S	14'.2	61'.2
31° 14'.9	7'.8	59'.8	14'.1	
45° 41'.7	7'.7	9° 13'.9 S	14'.0	
60° 08'.4	7'.6	27'.9	14'.0	
74° 35'.0	7'.6	41'.9	13'.9	
89° 01'.6	7'.6	55'.8	13'.8	
103° 28'.2	7'.4	10° 09'.6 S	13'.8	
117° 54'.6	7'.5	23'.4	13'.7	
132° 21'.1	7'.4	37'.1	13'.7	
146° 47'.5	7'.3	50'.8	13'.6	
161° 13'.8	7'.3	11° 04'.4 S	13'.5	
175° 40'.1	7'.2	17'.9	13'.4	
190° 06'.3	7'.2	11° 31'.3 S	13'.4	61'.2
204° 32'.5	7'.1	44'.7	13'.2	
218° 58'.6	7'.0	57'.9	13'.2	
233° 24'.6	7'.0	12° 11'.1 S	13'.1	
247° 50'.6	7'.0	24'.2	13'.1	
262° 16'.6	6'.9	37'.3	12'.9	
276° 42'.5	6'.8	50'.2	12'.9	
291° 08'.3	6'.8	13° 03'.1 S	12'.7	
305° 34'.1	6'.7	15'.8	12'.7	
319° 59'.8	6'.7	28'.5	12'.6	
334° 25'.5	6'.6	41'.1	12'.5	
348° 51'.1	6'.6	53'.6	12'.4	
3° 16'.7	6'.5	14° 06'.0 S	12'.3	61'.1
17° 42'.2	6'.4	18'.3	12'.2	
32° 07'.6	6'.4	30'.5	12'.1	
46° 33'.0	6'.4	42'.6	12'.0	
60° 58'.4	6'.3	54'.6	11'.8	
75° 23'.7	6'.2	15° 06'.4 S	11'.8	
89° 48'.9	6'.2	18'.2	11'.7	
104° 14'.1	6'.1	29'.9	11'.5	
118° 39'.2	6'.1	41'.4	11'.5	61'.0
133° 04'.3	6'.0	52'.9	11'.3	
147° 29'.3	6'.0	16° 04'.2 S	11'.3	
161° 54'.3	5'.9	15'.5	11'.1	
176° 19'.2	5'.9	16° 26'.6 S	10'.9	61'.0
190° 44'.1	5'.8	37'.5	10'.9	
205° 08'.9	5'.8	48'.4	10'.8	
219° 33'.7	5'.7	59'.2	10'.6	60'.9
233° 58'.4	5'.7	17° 09'.8 S	10'.5	
248° 23'.1	5'.6	20'.3	10'.4	
262° 47'.7	5'.6	30'.7	10'.2	
277° 12'.3	5'.5	40'.9	10'.1	
291° 36'.8	5'.5	51'.0	10'.0	60'.8
306° 01'.3	5'.5	18° 01'.0 S	9'.9	
320° 25'.8	5'.4	10'.9	9'.7	
334° 50'.2	5'.3	20'.6	9'.6	
SD 16'.7		16'.7	16'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 16	Moonrise 17	Moonrise 18
N 72°	-	01:41	03:30	18:17	20:53	-
N 70°	-	02:23	03:48	18:05	20:24	23:10
68°	-	02:51	04:02	17:55	20:03	22:21
66°	01:27	03:11	04:14	17:48	19:47	21:50
64°	02:05	03:28	04:23	17:41	19:33	21:27
62°	02:30	03:41	04:32	17:35	19:22	21:09
60°	02:49	03:52	04:39	17:31	19:13	20:54
N 58°	03:05	04:02	04:45	17:26	19:04	20:42
56°	03:18	04:10	04:51	17:23	18:57	20:31
54°	03:29	04:17	04:56	17:19	18:51	20:21
52°	03:39	04:24	05:00	17:16	18:45	20:13
50°	03:47	04:30	05:04	17:13	18:40	20:05
45°	04:05	04:42	05:13	17:07	18:28	19:49
N 40°	04:18	04:52	05:20	17:02	18:19	19:36
35°	04:29	05:00	05:26	16:58	18:11	19:25
30°	04:38	05:07	05:32	16:54	18:04	19:15
20°	04:52	05:18	05:41	16:48	17:53	18:59
N 10°	05:03	05:27	05:49	16:42	17:42	18:44
0°	05:11	05:35	05:56	16:37	17:33	18:31
S 10°	05:18	05:42	06:04	16:32	17:23	18:17
20°	05:23	05:49	06:11	16:27	17:13	18:03
30°	05:28	05:56	06:20	16:21	17:02	17:47
35°	05:30	05:59	06:25	16:17	16:56	17:38
40°	05:32	06:03	06:31	16:13	16:48	17:27
45°	05:33	06:07	06:37	16:09	16:40	17:15
S 50°	05:34	06:12	06:45	16:03	16:30	17:00
52°	05:35	06:14	06:48	16:01	16:25	16:53
54°	05:35	06:16	06:52	15:58	16:20	16:46
56°	05:35	06:18	06:56	15:55	16:14	16:37
58°	05:35	06:21	07:01	15:52	16:08	16:28
S 60°	05:35	06:24	07:07	15:49	16:01	16:17
S 62°	05:35	06:27	07:13	15:44	15:53	16:04

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 16	Moonset 17	Moonset 18
N 72°	20:34	22:28	-	03:19	02:53	02:16
N 70°	20:15	21:42	-	03:24	03:08	02:46
68°	20:00	21:13	-	03:29	03:20	03:09
66°	19:48	20:51	22:40	03:32	03:30	03:27
64°	19:38	20:34	22:00	03:35	03:38	03:42
62°	19:29	20:21	21:33	03:38	03:45	03:54
60°	19:22	20:09	21:13	03:41	03:51	04:05
N 58°	19:16	19:59	20:57	03:43	03:57	04:14
56°	19:10	19:51	20:43	03:45	04:02	04:22
54°	19:05	19:43	20:32	03:46	04:06	04:29
52°	19:00	19:37	20:22	03:48	04:10	04:36
50°	18:56	19:31	20:13	03:49	04:14	04:42
45°	18:47	19:18	19:56	03:52	04:22	04:55
N 40°	18:40	19:08	19:42	03:55	04:28	05:05
35°	18:34	19:00	19:31	03:57	04:34	05:14
30°	18:28	18:53	19:22	03:59	04:39	05:22
20°	18:19	18:41	19:08	04:03	04:48	05:36
N 10°	18:11	18:32	18:57	04:06	04:56	05:49
0°	18:03	18:24	18:48	04:09	05:03	06:00
S 10°	17:56	18:17	18:42	04:12	05:11	06:12
20°	17:48	18:10	18:36	04:15	05:19	06:24
30°	17:39	18:03	18:31	04:18	05:28	06:38
35°	17:34	17:59	18:29	04:20	05:33	06:46
40°	17:28	17:56	18:27	04:23	05:39	06:56
45°	17:22	17:51	18:26	04:25	05:46	07:07
S 50°	17:14	17:47	18:24	04:28	05:54	07:20
52°	17:10	17:45	18:24	04:30	05:58	07:26
54°	17:06	17:42	18:23	04:31	06:02	07:33
56°	17:02	17:40	18:23	04:33	06:07	07:41
58°	16:57	17:37	18:23	04:35	06:12	07:50
S 60°	16:52	17:34	18:23	04:37	06:18	08:00
S 62°	16:45	17:31	18:23	04:40	06:25	08:12

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
16	0 00	0 07	12:00	22:50	10:23	13d 96%
17	0 14	0 21	12:00	23:46	11:18	14d 99%
18	0 28	0 35	11:59	24:45	12:15	15d Full

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2011 April 19, 20, 21 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
19 Tuesday 00	206° 45'.2	208° 34'.4	2° 24'.1 S	194° 27'.6	4° 23'.2 N	188° 23'.7	6° 36'.6 N	13° 58'.4	2° 31'.0 S
01	221° 47'.6	223° 34'.1	22'.9	209° 28'.2	23'.9	203° 25'.6	36'.9	29° 01'.0	30'.9
02	236° 50'.1	238° 33'.7	21'.8	224° 28'.9	24'.7	218° 27'.5	37'.1	44° 03'.7	30'.9
03	251° 52'.6	253° 33'.4	20'.6	239° 29'.6	25'.5	233° 29'.4	37'.3	59° 06'.3	30'.8
04	266° 55'.0	268° 33'.1	19'.5	254° 30'.3	26'.2	248° 31'.3	37'.5	74° 08'.9	30'.7
05	281° 57'.5	283° 32'.7	18'.3	269° 31'.0	27'.0	263° 33'.2	37'.8	89° 11'.6	30'.7
06	297° 00'.0	298° 32'.4	17'.2	284° 31'.7	27'.7	278° 35'.1	38'.0	104° 14'.2	30'.6
07	312° 02'.4	313° 32'.1	16'.0	299° 32'.4	28'.5	293° 37'.0	38'.2	119° 16'.8	30'.5
08	327° 04'.9	328° 31'.7	14'.9	314° 33'.1	29'.3	308° 38'.9	38'.4	134° 19'.5	30'.5
09	342° 07'.4	343° 31'.4	13'.7	329° 33'.8	30'.0	323° 40'.8	38'.7	149° 22'.1	30'.4
10	357° 09'.8	358° 31'.1	12'.6	344° 34'.5	30'.8	338° 42'.7	38'.9	164° 24'.7	30'.3
11	12° 12'.3	13° 30'.7	11'.4	359° 35'.2	31'.6	353° 44'.6	39'.1	179° 27'.4	30'.3
12	27° 14'.7	28° 30'.4	2° 10'.3 S	14° 35'.9	4° 32'.3 N	8° 46'.5	6° 39'.3 N	194° 30'.0	2° 30'.2 S
13	42° 17'.2	43° 30'.1	09'.1	29° 36'.6	33'.1	23° 48'.5	39'.6	209° 32'.6	30'.1
14	57° 19'.7	58° 29'.7	08'.0	44° 37'.3	33'.9	38° 50'.4	39'.8	224° 35'.3	30'.0
15	72° 22'.1	73° 29'.4	06'.8	59° 38'.0	34'.6	53° 52'.3	40'.0	239° 37'.9	30'.0
16	87° 24'.6	88° 29'.1	05'.7	74° 38'.7	35'.4	68° 54'.2	40'.2	254° 40'.5	29'.9
17	102° 27'.1	103° 28'.8	04'.5	89° 39'.3	36'.1	83° 56'.1	40'.5	269° 43'.2	29'.8
18	117° 29'.5	118° 28'.4	03'.4	104° 40'.0	36'.9	98° 58'.0	40'.7	284° 45'.8	29'.8
19	132° 32'.0	133° 28'.1	02'.2	119° 40'.7	37'.7	113° 59'.9	40'.9	299° 48'.4	29'.7
20	147° 34'.5	148° 27'.8	01'.1	134° 41'.4	38'.4	129° 01'.8	41'.2	314° 51'.1	29'.6
21	162° 36'.9	163° 27'.4	1° 59'.9 S	149° 42'.1	39'.2	144° 03'.7	41'.4	329° 53'.7	29'.6
22	177° 39'.4	178° 27'.1	58'.7	164° 42'.8	40'.0	159° 05'.6	41'.6	344° 56'.3	29'.5
23	192° 41'.9	193° 26'.8	57'.6	179° 43'.5	40'.7	174° 07'.5	41'.8	359° 59'.0	29'.4
20 Wednesday 00	207° 44'.3	208° 26'.4	1° 56'.4 S	194° 44'.2	4° 41'.5 N	189° 09'.4	6° 42'.1 N	15° 01'.6	2° 29'.4 S
01	222° 46'.8	223° 26'.1	55'.3	209° 44'.9	42'.2	204° 11'.3	42'.3	30° 04'.2	29'.3
02	237° 49'.2	238° 25'.8	54'.1	224° 45'.6	43'.0	219° 13'.2	42'.5	45° 06'.9	29'.2
03	252° 51'.7	253° 25'.4	53'.0	239° 46'.3	43'.8	234° 15'.1	42'.7	60° 09'.5	29'.2
04	267° 54'.2	268° 25'.1	51'.8	254° 47'.0	44'.5	249° 17'.0	43'.0	75° 12'.1	29'.1
05	282° 56'.6	283° 24'.8	50'.7	269° 47'.7	45'.3	264° 18'.9	43'.2	90° 14'.8	29'.0
06	297° 59'.1	298° 24'.5	49'.5	284° 48'.4	46'.1	279° 20'.8	43'.4	105° 17'.4	29'.0
07	313° 01'.6	313° 24'.1	48'.4	299° 49'.1	46'.8	294° 22'.7	43'.6	120° 20'.0	28'.9
08	328° 04'.0	328° 23'.8	47'.2	314° 49'.7	47'.6	309° 24'.6	43'.9	135° 22'.7	28'.8
09	343° 06'.5	343° 23'.5	46'.1	329° 50'.4	48'.3	324° 26'.6	44'.1	150° 25'.3	28'.8
10	358° 09'.0	358° 23'.1	44'.9	344° 51'.1	49'.1	339° 28'.5	44'.3	165° 27'.9	28'.7
11	13° 11'.4	13° 22'.8	43'.7	359° 51'.8	49'.9	354° 30'.4	44'.5	180° 30'.6	28'.6
12	28° 13'.9	28° 22'.5	1° 42'.6 S	14° 52'.5	4° 50'.6 N	9° 32'.3	6° 44'.8 N	195° 33'.2	2° 28'.6 S
13	43° 16'.3	43° 22'.1	41'.4	29° 53'.2	51'.4	24° 34'.2	45'.0	210° 35'.8	28'.5
14	58° 18'.8	58° 21'.8	40'.3	44° 53'.9	52'.2	39° 36'.1	45'.2	225° 38'.4	28'.4
15	73° 21'.3	73° 21'.5	39'.1	59° 54'.6	52'.9	54° 38'.0	45'.4	240° 41'.1	28'.4
16	88° 23'.7	88° 21'.2	38'.0	74° 55'.3	53'.7	69° 39'.9	45'.7	255° 43'.7	28'.3
17	103° 26'.2	103° 20'.8	36'.8	89° 56'.0	54'.4	84° 41'.8	45'.9	270° 46'.3	28'.2
18	118° 28'.7	118° 20'.5	35'.7	104° 56'.7	55'.2	99° 43'.7	46'.1	285° 49'.0	28'.2
19	133° 31'.1	133° 20'.2	34'.5	119° 57'.4	56'.0	114° 45'.6	46'.3	300° 51'.6	28'.1
20	148° 33'.6	148° 19'.8	33'.3	134° 58'.1	56'.7	129° 47'.5	46'.6	315° 54'.2	28'.0
21	163° 36'.1	163° 19'.5	32'.2	149° 58'.8	57'.5	144° 49'.4	46'.8	330° 56'.9	28'.0
22	178° 38'.5	178° 19'.2	31'.0	164° 59'.5	58'.2	159° 51'.3	47'.0	345° 59'.5	27'.9
23	193° 41'.0	193° 18'.8	29'.9	180° 00'.1	59'.0	174° 53'.2	47'.2	1° 02'.1	27'.8
21 Thursday 00	208° 43'.5	208° 18'.5	1° 28'.7 S	195° 00'.8	4° 59'.8 N	189° 55'.1	6° 47'.5 N	16° 04'.8	2° 27'.8 S
01	223° 45'.9	223° 18'.2	27'.6	210° 01'.5	5° 00'.5 N	204° 57'.0	47'.7	31° 07'.4	27'.7
02	238° 48'.4	238° 17'.9	26'.4	225° 02'.2	01'.3	219° 58'.9	47'.9	46° 10'.0	27'.6
03	253° 50'.8	253° 17'.5	25'.2	240° 02'.9	02'.0	235° 00'.8	48'.1	61° 12'.7	27'.6
04	268° 53'.3	268° 17'.2	24'.1	255° 03'.6	02'.8	250° 02'.8	48'.4	76° 15'.3	27'.5
05	283° 55'.8	283° 16'.9	22'.9	270° 04'.3	03'.6	265° 04'.7	48'.6	91° 17'.9	27'.4
06	298° 58'.2	298° 16'.5	21'.8	285° 05'.0	04'.3	280° 06'.6	48'.8	106° 20'.5	27'.4
07	314° 00'.7	313° 16'.2	20'.6	300° 05'.7	05'.1	295° 08'.5	49'.0	121° 23'.2	27'.3
08	329° 03'.2	328° 15'.9	19'.5	315° 06'.4	05'.8	310° 10'.4	49'.3	136° 25'.8	27'.2
09	344° 05'.6	343° 15'.6	18'.3	330° 07'.1	06'.6	325° 12'.3	49'.5	151° 28'.4	27'.2
10	359° 08'.1	358° 15'.2	17'.1	345° 07'.8	07'.3	340° 14'.2	49'.7	166° 31'.1	27'.1
11	14° 10'.6	13° 14'.9	16'.0	0° 08'.5	08'.1	355° 16'.1	49'.9	181° 33'.7	27'.0
12	29° 13'.0	28° 14'.6	1° 14'.8 S	15° 09'.2	5° 08'.9 N	10° 18'.0	6° 50'.2 N	196° 36'.3	2° 27'.0 S
13	44° 15'.5	43° 14'.2	13'.7	30° 09'.9	09'.6	25° 19'.9	50'.4	211° 39'.0	26'.9
14	59° 18'.0	58° 13'.9	12'.5	45° 10'.5	10'.4	40° 21'.8	50'.6	226° 41'.6	26'.8
15	74° 20'.4	73° 13'.6	11'.3	60° 11'.2	11'.1	55° 23'.7	50'.8	241° 44'.2	26'.8
16	89° 22'.9	88° 13'.3	10'.2	75° 11'.9	11'.9	70° 25'.6	51'.1	256° 46'.8	26'.7
17	104° 25'.3	103° 12'.9	09'.0	90° 12'.6	12'.7	85° 27'.5	51'.3	271° 49'.5	26'.6
18	119° 27'.8	118° 12'.6	07'.9	105° 13'.3	13'.4	100° 29'.4	51'.5	286° 52'.1	26'.6
19	134° 30'.3	133° 12'.3	06'.7	120° 14'.0	14'.2	115° 31'.3	51'.7	301° 54'.7	26'.5
20	149° 32'.7	148° 11'.9	05'.5	135° 14'.7	14'.9	130° 33'.2	51'.9	316° 57'.4	26'.4
21	164° 35'.2	163° 11'.6	04'.4	150° 15'.4	15'.7	145° 35'.2	52'.2	332° 00'.0	26'.4
22	179° 37'.7	178° 11'.3	03'.2	165° 16'.1	16'.4	160° 37'.1	52'.4	347° 02'.6	26'.3
23	194° 40'.1	193° 11'.0	02'.1	180° 16'.8	17'.2	175° 39'.0	52'.6	2° 05'.3	26'.2
	M.P. 10:03	v -0'.3	d 1'.2	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.7 S
Achernar	335° 28'.4	57° 10'.7 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.9	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.6	49° 15'.3 N
Alnair	27° 45'.8	46° 54'.1 S
Alnilam	275° 48'.1	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.5	29° 09'.1 N
Altair	62° 09'.7	8° 53'.8 N
Ankaa	353° 17'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 30'.8	69° 02'.7 S
Avior	234° 18'.7	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.1	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.0 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.5 S
Dubhe	193° 53'.0	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.6	51° 29'.0 N
Enif	33° 48'.8	9° 55'.6 N
Fomalhaut	15° 25'.9	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.8 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.7	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.4 N
Markab	13° 40'.1	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 39'.9	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.1	26° 16'.8 S
Peacock	53° 21'.7	56° 41'.6 S
Polaris	318° 59'.3	89° 18'.9 N
Pollux	243° 29'.6	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.7	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.4 S
Schedar	349° 42'.9	56° 35'.9 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.5	43° 29'.1 S
Vega	80° 39'.9	38° 47'.4 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	0° 42'.1	10:06
Mars	346° 59'.9	11:01
Jupiter	341° 25'.1	11:22
Saturn	167° 17'.3	22:56

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 10'.4	10° 58'.7 N	349° 14'.5	5'.4	18° 30'.2 S	9'.4	60'.7
195° 10'.6	59'.5	3° 38'.9	5'.2	39'.6	9'.4	
210° 10'.7	11° 00'.4 N	18° 03'.1	5'.3	49'.0	9'.2	
225° 10'.8	01'.3	32° 27'.4	5'.2	58'.2	9'.0	
240° 11'.0	02'.1	46° 51'.6	5'.1	19° 07'.2 S	8'.9	
255° 11'.1	03'.0	61° 15'.7	5'.2	16'.1	8'.8	60'.6
270° 11'.3	03'.9	75° 39'.9	5'.1	24'.9	8'.6	
285° 11'.4	04'.7	90° 04'.0	5'.0	33'.5	8'.5	
300° 11'.5	05'.6	104° 28'.0	5'.0	42'.0	8'.3	
315° 11'.7	06'.5	118° 52'.0	5'.0	50'.3	8'.2	60'.5
330° 11'.8	07'.3	133° 16'.0	5'.0	58'.5	8'.0	
345° 11'.9	08'.2	147° 40'.0	4'.9	20° 06'.5 S	7'.9	
0° 12'.1	11° 09'.1 N	162° 03'.9	4'.9	20° 14'.4 S	7'.8	60'.4
15° 12'.2	09'.9	176° 27'.8	4'.9	22'.2	7'.6	
30° 12'.4	10'.8	190° 51'.7	4'.9	29'.8	7'.4	
45° 12'.5	11'.7	205° 15'.6	4'.8	37'.2	7'.3	
60° 12'.6	12'.5	219° 39'.4	4'.8	44'.5	7'.2	60'.3
75° 12'.8	13'.4	234° 03'.2	4'.8	51'.7	7'.0	
90° 12'.9	14'.2	248° 27'.0	4'.8	58'.7	6'.8	
105° 13'.0	15'.1	262° 50'.8	4'.7	21° 05'.5 S	6'.7	60'.2
120° 13'.2	16'.0	277° 14'.5	4'.8	12'.2	6'.5	
135° 13'.3	16'.8	291° 38'.3	4'.7	18'.7	6'.4	
150° 13'.4	17'.7	306° 02'.0	4'.7	25'.1	6'.2	
165° 13'.6	18'.6	320° 25'.7	4'.7	31'.3	6'.1	60'.1
180° 13'.7	11° 19'.4 N	334° 49'.4	4'.7	21° 37'.4 S	5'.9	60'.1
195° 13'.8	20'.3	349° 13'.1	4'.7	43'.3	5'.8	
210° 14'.0	21'.1	3° 36'.8	4'.6	49'.1	5'.6	60'.0
225° 14'.1	22'.0	18° 00'.4	4'.7	54'.7	5'.4	
240° 14'.2	22'.9	32° 24'.1	4'.7	22° 00'.1 S	5'.3	
255° 14'.4	23'.7	46° 47'.8	4'.6	05'.4	5'.1	59'.9
270° 14'.5	24'.6	61° 11'.4	4'.7	10'.5	4'.9	
285° 14'.6	25'.4	75° 35'.1	4'.6	15'.4	4'.8	
300° 14'.8	26'.3	89° 58'.7	4'.7	20'.2	4'.7	59'.8
315° 14'.9	27'.2	104° 22'.4	4'.7	24'.9	4'.5	
330° 15'.0	28'.0	118° 46'.1	4'.7	29'.4	4'.3	
345° 15'.2	28'.9	133° 09'.8	4'.7	33'.7	4'.1	59'.7
0° 15'.3	11° 29'.7 N	147° 33'.5	4'.6	22° 37'.8 S	4'.0	59'.7
15° 15'.4	30'.6	161° 57'.1	4'.8	41'.8	3'.9	59'.6
30° 15'.6	31'.4	176° 20'.9	4'.7	45'.7	3'.6	
45° 15'.7	32'.3	190° 44'.6	4'.7	49'.3	3'.6	
60° 15'.8	33'.2	205° 08'.3	4'.8	52'.9	3'.3	59'.5
75° 16'.0	34'.0	219° 32'.1	4'.8	56'.2	3'.2	
90° 16'.1	34'.9	233° 55'.9	4'.8	59'.4	3'.0	
105° 16'.2	35'.7	248° 19'.7	4'.8	23° 02'.4 S	2'.9	59'.4
120° 16'.4	36'.6	262° 43'.5	4'.8	05'.3	2'.7	
135° 16'.5	37'.4	277° 07'.3	4'.9	08'.0	2'.6	59'.3
150° 16'.6	38'.3	291° 31'.2	4'.9	10'.6	2'.4	
165° 16'.8	39'.1	305° 55'.1	4'.9	13'.0	2'.2	
180° 16'.9	11° 40'.0 N	320° 19'.0	5'.0	23° 15'.2 S	2'.1	59'.2
195° 17'.0	40'.9	334° 43'.0	5'.0	17'.3	1'.9	
210° 17'.1	41'.7	349° 07'.0	5'.0	19'.2	1'.7	
225° 17'.3	42'.6	3° 31'.0	5'.1	20'.9	1'.6	59'.1
240° 17'.4	43'.4	17° 55'.1	5'.1	22'.5	1'.4	
255° 17'.5	44'.3	32° 19'.2	5'.1	23'.9	1'.3	59'.0
270° 17'.7	45'.1	46° 43'.3	5'.2	25'.2	1'.1	
285° 17'.8	46'.0	61° 07'.5	5'.2	26'.3	1'.0	
300° 17'.9	46'.8	75° 31'.7	5'.3	27'.3	0'.8	58'.9
315° 18'.0	47'.7	89° 56'.0	5'.3	28'.1	0'.6	
330° 18'.2	48'.5	104° 20'.3	5'.4	28'.7	0'.5	58'.8
345° 18'.3	49'.4	118° 44'.7	5'.4	29'.2	0'.4	
0° 18'.4	11° 50'.2 N	133° 09'.1	5'.5	23° 29'.6 S	0'.2	58'.8
15° 18'.6	51'.1	147° 33'.6	5'.5	29'.8	0'.0	58'.7
30° 18'.7	51'.9	161° 58'.1	5'.6	29'.8	0'.1	
45° 18'.8	52'.8	176° 22'.7	5'.7	29'.7	0'.3	58'.6
60° 18'.9	53'.6	190° 47'.4	5'.7	29'.4	0'.4	
75° 19'.1	54'.5	205° 12'.1	5'.7	29'.0	0'.6	
90° 19'.2	55'.3	219° 36'.8	5'.8	28'.4	0'.7	58'.5
105° 19'.3	56'.2	234° 01'.6	5'.9	27'.7	0'.9	
120° 19'.4	57'.0	248° 26'.5	5'.9	26'.8	1'.0	58'.4
135° 19'.6	57'.8	262° 51'.4	6'.1	25'.8	1'.2	
150° 19'.7	58'.7	277° 16'.5	6'.0	24'.6	1'.3	
165° 19'.8	59'.5	291° 41'.5	6'.2	23'.3	1'.5	58'.3
SD 15'.9	d 0'.9	SD	16'.5	16'.3	16'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 19	Moonrise 20	Moonrise 21
N 72°	-	01:02	03:12	-	-	-
N 70°	-	02:00	03:33	-	-	-
68°	-	02:33	03:49	-	01:24	-
66°	00:54	02:57	04:02	23:56	-	01:52
64°	01:45	03:15	04:13	23:18	-	00:52
62°	02:15	03:30	04:22	22:51	-	00:18
60°	02:37	03:42	04:30	22:31	23:53	24:53
N 58°	02:54	03:53	04:37	22:14	23:33	24:33
56°	03:09	04:02	04:43	22:00	23:17	24:17
54°	03:21	04:10	04:49	21:47	23:03	24:03
52°	03:31	04:17	04:54	21:37	22:50	23:51
50°	03:40	04:23	04:58	21:27	22:40	23:40
45°	03:59	04:37	05:08	21:07	22:17	23:17
N 40°	04:13	04:47	05:16	20:50	21:59	22:59
35°	04:25	04:56	05:22	20:37	21:44	22:44
30°	04:34	05:04	05:28	20:25	21:31	22:31
20°	04:49	05:16	05:39	20:04	21:08	22:08
N 10°	05:01	05:26	05:47	19:47	20:49	21:49
0°	05:10	05:35	05:56	19:31	20:31	21:30
S 10°	05:18	05:42	06:04	19:14	20:13	21:12
20°	05:24	05:50	06:12	18:57	19:54	20:53
30°	05:30	05:58	06:22	18:37	19:32	20:30
35°	05:32	06:02	06:27	18:26	19:19	20:17
40°	05:34	06:06	06:34	18:13	19:04	20:02
45°	05:36	06:11	06:41	17:57	18:47	19:44
S 50°	05:38	06:16	06:49	17:38	18:25	19:21
52°	05:39	06:19	06:53	17:29	18:15	19:11
54°	05:40	06:21	06:58	17:19	18:03	18:58
56°	05:41	06:24	07:02	17:08	17:50	18:45
58°	05:41	06:27	07:08	16:55	17:34	18:28
S 60°	05:42	06:30	07:14	16:40	17:16	18:09
S 62°	05:42	06:34	07:21	16:22	16:53	17:44

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 19	Moonset 20	Moonset 21
N 72°	20:51	23:13	-	-	-	-
N 70°	20:29	22:04	-	02:04	-	-
68°	20:12	21:29	-	02:53	01:57	-
66°	19:58	21:05	23:20	03:25	03:26	03:36
64°	19:47	20:46	22:19	03:49	04:04	04:37
62°	19:38	20:30	21:47	04:08	04:31	05:11
60°	19:30	20:18	21:24	04:24	04:52	05:36
N 58°	19:22	20:07	21:06	04:37	05:09	05:56
56°	19:16	19:58	20:52	04:48	05:24	06:12
54°	19:11	19:50	20:39	04:58	05:37	06:26
52°	19:06	19:42	20:29	05:08	05:48	06:39
50°	19:01	19:36	20:19	05:16	05:58	06:49
45°	18:51	19:22	20:00	05:33	06:19	07:12
N 40°	18:43	19:12	19:46	05:47	06:36	07:30
35°	18:36	19:03	19:34	05:59	06:50	07:46
30°	18:30	18:55	19:24	06:10	07:02	07:59
20°	18:20	18:42	19:09	06:28	07:24	08:22
N 10°	18:11	18:32	18:57	06:44	07:42	08:41
0°	18:02	18:23	18:48	06:59	07:59	09:00
S 10°	17:54	18:15	18:40	07:14	08:17	09:18
20°	17:45	18:08	18:34	07:30	08:35	09:37
30°	17:36	18:00	18:28	07:48	08:57	10:00
35°	17:30	17:56	18:25	07:59	09:09	10:13
40°	17:24	17:51	18:23	08:12	09:24	10:28
45°	17:17	17:47	18:21	08:26	09:41	10:46
S 50°	17:08	17:41	18:19	08:44	10:02	11:09
52°	17:04	17:39	18:18	08:53	10:12	11:20
54°	17:00	17:36	18:17	09:02	10:24	11:32
56°	16:55	17:33	18:16	09:13	10:37	11:46
58°	16:49	17:30	18:16	09:25	10:52	12:02
S 60°	16:43	17:26	18:15	09:40	11:10	12:22
S 62°	16:36	17:23	18:14	09:57	11:32	12:46

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
19	0 41	0 48	11:59	00:45	13:15	16d 97%
20	0 55	1 01	11:59	01:45	14:15	17d 92%
21	1 07	1 13	11:59	02:45	15:15	18d 85%

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2011 April 22, 23, 24 (Fri, Saturday, Sunday)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
22 Friday 00	209° 42'.6	208° 10'.6	1° 00'.9 S	195° 17'.5	5° 18'.0 N	190° 40'.9	6° 52'.8 N	17° 07'.9	2° 26'.2 S
01	224° 45'.1	223° 10'.3	0° 59'.7 S	210° 18'.2	18'.7	205° 42'.8	53'.1	32° 10'.5	26'.1
02	239° 47'.5	238° 10'.0	58'.6	225° 18'.9	19'.5	220° 44'.7	53'.3	47° 13'.1	26'.0
03	254° 50'.0	253° 09'.6	57'.4	240° 19'.6	20'.2	235° 46'.6	53'.5	62° 15'.8	26'.0
04	269° 52'.5	268° 09'.3	56'.3	255° 20'.2	21'.0	250° 48'.5	53'.7	77° 18'.4	25'.9
05	284° 54'.9	283° 09'.0	55'.1	270° 20'.9	21'.7	265° 50'.4	54'.0	92° 21'.0	25'.8
06	299° 57'.4	298° 08'.7	53'.9	285° 21'.6	22'.5	280° 52'.3	54'.2	107° 23'.7	25'.8
07	314° 59'.8	313° 08'.3	52'.8	300° 22'.3	23'.3	295° 54'.2	54'.4	122° 26'.3	25'.7
08	330° 02'.3	328° 08'.0	51'.6	315° 23'.0	24'.0	310° 56'.1	54'.6	137° 28'.9	25'.6
09	345° 04'.8	343° 07'.7	50'.5	330° 23'.7	24'.8	325° 58'.0	54'.9	152° 31'.5	25'.6
10	0° 07'.2	358° 07'.3	49'.3	345° 24'.4	25'.5	340° 59'.9	55'.1	167° 34'.2	25'.5
11	15° 09'.7	13° 07'.0	48'.1	0° 25'.1	26'.3	356° 01'.8	55'.3	182° 36'.8	25'.4
12	30° 12'.2	28° 06'.7	0° 47'.0 S	15° 25'.8	5° 27'.0 N	11° 03'.7	6° 55'.5 N	197° 39'.4	2° 25'.4 S
13	45° 14'.6	43° 06'.4	45'.8	30° 26'.5	27'.8	26° 05'.6	55'.8	212° 42'.1	25'.3
14	60° 17'.1	58° 06'.0	44'.7	45° 27'.2	28'.6	41° 07'.6	56'.0	227° 44'.7	25'.2
15	75° 19'.6	73° 05'.7	43'.5	60° 27'.9	29'.3	56° 09'.5	56'.2	242° 47'.3	25'.2
16	90° 22'.0	88° 05'.4	42'.3	75° 28'.6	30'.1	71° 11'.4	56'.4	257° 49'.9	25'.1
17	105° 24'.5	103° 05'.0	41'.2	90° 29'.3	30'.8	86° 13'.3	56'.7	272° 52'.6	25'.0
18	120° 27'.0	118° 04'.7	40'.0	105° 30'.0	31'.6	101° 15'.2	56'.9	287° 55'.2	25'.0
19	135° 29'.4	133° 04'.4	38'.9	120° 30'.6	32'.3	116° 17'.1	57'.1	302° 57'.8	24'.9
20	150° 31'.9	148° 04'.1	37'.7	135° 31'.3	33'.1	131° 19'.0	57'.3	318° 00'.5	24'.9
21	165° 34'.3	163° 03'.7	36'.5	150° 32'.0	33'.8	146° 20'.9	57'.5	333° 03'.1	24'.8
22	180° 36'.8	178° 03'.4	35'.4	165° 32'.7	34'.6	161° 22'.8	57'.8	348° 05'.7	24'.7
23	195° 39'.3	193° 03'.1	34'.2	180° 33'.4	35'.3	176° 24'.7	58'.0	3° 08'.3	24'.7
23 Saturday 00	210° 41'.7	208° 02'.8	0° 33'.0 S	195° 34'.1	5° 36'.1 N	191° 26'.6	6° 58'.2 N	18° 11'.0	2° 24'.6 S
01	225° 44'.2	223° 02'.4	31'.9	210° 34'.8	36'.9	206° 28'.5	58'.4	33° 13'.6	24'.5
02	240° 46'.7	238° 02'.1	30'.7	225° 35'.5	37'.6	221° 30'.4	58'.7	48° 16'.2	24'.5
03	255° 49'.1	253° 01'.8	29'.6	240° 36'.2	38'.4	236° 32'.3	58'.9	63° 18'.8	24'.4
04	270° 51'.6	268° 01'.4	28'.4	255° 36'.9	39'.1	251° 34'.2	59'.1	78° 21'.5	24'.3
05	285° 54'.1	283° 01'.1	27'.2	270° 37'.6	39'.9	266° 36'.1	59'.3	93° 24'.1	24'.3
06	300° 56'.5	298° 00'.8	26'.1	285° 38'.3	40'.6	281° 38'.1	59'.6	108° 26'.7	24'.2
07	315° 59'.0	313° 00'.5	24'.9	300° 39'.0	41'.4	296° 40'.0	59'.8	123° 29'.4	24'.1
08	331° 01'.4	328° 00'.1	23'.7	315° 39'.6	42'.1	311° 41'.9	7° 00'.0 N	138° 32'.0	24'.1
09	346° 03'.9	342° 59'.8	22'.6	330° 40'.3	42'.9	326° 43'.8	00'.2	153° 34'.6	24'.0
10	1° 06'.4	357° 59'.5	21'.4	345° 41'.0	43'.6	341° 45'.7	00'.5	168° 37'.2	23'.9
11	16° 08'.8	12° 59'.1	20'.3	0° 41'.7	44'.4	356° 47'.6	00'.7	183° 39'.9	23'.9
12	31° 11'.3	27° 58'.8	0° 19'.1 S	15° 42'.4	5° 45'.1 N	11° 49'.5	7° 00'.9 N	198° 42'.5	2° 23'.8 S
13	46° 13'.8	42° 58'.5	17'.9	30° 43'.1	45'.9	26° 51'.4	01'.1	213° 45'.1	23'.8
14	61° 16'.2	57° 58'.2	16'.8	45° 43'.8	46'.6	41° 53'.3	01'.3	228° 47'.7	23'.7
15	76° 18'.7	72° 57'.8	15'.6	60° 44'.5	47'.4	56° 55'.2	01'.6	243° 50'.4	23'.6
16	91° 21'.2	87° 57'.5	14'.4	75° 45'.2	48'.2	71° 57'.1	01'.8	258° 53'.0	23'.6
17	106° 23'.6	102° 57'.2	13'.3	90° 45'.9	48'.9	86° 59'.0	02'.0	273° 55'.6	23'.5
18	121° 26'.1	117° 56'.9	12'.1	105° 46'.6	49'.7	102° 00'.9	02'.2	288° 58'.3	23'.4
19	136° 28'.6	132° 56'.5	10'.9	120° 47'.3	50'.4	117° 02'.8	02'.5	304° 00'.9	23'.4
20	151° 31'.0	147° 56'.2	09'.8	135° 48'.0	51'.2	132° 04'.7	02'.7	319° 03'.5	23'.3
21	166° 33'.5	162° 55'.9	08'.6	150° 48'.7	51'.9	147° 06'.7	02'.9	334° 06'.1	23'.2
22	181° 35'.9	177° 55'.5	07'.5	165° 49'.3	52'.7	162° 08'.6	03'.1	349° 08'.8	23'.2
23	196° 38'.4	192° 55'.2	06'.3	180° 50'.0	53'.4	177° 10'.5	03'.4	4° 11'.4	23'.1
24 Sunday 00	211° 40'.9	207° 54'.9	0° 05'.1 S	195° 50'.7	5° 54'.2 N	192° 12'.4	7° 03'.6 N	19° 14'.0	2° 23'.0 S
01	226° 43'.3	222° 54'.6	04'.0	210° 51'.4	54'.9	207° 14'.3	03'.8	34° 16'.6	23'.0
02	241° 45'.8	237° 54'.2	02'.8	225° 52'.1	55'.7	222° 16'.2	04'.0	49° 19'.3	22'.9
03	256° 48'.3	252° 53'.9	01'.6	240° 52'.8	56'.4	237° 18'.1	04'.2	64° 21'.9	22'.9
04	271° 50'.7	267° 53'.6	00'.5	255° 53'.5	57'.2	252° 20'.0	04'.5	79° 24'.5	22'.8
05	286° 53'.2	282° 53'.3	00'.7	270° 54'.2	57'.9	267° 21'.9	04'.7	94° 27'.1	22'.7
06	301° 55'.7	297° 52'.9	01'.9	285° 54'.9	58'.7	282° 23'.8	04'.9	109° 29'.8	22'.7
07	316° 58'.1	312° 52'.6	03'.0	300° 55'.6	59'.4	297° 25'.7	05'.1	124° 32'.4	22'.6
08	332° 00'.6	327° 52'.3	04'.2	315° 56'.3	6° 00'.2 N	312° 27'.6	05'.4	139° 35'.0	22'.5
09	347° 03'.1	342° 51'.9	05'.4	330° 57'.0	00'.9	327° 29'.5	05'.6	154° 37'.6	22'.5
10	2° 05'.5	357° 51'.6	06'.5	345° 57'.7	01'.7	342° 31'.4	05'.8	169° 40'.3	22'.4
11	17° 08'.0	12° 51'.3	07'.7	0° 58'.3	02'.4	357° 33'.4	06'.0	184° 42'.9	22'.3
12	32° 10'.4	27° 51'.0	0° 08'.9 N	15° 59'.0	6° 03'.2 N	12° 35'.3	7° 06'.2 N	199° 45'.5	2° 22'.3 S
13	47° 12'.9	42° 50'.6	10'.0	30° 59'.7	03'.9	27° 37'.2	06'.5	214° 48'.1	22'.2
14	62° 15'.4	57° 50'.3	11'.2	46° 00'.4	04'.7	42° 39'.1	06'.7	229° 50'.8	22'.1
15	77° 17'.8	72° 50'.0	12'.3	61° 01'.1	05'.4	57° 41'.0	06'.9	244° 53'.4	22'.1
16	92° 20'.3	87° 49'.7	13'.5	76° 01'.8	06'.2	72° 42'.9	07'.1	259° 56'.0	22'.0
17	107° 22'.8	102° 49'.3	14'.7	91° 02'.5	06'.9	87° 44'.8	07'.4	274° 58'.6	22'.0
18	122° 25'.2	117° 49'.0	15'.8	106° 03'.2	07'.7	102° 46'.7	07'.6	290° 01'.3	21'.9
19	137° 27'.7	132° 48'.7	17'.0	121° 03'.9	08'.4	117° 48'.6	07'.8	305° 03'.9	21'.8
20	152° 30'.2	147° 48'.3	18'.2	136° 04'.6	09'.2	132° 50'.5	08'.0	320° 06'.5	21'.8
21	167° 32'.6	162° 48'.0	19'.3	151° 05'.3	09'.9	147° 52'.4	08'.2	335° 09'.1	21'.7
22	182° 35'.1	177° 47'.7	20'.5	166° 06'.0	10'.7	162° 54'.3	08'.5	350° 11'.8	21'.6
23	197° 37'.5	192° 47'.4	21'.7	181° 06'.6	11'.4	177° 56'.2	08'.7	5° 14'.4	21'.6
	M.P. 09:52	v -0'.3	d 1'.2	v 0'.7	d 0'.8	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.6 S
Achernar	335° 28'.4	57° 10'.7 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.9	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.4	55° 53'.8 N
Alkaid	152° 59'.5	49° 15'.3 N
Alnair	27° 45'.8	46° 54'.1 S
Alnilam	275° 48'.1	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 12'.0	26° 40'.4 N
Alpheratz	357° 45'.4	29° 09'.1 N
Altair	62° 09'.7	8° 53'.8 N
Ankaa	353° 17'.5	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 30'.7	69° 02'.7 S
Avior	234° 18'.7	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.1	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.0 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.4 S
Dubhe	193° 53'.0	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.6	51° 29'.0 N
Enif	33° 48'.8	9° 55'.6 N
Fomalhaut	15° 25'.9	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.5	60° 25'.8 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.7	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.4 N
Markab	13° 40'.1	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 39'.9	69° 46'.2 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.1	26° 16'.8 S
Peacock	53° 21'.6	56° 41'.6 S
Polaris	318° 59'.2	89° 18'.9 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.7	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.4 S
Schedar	349° 42'.9	56° 35'.9 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.5	43° 29'.1 S
Vega	80° 39'.8	38° 47'.4 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	357° 21'.0	10:08
Mars	344° 52'.4	10:57
Jupiter	340° 44'.9	11:13
Saturn	167° 29'.2	22:43

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 19'.9	12° 00'.4 N	306° 06'.7	6'.2	23° 21'.8 S	1'.6	58'.3
195° 20'.1	01'.2	320° 31'.9	6'.2	20'.2	1'.8	58'.2
210° 20'.2	02'.1	334° 57'.1	6'.4	18'.4	1'.9	
225° 20'.3	02'.9	349° 22'.5	6'.4	16'.5	2'.0	
240° 20'.4	03'.8	3° 47'.9	6'.5	14'.5	2'.2	58'.1
255° 20'.6	04'.6	18° 13'.4	6'.6	12'.3	2'.3	
270° 20'.7	05'.5	32° 39'.0	6'.6	10'.0	2'.5	58'.0
285° 20'.8	06'.3	47° 04'.6	6'.7	07'.5	2'.6	
300° 20'.9	07'.1	61° 30'.3	6'.8	04'.9	2'.7	
315° 21'.1	08'.0	75° 56'.1	6'.9	02'.2	2'.9	57'.9
330° 21'.2	08'.8	90° 22'.0	7'.0	22° 59'.3 S	3'.0	
345° 21'.3	09'.7	104° 48'.0	7'.0	56'.3	3'.2	57'.8
0° 21'.4	12° 10'.5 N	119° 14'.0	7'.1	22° 53'.1 S	3'.3	57'.8
15° 21'.6	11'.3	133° 40'.1	7'.2	49'.8	3'.4	
30° 21'.7	12'.2	148° 06'.3	7'.3	46'.4	3'.5	57'.7
45° 21'.8	13'.0	162° 32'.6	7'.4	42'.9	3'.7	
60° 21'.9	13'.9	176° 59'.0	7'.5	39'.2	3'.8	57'.6
75° 22'.1	14'.7	191° 25'.5	7'.5	35'.4	3'.9	
90° 22'.2	15'.5	205° 52'.0	7'.6	31'.5	4'.1	
105° 22'.3	16'.4	220° 18'.6	7'.7	27'.4	4'.2	57'.5
120° 22'.4	17'.2	234° 45'.3	7'.8	23'.2	4'.3	
135° 22'.5	18'.1	249° 12'.1	7'.9	18'.9	4'.4	57'.4
150° 22'.7	18'.9	263° 39'.0	8'.0	14'.5	4'.6	
165° 22'.8	19'.7	278° 06'.0	8'.1	09'.9	4'.6	
180° 22'.9	12° 20'.6 N	292° 33'.1	8'.1	22° 05'.3 S	4'.8	57'.3
195° 23'.0	21'.4	307° 00'.2	8'.3	00'.5	5'.0	
210° 23'.1	22'.2	321° 27'.5	8'.3	21° 55'.5 S	5'.0	
225° 23'.3	23'.1	335° 54'.8	8'.5	50'.5	5'.1	57'.2
240° 23'.4	23'.9	350° 22'.3	8'.5	45'.4	5'.3	
255° 23'.5	24'.8	4° 49'.8	8'.6	40'.1	5'.4	57'.1
270° 23'.6	25'.6	19° 17'.4	8'.7	34'.7	5'.5	
285° 23'.7	26'.4	33° 45'.1	8'.8	29'.2	5'.6	
300° 23'.9	27'.3	48° 12'.9	8'.9	23'.6	5'.7	57'.0
315° 24'.0	28'.1	62° 40'.8	9'.0	17'.9	5'.8	
330° 24'.1	28'.9	77° 08'.8	9'.1	12'.1	6'.0	56'.9
345° 24'.2	29'.8	91° 36'.9	9'.1	06'.1	6'.0	
0° 24'.3	12° 30'.6 N	106° 05'.0	9'.3	21° 00'.1 S	6'.1	56'.9
15° 24'.4	31'.4	120° 33'.3	9'.3	20° 54'.0 S	6'.3	56'.8
30° 24'.6	32'.3	135° 01'.6	9'.5	47'.7	6'.4	
45° 24'.7	33'.1	149° 30'.1	9'.5	41'.3	6'.4	
60° 24'.8	33'.9	163° 58'.6	9'.7	34'.9	6'.6	56'.7
75° 24'.9	34'.8	178° 27'.3	9'.7	28'.3	6'.6	
90° 25'.0	35'.6	192° 56'.0	9'.8	21'.7	6'.8	56'.6
105° 25'.2	36'.4	207° 24'.8	10'.0	14'.9	6'.8	
120° 25'.3	37'.2	221° 53'.8	10'.0	08'.1	7'.0	
135° 25'.4	38'.1	236° 22'.8	10'.1	01'.1	7'.0	56'.5
150° 25'.5	38'.9	250° 51'.9	10'.2	19° 54'.1 S	7'.2	
165° 25'.6	39'.7	265° 21'.1	10'.3	46'.9	7'.2	
180° 25'.7	12° 40'.6 N	279° 50'.4	10'.4	19° 39'.7 S	7'.3	56'.4
195° 25'.8	41'.4	294° 19'.8	10'.4	32'.4	7'.5	
210° 26'.0	42'.2	308° 49'.2	10'.6	24'.9	7'.5	
225° 26'.1	43'.0	323° 18'.8	10'.7	17'.4	7'.6	56'.3
240° 26'.2	43'.9	337° 48'.5	10'.7	09'.8	7'.6	
255° 26'.3	44'.7	352° 18'.2	10'.9	02'.2	7'.8	
270° 26'.4	45'.5	6° 48'.1	10'.9	18° 54'.4 S	7'.9	56'.2
285° 26'.5	46'.4	21° 18'.0	11'.0	46'.5	7'.9	
300° 26'.6	47'.2	35° 48'.0	11'.1	38'.6	8'.0	
315° 26'.8	48'.0	50° 18'.1	11'.2	30'.6	8'.1	56'.1
330° 26'.9	48'.8	64° 48'.3	11'.3	22'.5	8'.2	
345° 27'.0	49'.7	79° 18'.6	11'.4	14'.3	8'.3	
0° 27'.1	12° 50'.5 N	93° 49'.0	11'.5	18° 06'.0 S	8'.3	56'.0
15° 27'.2	51'.3	108° 19'.5	11'.5	17° 57'.7 S	8'.4	
30° 27'.3	52'.1	122° 50'.0	11'.7	49'.3	8'.5	
45° 27'.4	53'.0	137° 20'.7	11'.7	40'.8	8'.6	55'.9
60° 27'.6	53'.8	151° 51'.4	11'.9	32'.2	8'.6	
75° 27'.7	54'.6	166° 22'.3	11'.9	23'.6	8'.7	
90° 27'.8	55'.4	180° 53'.2	12'.0	14'.9	8'.8	55'.8
105° 27'.9	56'.2	195° 24'.2	12'.0	06'.1	8'.9	
120° 28'.0	57'.1	209° 55'.2	12'.2	16° 57'.2 S	8'.9	
135° 28'.1	57'.9	224° 26'.4	12'.2	48'.3	9'.0	55'.7
150° 28'.2	58'.7	238° 57'.6	12'.4	39'.3	9'.1	
165° 28'.3	59'.5	253° 29'.0	12'.4	30'.2	9'.1	
SD 15'.9	d 0'.8	SD	15'.8	15'.5	15'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 22	Moonrise 23	Moonrise 24
N 72°	-	-	02:53	-	-	-
N 70°	-	01:34	03:17	-	-	04:23
68°	-	02:15	03:36	-	04:12	03:29
66°	-	02:42	03:50	02:49	02:56	02:56
64°	01:22	03:03	04:02	01:51	02:19	02:32
62°	01:59	03:19	04:13	01:18	01:53	02:12
60°	02:24	03:33	04:21	00:53	01:32	01:56
N 58°	02:43	03:44	04:29	00:33	01:15	01:43
56°	02:59	03:54	04:36	00:17	01:00	01:31
54°	03:12	04:02	04:42	00:03	00:48	01:21
52°	03:23	04:10	04:47	-	00:37	01:12
50°	03:33	04:17	04:52	-	00:27	01:04
45°	03:53	04:31	05:03	-	00:07	00:46
N 40°	04:08	04:43	05:11	23:50	-	00:32
35°	04:21	04:52	05:19	23:36	-	00:20
30°	04:31	05:00	05:25	23:23	-	00:09
20°	04:47	05:14	05:36	23:02	23:51	24:34
N 10°	04:59	05:25	05:46	22:44	23:35	24:21
0°	05:09	05:34	05:55	22:27	23:20	24:09
S 10°	05:18	05:42	06:04	22:10	23:05	23:56
20°	05:25	05:51	06:13	21:51	22:49	23:43
30°	05:31	05:59	06:24	21:30	22:30	23:28
35°	05:34	06:04	06:30	21:18	22:19	23:20
40°	05:37	06:09	06:37	21:04	22:07	23:09
45°	05:40	06:14	06:44	20:47	21:52	22:58
S 50°	05:43	06:21	06:54	20:26	21:34	22:43
52°	05:44	06:23	06:58	20:15	21:25	22:37
54°	05:45	06:26	07:03	20:04	21:16	22:29
56°	05:46	06:30	07:08	19:51	21:05	22:21
58°	05:47	06:33	07:14	19:36	20:53	22:11
S 60°	05:48	06:37	07:21	19:18	20:38	22:00
S 62°	05:49	06:41	07:29	18:56	20:21	21:48

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 22	Moonset 23	Moonset 24
N 72°	21:09	-	-	-	-	-
N 70°	20:43	22:32	-	-	-	06:54
68°	20:24	21:47	-	-	05:16	07:47
66°	20:09	21:19	-	04:43	06:32	08:19
64°	19:56	20:57	22:43	05:40	07:08	08:43
62°	19:46	20:40	22:03	06:14	07:34	09:01
60°	19:37	20:26	21:37	06:38	07:54	09:17
N 58°	19:29	20:15	21:16	06:58	08:11	09:30
56°	19:22	20:05	21:00	07:14	08:25	09:41
54°	19:16	19:56	20:47	07:28	08:37	09:51
52°	19:11	19:48	20:35	07:40	08:48	09:59
50°	19:06	19:41	20:25	07:50	08:57	10:07
45°	18:55	19:26	20:05	08:13	09:17	10:23
N 40°	18:46	19:15	19:49	08:31	09:34	10:37
35°	18:39	19:05	19:37	08:46	09:47	10:48
30°	18:32	18:57	19:26	08:59	09:59	10:58
20°	18:21	18:43	19:10	09:21	10:19	11:15
N 10°	18:11	18:32	18:58	09:40	10:37	11:30
0°	18:02	18:23	18:48	09:58	10:53	11:44
S 10°	17:53	18:14	18:39	10:16	11:09	11:57
20°	17:43	18:06	18:32	10:35	11:26	12:12
30°	17:33	17:57	18:25	10:57	11:46	12:28
35°	17:27	17:52	18:22	11:09	11:57	12:38
40°	17:20	17:47	18:19	11:24	12:10	12:49
45°	17:12	17:42	18:16	11:41	12:26	13:02
S 50°	17:02	17:35	18:13	12:03	12:45	13:17
52°	16:58	17:33	18:12	12:13	12:54	13:24
54°	16:53	17:30	18:11	12:25	13:04	13:32
56°	16:48	17:26	18:10	12:38	13:15	13:41
58°	16:42	17:23	18:09	12:53	13:28	13:51
S 60°	16:35	17:19	18:07	13:11	13:43	14:03
S 62°	16:27	17:14	18:06	13:34	14:01	14:16

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
22	1 20	1 26	11:59	03:44	16:13	19d 76%
23	1 31	1 37	11:58	04:40	17:06	20d 66%
24	1 43	1 48	11:58	05:32	17:56	21d 56%

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2011 April 25, 26, 27 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.4	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
25 Monday 00	212° 40'.0	207° 47'.0	0° 22'.8 N	196° 07'.3	6° 12'.2 N	192° 58'.1	7° 08'.9 N	20° 17'.0	2° 21'.5 S
01	227° 42'.5	222° 46'.7	24'.0	211° 08'.0	12'.9	208° 00'.1	09'.1	35° 19'.6	21'.5
02	242° 44'.9	237° 46'.4	25'.2	226° 08'.7	13'.7	223° 02'.0	09'.4	50° 22'.3	21'.4
03	257° 47'.4	252° 46'.0	26'.3	241° 09'.4	14'.4	238° 03'.9	09'.6	65° 24'.9	21'.3
04	272° 49'.9	267° 45'.7	27'.5	256° 10'.1	15'.2	253° 05'.8	09'.8	80° 27'.5	21'.3
05	287° 52'.3	282° 45'.4	28'.7	271° 10'.8	15'.9	268° 07'.7	10'.0	95° 30'.1	21'.2
06	302° 54'.8	297° 45'.1	29'.8	286° 11'.5	16'.7	283° 09'.6	10'.2	110° 32'.8	21'.1
07	317° 57'.3	312° 44'.7	31'.0	301° 12'.2	17'.4	298° 11'.5	10'.5	125° 35'.4	21'.1
08	332° 59'.7	327° 44'.4	32'.2	316° 12'.9	18'.2	313° 13'.4	10'.7	140° 38'.0	21'.0
09	348° 02'.2	342° 44'.1	33'.3	331° 13'.6	18'.9	328° 15'.3	10'.9	155° 40'.6	20'.9
10	3° 04'.7	357° 43'.8	34'.5	346° 14'.3	19'.6	343° 17'.2	11'.1	170° 43'.3	20'.9
11	18° 07'.1	12° 43'.4	35'.7	1° 14'.9	20'.4	358° 19'.1	11'.4	185° 45'.9	20'.8
12	33° 09'.6	27° 43'.1	0° 36'.8 N	16° 15'.6	6° 21'.1 N	13° 21'.0	7° 11'.6 N	200° 48'.5	2° 20'.8 S
13	48° 12'.0	42° 42'.8	38'.0	31° 16'.3	21'.9	28° 22'.9	11'.8	215° 51'.1	20'.7
14	63° 14'.5	57° 42'.4	39'.2	46° 17'.0	22'.6	43° 24'.9	12'.0	230° 53'.7	20'.6
15	78° 17'.0	72° 42'.1	40'.3	61° 17'.7	23'.4	58° 26'.8	12'.2	245° 56'.4	20'.6
16	93° 19'.4	87° 41'.8	41'.5	76° 18'.4	24'.1	73° 28'.7	12'.5	260° 59'.0	20'.5
17	108° 21'.9	102° 41'.5	42'.7	91° 19'.1	24'.9	88° 30'.6	12'.7	276° 01'.6	20'.4
18	123° 24'.4	117° 41'.1	43'.8	106° 19'.8	25'.6	103° 32'.5	12'.9	291° 04'.2	20'.4
19	138° 26'.8	132° 40'.8	45'.0	121° 20'.5	26'.4	118° 34'.4	13'.1	306° 06'.9	20'.3
20	153° 29'.3	147° 40'.5	46'.2	136° 21'.2	27'.1	133° 36'.3	13'.3	321° 09'.5	20'.3
21	168° 31'.8	162° 40'.1	47'.3	151° 21'.9	27'.9	148° 38'.2	13'.6	336° 12'.1	20'.2
22	183° 34'.2	177° 39'.8	48'.5	166° 22'.6	28'.6	163° 40'.1	13'.8	351° 14'.7	20'.1
23	198° 36'.7	192° 39'.5	49'.7	181° 23'.2	29'.3	178° 42'.0	14'.0	6° 17'.4	20'.1
26 Tuesday 00	213° 39'.2	207° 39'.2	0° 50'.8 N	196° 23'.9	6° 30'.1 N	193° 43'.9	7° 14'.2 N	21° 20'.0	2° 20'.0 S
01	228° 41'.6	222° 38'.8	52'.0	211° 24'.6	30'.8	208° 45'.8	14'.5	36° 22'.6	19'.9
02	243° 44'.1	237° 38'.5	53'.2	226° 25'.3	31'.6	223° 47'.8	14'.7	51° 25'.2	19'.9
03	258° 46'.5	252° 38'.2	54'.3	241° 26'.0	32'.3	238° 49'.7	14'.9	66° 27'.8	19'.8
04	273° 49'.0	267° 37'.9	55'.5	256° 26'.7	33'.1	253° 51'.6	15'.1	81° 30'.5	19'.8
05	288° 51'.5	282° 37'.5	56'.7	271° 27'.4	33'.8	268° 53'.5	15'.3	96° 33'.1	19'.7
06	303° 53'.9	297° 37'.2	57'.8	286° 28'.1	34'.6	283° 55'.4	15'.6	111° 35'.7	19'.6
07	318° 56'.4	312° 36'.9	59'.0	301° 28'.8	35'.3	298° 57'.3	15'.8	126° 38'.3	19'.6
08	333° 58'.9	327° 36'.5	1° 00'.2 N	316° 29'.5	36'.0	313° 59'.2	16'.0	141° 41'.0	19'.5
09	349° 01'.3	342° 36'.2	01'.3	331° 30'.2	36'.8	329° 01'.1	16'.2	156° 43'.6	19'.5
10	4° 03'.8	357° 35'.9	02'.5	346° 30'.9	37'.5	344° 03'.0	16'.4	171° 46'.2	19'.4
11	19° 06'.3	12° 35'.6	03'.7	1° 31'.5	38'.3	359° 04'.9	16'.7	186° 48'.8	19'.3
12	34° 08'.7	27° 35'.2	1° 04'.8 N	16° 32'.2	6° 39'.0 N	14° 06'.8	7° 16'.9 N	201° 51'.4	2° 19'.3 S
13	49° 11'.2	42° 34'.9	06'.0	31° 32'.9	39'.8	29° 08'.7	17'.1	216° 54'.1	19'.2
14	64° 13'.6	57° 34'.6	07'.2	46° 33'.6	40'.5	44° 10'.7	17'.3	231° 56'.7	19'.1
15	79° 16'.1	72° 34'.2	08'.3	61° 34'.3	41'.3	59° 12'.6	17'.6	246° 59'.3	19'.1
16	94° 18'.6	87° 33'.9	09'.5	76° 35'.0	42'.0	74° 14'.5	17'.8	262° 01'.9	19'.0
17	109° 21'.0	102° 33'.6	10'.7	91° 35'.7	42'.7	89° 16'.4	18'.0	277° 04'.5	19'.0
18	124° 23'.5	117° 33'.3	11'.8	106° 36'.4	43'.5	104° 18'.3	18'.2	292° 07'.2	18'.9
19	139° 26'.0	132° 32'.9	13'.0	121° 37'.1	44'.2	119° 20'.2	18'.4	307° 09'.8	18'.8
20	154° 28'.4	147° 32'.6	14'.2	136° 37'.8	45'.0	134° 22'.1	18'.7	322° 12'.4	18'.8
21	169° 30'.9	162° 32'.3	15'.3	151° 38'.5	45'.7	149° 24'.0	18'.9	337° 15'.0	18'.7
22	184° 33'.4	177° 31'.9	16'.5	166° 39'.1	46'.5	164° 25'.9	19'.1	352° 17'.7	18'.7
23	199° 35'.8	192° 31'.6	17'.7	181° 39'.8	47'.2	179° 27'.8	19'.3	7° 20'.3	18'.6
27 Wednesday 00	214° 38'.3	207° 31'.3	1° 18'.8 N	196° 40'.5	6° 47'.9 N	194° 29'.7	7° 19'.5 N	22° 22'.9	2° 18'.5 S
01	229° 40'.8	222° 31'.0	20'.0	211° 41'.2	48'.7	209° 31'.6	19'.8	37° 25'.5	18'.5
02	244° 43'.2	237° 30'.6	21'.2	226° 41'.9	49'.4	224° 33'.6	20'.0	52° 28'.1	18'.4
03	259° 45'.7	252° 30'.3	22'.3	241° 42'.6	50'.2	239° 35'.5	20'.2	67° 30'.8	18'.3
04	274° 48'.1	267° 30'.0	23'.5	256° 43'.3	50'.9	254° 37'.4	20'.4	82° 33'.4	18'.3
05	289° 50'.6	282° 29'.6	24'.7	271° 44'.0	51'.6	269° 39'.3	20'.6	97° 36'.0	18'.2
06	304° 53'.1	297° 29'.3	25'.8	286° 44'.7	52'.4	284° 41'.2	20'.9	112° 38'.6	18'.2
07	319° 55'.5	312° 29'.0	27'.0	301° 45'.4	53'.1	299° 43'.1	21'.1	127° 41'.2	18'.1
08	334° 58'.0	327° 28'.6	28'.2	316° 46'.0	53'.9	314° 45'.0	21'.3	142° 43'.9	18'.0
09	350° 00'.5	342° 28'.3	29'.3	331° 46'.7	54'.6	329° 46'.9	21'.5	157° 46'.5	18'.0
10	5° 02'.9	357° 28'.0	30'.5	346° 47'.4	55'.3	344° 48'.8	21'.7	172° 49'.1	17'.9
11	20° 05'.4	12° 27'.7	31'.7	1° 48'.1	56'.1	359° 50'.7	22'.0	187° 51'.7	17'.9
12	35° 07'.9	27° 27'.3	1° 32'.8 N	16° 48'.8	6° 56'.8 N	14° 52'.6	7° 22'.2 N	202° 54'.3	2° 17'.8 S
13	50° 10'.3	42° 27'.0	34'.0	31° 49'.5	57'.6	29° 54'.6	22'.4	217° 57'.0	17'.7
14	65° 12'.8	57° 26'.7	35'.2	46° 50'.2	58'.3	44° 56'.5	22'.6	232° 59'.6	17'.7
15	80° 15'.3	72° 26'.3	36'.3	61° 50'.9	59'.0	59° 58'.4	22'.8	248° 02'.2	17'.6
16	95° 17'.7	87° 26'.0	37'.5	76° 51'.6	59'.8	75° 00'.3	23'.1	263° 04'.8	17'.6
17	110° 20'.2	102° 25'.7	38'.7	91° 52'.3	7° 00'.5 N	90° 02'.2	23'.3	278° 07'.4	17'.5
18	125° 22'.6	117° 25'.4	39'.8	106° 53'.0	01'.3	105° 04'.1	23'.5	293° 10'.0	17'.4
19	140° 25'.1	132° 25'.0	41'.0	121° 53'.6	02'.0	120° 06'.0	23'.7	308° 12'.7	17'.4
20	155° 27'.6	147° 24'.7	42'.2	136° 54'.3	02'.7	135° 07'.9	23'.9	323° 15'.3	17'.3
21	170° 30'.0	162° 24'.4	43'.3	151° 55'.0	03'.5	150° 09'.8	24'.2	338° 17'.9	17'.3
22	185° 32'.5	177° 24'.0	44'.5	166° 55'.7	04'.2	165° 11'.7	24'.4	353° 20'.5	17'.2
23	200° 35'.0	192° 23'.7	45'.7	181° 56'.4	05'.0	180° 13'.6	24'.6	8° 23'.1	17'.1
	M.P. 09:40	v -0'.3	d 1'.2	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.6 S
Achernar	335° 28'.4	57° 10'.7 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.9	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.4	55° 53'.9 N
Alkaid	152° 59'.5	49° 15'.3 N
Alnair	27° 45'.8	46° 54'.1 S
Alnilam	275° 48'.1	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.4 N
Alpheratz	357° 45'.4	29° 09'.1 N
Altair	62° 09'.7	8° 53'.8 N
Ankaa	353° 17'.5	42° 14'.5 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.2 N
Atria	107° 30'.7	69° 02'.7 S
Avior	234° 18'.7	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.1	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.0 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.4 S
Dubhe	193° 53'.0	61° 41'.4 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.5	51° 29'.0 N
Enif	33° 48'.7	9° 55'.6 N
Fomalhaut	15° 25'.9	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.5	60° 25'.8 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.4 N
Markab	13° 40'.1	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.0	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.1	26° 16'.8 S
Peacock	53° 21'.6	56° 41'.6 S
Polaris	318° 59'.3	89° 18'.9 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.4 S
Schedar	349° 42'.9	56° 35'.9 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.5	43° 29'.1 S
Vega	80° 39'.8	38° 47'.4 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	354° 00'.0	10:10
Mars	342° 44'.8	10:54
Jupiter	340° 04'.8	11:04
Saturn	167° 40'.8	22:31

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 28'.4	13° 00'.3 N	268° 00'.4	12'.5	16° 21'.1 S	9'.2	55'.7
195° 28'.6	01'.2	282° 31'.9	12'.6	11'.9	9'.3	55'.6
210° 28'.7	02'.0	297° 03'.5	12'.6	02'.6	9'.3	
225° 28'.8	02'.8	311° 35'.1	12'.8	15° 53'.3 S	9'.4	
240° 28'.9	03'.6	326° 06'.9	12'.8	43'.9	9'.4	55'.5
255° 29'.0	04'.4	340° 38'.7	12'.9	34'.5	9'.5	
270° 29'.1	05'.3	355° 10'.6	12'.9	25'.0	9'.6	
285° 29'.2	06'.1	9° 42'.5	13'.1	15'.4	9'.6	55'.4
300° 29'.3	06'.9	24° 14'.6	13'.1	05'.8	9'.7	
315° 29'.4	07'.7	38° 46'.7	13'.2	14° 56'.1 S	9'.8	
330° 29'.5	08'.5	53° 18'.9	13'.3	46'.3	9'.8	
345° 29'.6	09'.3	67° 51'.2	13'.3	36'.5	9'.8	55'.3
0° 29'.8	13° 10'.2 N	82° 23'.5	13'.4	14° 26'.7 S	9'.9	55'.3
15° 29'.9	11'.0	96° 55'.9	13'.5	16'.8	10'.0	
30° 30'.0	11'.8	111° 28'.4	13'.6	06'.8	10'.0	
45° 30'.1	12'.6	126° 01'.0	13'.6	13° 56'.8 S	10'.1	55'.2
60° 30'.2	13'.4	140° 33'.6	13'.7	46'.7	10'.1	
75° 30'.3	14'.2	155° 06'.3	13'.8	36'.6	10'.1	
90° 30'.4	15'.0	169° 39'.1	13'.9	26'.5	10'.3	
105° 30'.5	15'.9	184° 12'.0	13'.9	16'.2	10'.2	55'.1
120° 30'.6	16'.7	198° 44'.9	14'.0	06'.0	10'.3	
135° 30'.7	17'.5	213° 17'.9	14'.0	12° 55'.7 S	10'.4	
150° 30'.8	18'.3	227° 50'.9	14'.1	45'.3	10'.4	
165° 30'.9	19'.1	242° 24'.0	14'.2	34'.9	10'.4	55'.0
180° 31'.0	13° 19'.9 N	256° 57'.2	14'.2	12° 24'.5 S	10'.5	55'.0
195° 31'.1	20'.7	271° 30'.4	14'.3	14'.0	10'.6	
210° 31'.2	21'.5	286° 03'.7	14'.4	03'.4	10'.5	
225° 31'.3	22'.3	300° 37'.1	14'.4	11° 52'.9 S	10'.7	54'.9
240° 31'.4	23'.2	315° 10'.5	14'.5	42'.2	10'.6	
255° 31'.6	24'.0	329° 44'.0	14'.5	31'.6	10'.7	
270° 31'.7	24'.8	344° 17'.5	14'.6	20'.9	10'.7	
285° 31'.8	25'.6	358° 51'.1	14'.7	10'.2	10'.8	
300° 31'.9	26'.4	13° 24'.8	14'.7	10° 59'.4 S	10'.8	54'.8
315° 32'.0	27'.2	27° 58'.5	14'.7	48'.6	10'.9	
330° 32'.1	28'.0	42° 32'.2	14'.8	37'.7	10'.8	
345° 32'.2	28'.8	57° 06'.0	14'.9	26'.9	11'.0	
0° 32'.3	13° 29'.6 N	71° 39'.9	14'.9	10° 15'.9 S	10'.9	54'.8
15° 32'.4	30'.4	86° 13'.8	15'.0	05'.0	11'.0	54'.7
30° 32'.5	31'.2	100° 47'.8	15'.0	9° 54'.0 S	11'.0	
45° 32'.6	32'.0	115° 21'.8	15'.1	43'.0	11'.1	
60° 32'.7	32'.8	129° 55'.9	15'.1	31'.9	11'.0	
75° 32'.8	33'.6	144° 30'.0	15'.2	20'.9	11'.1	
90° 32'.9	34'.4	159° 04'.2	15'.2	09'.8	11'.2	54'.6
105° 33'.0	35'.2	173° 38'.4	15'.3	8° 58'.6 S	11'.1	
120° 33'.1	36'.1	188° 12'.7	15'.3	47'.5	11'.2	
135° 33'.2	36'.9	202° 47'.0	15'.4	36'.3	11'.3	
150° 33'.3	37'.7	217° 21'.4	15'.4	25'.0	11'.2	
165° 33'.4	38'.5	231° 55'.8	15'.4	13'.8	11'.3	54'.5
180° 33'.5	13° 39'.3 N	246° 30'.2	15'.5	8° 02'.5 S	11'.3	54'.5
195° 33'.6	40'.1	261° 04'.7	15'.5	7° 51'.2 S	11'.3	
210° 33'.7	40'.9	275° 39'.2	15'.6	39'.9	11'.4	
225° 33'.8	41'.7	290° 13'.8	15'.6	28'.5	11'.3	
240° 33'.9	42'.5	304° 48'.4	15'.6	17'.2	11'.4	
255° 34'.0	43'.3	319° 23'.0	15'.7	05'.8	11'.4	
270° 34'.1	44'.1	333° 57'.7	15'.7	6° 54'.4 S	11'.5	54'.4
285° 34'.2	44'.9	348° 32'.4	15'.8	42'.9	11'.4	
300° 34'.3	45'.7	3° 07'.2	15'.7	31'.5	11'.5	
315° 34'.4	46'.5	17° 41'.9	15'.9	20'.0	11'.5	
330° 34'.5	47'.3	32° 16'.8	15'.8	08'.5	11'.5	
345° 34'.6	48'.1	46° 51'.6	15'.9	5° 57'.0 S	11'.6	
0° 34'.7	13° 48'.9 N	61° 26'.5	15'.9	5° 45'.4 S	11'.5	54'.4
15° 34'.8	49'.6	76° 01'.4	15'.9	33'.9	11'.6	54'.3
30° 34'.9	50'.4	90° 36'.3	16'.0	22'.3	11'.5	
45° 35'.0	51'.2	105° 11'.3	16'.0	10'.8	11'.6	
60° 35'.1	52'.0	119° 46'.3	16'.0	4° 59'.2 S	11'.7	
75° 35'.2	52'.8	134° 21'.3	16'.1	47'.5	11'.6	
90° 35'.3	53'.6	148° 56'.4	16'.0	35'.9	11'.6	
105° 35'.3	54'.4	163° 31'.4	16'.1	24'.3	11'.7	
120° 35'.4	55'.2	178° 06'.5	16'.1	12'.6	11'.6	
135° 35'.5	56'.0	192° 41'.6	16'.2	01'.0	11'.7	54'.2
150° 35'.6	56'.8	207° 16'.8	16'.1	3° 49'.3 S	11'.7	
165° 35'.7	57'.6	221° 51'.9	16'.2	37'.6	11'.7	
SD 15'.9	d 0'.8	SD	15'.1	14'.9	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27
N 72°	-	-	02:33	04:18	03:40	03:15
N 70°	-	00:58	03:01	03:41	03:20	03:05
68°	-	01:54	03:22	03:14	03:04	02:56
66°	-	02:26	03:39	02:54	02:51	02:49
64°	00:51	02:50	03:52	02:38	02:41	02:42
62°	01:40	03:08	04:03	02:24	02:32	02:37
60°	02:10	03:23	04:13	02:12	02:24	02:32
N 58°	02:32	03:35	04:21	02:02	02:17	02:28
56°	02:49	03:46	04:29	01:54	02:10	02:24
54°	03:03	03:55	04:35	01:46	02:05	02:21
52°	03:15	04:03	04:41	01:39	02:00	02:18
50°	03:26	04:11	04:46	01:32	01:55	02:15
45°	03:47	04:26	04:58	01:18	01:45	02:09
N 40°	04:04	04:38	05:07	01:07	01:37	02:04
35°	04:17	04:49	05:15	00:57	01:30	01:59
30°	04:28	04:57	05:22	00:49	01:24	01:56
20°	04:45	05:11	05:34	00:34	01:13	01:49
N 10°	04:58	05:23	05:45	00:21	01:03	01:43
0°	05:09	05:33	05:54	00:09	00:54	01:37
S 10°	05:18	05:43	06:04	-	00:45	01:31
20°	05:26	05:52	06:14	-	00:35	01:25
30°	05:33	06:01	06:26	-	00:24	01:19
35°	05:36	06:06	06:32	-	00:18	01:15
40°	05:40	06:12	06:40	-	00:11	01:10
45°	05:43	06:18	06:48	-	00:02	01:05
S 50°	05:47	06:25	06:58	23:52	-	00:58
52°	05:48	06:28	07:03	23:47	-	00:55
54°	05:50	06:31	07:08	23:42	-	00:52
56°	05:51	06:35	07:14	23:36	-	00:49
58°	05:53	06:39	07:21	23:29	-	00:45
S 60°	05:55	06:44	07:28	23:21	-	00:40
S 62°	05:56	06:49	07:37	23:13	-	00:35

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 25	Moonset 26	Moonset 27
N 72°	21:28	-	-	08:40	10:51	12:44
N 70°	20:58	23:14	-	09:16	11:09	12:52
68°	20:37	22:08	-	09:41	11:23	12:59
66°	20:20	21:34	-	10:00	11:35	13:05
64°	20:06	21:09	23:19	10:16	11:44	13:09
62°	19:54	20:51	22:21	10:28	11:52	13:14
60°	19:44	20:35	21:50	10:39	11:59	13:17
N 58°	19:36	20:23	21:27	10:48	12:05	13:20
56°	19:28	20:12	21:09	10:57	12:11	13:23
54°	19:22	20:02	20:55	11:04	12:16	13:26
52°	19:16	19:54	20:42	11:10	12:20	13:28
50°	19:10	19:46	20:31	11:16	12:24	13:30
45°	18:59	19:31	20:10	11:29	12:32	13:34
N 40°	18:49	19:18	19:53	11:39	12:39	13:38
35°	18:41	19:08	19:40	11:48	12:45	13:41
30°	18:34	18:59	19:29	11:56	12:51	13:44
20°	18:22	18:45	19:11	12:09	13:00	13:49
N 10°	18:11	18:33	18:58	12:20	13:08	13:53
0°	18:01	18:23	18:47	12:31	13:15	13:57
S 10°	17:52	18:13	18:38	12:42	13:22	14:01
20°	17:41	18:04	18:30	12:53	13:30	14:05
30°	17:30	17:54	18:22	13:06	13:39	14:10
35°	17:23	17:49	18:19	13:13	13:44	14:12
40°	17:16	17:44	18:15	13:21	13:50	14:15
45°	17:07	17:37	18:12	13:31	13:56	14:19
S 50°	16:57	17:30	18:08	13:43	14:04	14:23
52°	16:52	17:27	18:07	13:48	14:08	14:25
54°	16:46	17:23	18:05	13:54	14:12	14:27
56°	16:41	17:20	18:03	14:01	14:16	14:29
58°	16:34	17:16	18:02	14:08	14:21	14:32
S 60°	16:27	17:11	18:00	14:17	14:27	14:34
S 62°	16:18	17:06	17:58	14:26	14:33	14:38

	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
Day						
25	1 54	1 59	11:58	06:20	18:43	22d 46%
26	2 04	2 09	11:58	07:05	19:26	23d 37%
27	2 14	2 18	11:58	07:47	20:08	24d 28%

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2011 April 28, 29, 30 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
28 Thursday 00	215° 37'.4	207° 23'.4	1° 46'.8 N	196° 57'.1	7° 05'.7 N	195° 15'.6	7° 24'.8 N	23° 25'.8	2° 17'.1 S
01	230° 39'.9	222° 23'.0	48'.0	211° 57'.8	06'.4	210° 17'.5	25'.0	38° 28'.4	17'.0
02	245° 42'.4	237° 22'.7	49'.2	226° 58'.5	07'.2	225° 19'.4	25'.3	53° 31'.0	17'.0
03	260° 44'.8	252° 22'.4	50'.3	241° 59'.2	07'.9	240° 21'.3	25'.5	68° 33'.6	16'.9
04	275° 47'.3	267° 22'.1	51'.5	256° 59'.9	08'.7	255° 23'.2	25'.7	83° 36'.2	16'.8
05	290° 49'.7	282° 21'.7	52'.7	272° 00'.5	09'.4	270° 25'.1	25'.9	98° 38'.9	16'.8
06	305° 52'.2	297° 21'.4	53'.8	287° 01'.2	10'.1	285° 27'.0	26'.1	113° 41'.5	16'.7
07	320° 54'.7	312° 21'.1	55'.0	302° 01'.9	10'.9	300° 28'.9	26'.4	128° 44'.1	16'.7
08	335° 57'.1	327° 20'.7	56'.2	317° 02'.6	11'.6	315° 30'.8	26'.6	143° 46'.7	16'.6
09	350° 59'.6	342° 20'.4	57'.3	332° 03'.3	12'.3	330° 32'.7	26'.8	158° 49'.3	16'.5
10	6° 02'.1	357° 20'.1	58'.5	347° 04'.0	13'.1	345° 34'.7	27'.0	173° 51'.9	16'.5
11	21° 04'.5	12° 19'.7	59'.7	2° 04'.7	13'.8	0° 36'.6	27'.2	188° 54'.6	16'.4
12	36° 07'.0	27° 19'.4	2° 00'.8 N	17° 05'.4	7° 14'.6 N	15° 38'.5	7° 27'.5 N	203° 57'.2	2° 16'.4 S
13	51° 09'.5	42° 19'.1	02'.0	32° 06'.1	15'.3	30° 40'.4	27'.7	218° 59'.8	16'.3
14	66° 11'.9	57° 18'.8	03'.2	47° 06'.8	16'.0	45° 42'.3	27'.9	234° 02'.4	16'.2
15	81° 14'.4	72° 18'.4	04'.3	62° 07'.4	16'.8	60° 44'.2	28'.1	249° 05'.0	16'.2
16	96° 16'.9	87° 18'.1	05'.5	77° 08'.1	17'.5	75° 46'.1	28'.3	264° 07'.6	16'.1
17	111° 19'.3	102° 17'.8	06'.7	92° 08'.8	18'.2	90° 48'.0	28'.6	279° 10'.3	16'.1
18	126° 21'.8	117° 17'.4	07'.8	107° 09'.5	19'.0	105° 49'.9	28'.8	294° 12'.9	16'.0
19	141° 24'.2	132° 17'.1	09'.0	122° 10'.2	19'.7	120° 51'.8	29'.0	309° 15'.5	15'.9
20	156° 26'.7	147° 16'.8	10'.2	137° 10'.9	20'.4	135° 53'.8	29'.2	324° 18'.1	15'.9
21	171° 29'.2	162° 16'.4	11'.3	152° 11'.6	21'.2	150° 55'.7	29'.4	339° 20'.7	15'.8
22	186° 31'.6	177° 16'.1	12'.5	167° 12'.3	21'.9	165° 57'.6	29'.6	354° 23'.3	15'.8
23	201° 34'.1	192° 15'.8	13'.7	182° 13'.0	22'.6	180° 59'.5	29'.9	9° 26'.0	15'.7
29 Friday 00	216° 36'.6	207° 15'.4	2° 14'.8 N	197° 13'.6	7° 23'.4 N	196° 01'.4	7° 30'.1 N	24° 28'.6	2° 15'.6 S
01	231° 39'.0	222° 15'.1	16'.0	212° 14'.3	24'.1	211° 03'.3	30'.3	39° 31'.2	15'.6
02	246° 41'.5	237° 14'.8	17'.2	227° 15'.0	24'.8	226° 05'.2	30'.5	54° 33'.8	15'.5
03	261° 44'.0	252° 14'.4	18'.3	242° 15'.7	25'.6	241° 07'.1	30'.7	69° 36'.4	15'.5
04	276° 46'.4	267° 14'.1	19'.5	257° 16'.4	26'.3	256° 09'.0	31'.0	84° 39'.0	15'.4
05	291° 48'.9	282° 13'.8	20'.7	272° 17'.1	27'.1	271° 10'.9	31'.2	99° 41'.7	15'.4
06	306° 51'.3	297° 13'.4	21'.8	287° 17'.8	27'.8	286° 12'.9	31'.4	114° 44'.3	15'.3
07	321° 53'.8	312° 13'.1	23'.0	302° 18'.5	28'.5	301° 14'.8	31'.6	129° 46'.9	15'.2
08	336° 56'.3	327° 12'.8	24'.2	317° 19'.2	29'.3	316° 16'.7	31'.8	144° 49'.5	15'.2
09	351° 58'.7	342° 12'.5	25'.3	332° 19'.9	30'.0	331° 18'.6	32'.1	159° 52'.1	15'.1
10	7° 01'.2	357° 12'.1	26'.5	347° 20'.5	30'.7	346° 20'.5	32'.3	174° 54'.7	15'.1
11	22° 03'.7	12° 11'.8	27'.7	2° 21'.2	31'.5	1° 22'.4	32'.5	189° 57'.4	15'.0
12	37° 06'.1	27° 11'.5	2° 28'.8 N	17° 21'.9	7° 32'.2 N	16° 24'.3	7° 32'.7 N	205° 00'.0	2° 14'.9 S
13	52° 08'.6	42° 11'.1	30'.0	32° 22'.6	32'.9	31° 26'.2	32'.9	220° 02'.6	14'.9
14	67° 11'.1	57° 10'.8	31'.2	47° 23'.3	33'.7	46° 28'.1	33'.1	235° 05'.2	14'.8
15	82° 13'.5	72° 10'.5	32'.3	62° 24'.0	34'.4	61° 30'.1	33'.4	250° 07'.8	14'.8
16	97° 16'.0	87° 10'.1	33'.5	77° 24'.7	35'.1	76° 32'.0	33'.6	265° 10'.4	14'.7
17	112° 18'.5	102° 09'.8	34'.7	92° 25'.4	35'.9	91° 33'.9	33'.8	280° 13'.0	14'.6
18	127° 20'.9	117° 09'.5	35'.8	107° 26'.1	36'.6	106° 35'.8	34'.0	295° 15'.7	14'.6
19	142° 23'.4	132° 09'.1	37'.0	122° 26'.7	37'.3	121° 37'.7	34'.2	310° 18'.3	14'.5
20	157° 25'.8	147° 08'.8	38'.2	137° 27'.4	38'.0	136° 39'.6	34'.5	325° 20'.9	14'.5
21	172° 28'.3	162° 08'.5	39'.3	152° 28'.1	38'.8	151° 41'.5	34'.7	340° 23'.5	14'.4
22	187° 30'.8	177° 08'.1	40'.5	167° 28'.8	39'.5	166° 43'.4	34'.9	355° 26'.1	14'.4
23	202° 33'.2	192° 07'.8	41'.7	182° 29'.5	40'.2	181° 45'.3	35'.1	10° 28'.7	14'.3
30 Saturday 00	217° 35'.7	207° 07'.5	2° 42'.8 N	197° 30'.2	7° 41'.0 N	196° 47'.3	7° 35'.3 N	25° 31'.3	2° 14'.2 S
01	232° 38'.2	222° 07'.1	44'.0	212° 30'.9	41'.7	211° 49'.2	35'.5	40° 34'.0	14'.2
02	247° 40'.6	237° 06'.8	45'.2	227° 31'.6	42'.4	226° 51'.1	35'.8	55° 36'.6	14'.1
03	262° 43'.1	252° 06'.5	46'.3	242° 32'.3	43'.2	241° 53'.0	36'.0	70° 39'.2	14'.1
04	277° 45'.6	267° 06'.1	47'.5	257° 32'.9	43'.9	256° 54'.9	36'.2	85° 41'.8	14'.0
05	292° 48'.0	282° 05'.8	48'.7	272° 33'.6	44'.6	271° 56'.8	36'.4	100° 44'.4	14'.0
06	307° 50'.5	297° 05'.5	49'.8	287° 34'.3	45'.4	286° 58'.7	36'.6	115° 47'.0	13'.9
07	322° 53'.0	312° 05'.1	51'.0	302° 35'.0	46'.1	302° 00'.6	36'.9	130° 49'.6	13'.8
08	337° 55'.4	327° 04'.8	52'.2	317° 35'.7	46'.8	317° 02'.5	37'.1	145° 52'.3	13'.8
09	352° 57'.9	342° 04'.5	53'.3	332° 36'.4	47'.5	332° 04'.5	37'.3	160° 54'.9	13'.7
10	8° 00'.3	357° 04'.1	54'.5	347° 37'.1	48'.3	347° 06'.4	37'.5	175° 57'.5	13'.7
11	23° 02'.8	12° 03'.8	55'.7	2° 37'.8	49'.0	2° 08'.3	37'.7	191° 00'.1	13'.6
12	38° 05'.3	27° 03'.5	2° 56'.8 N	17° 38'.4	7° 49'.7 N	17° 10'.2	7° 37'.9 N	206° 02'.7	2° 13'.6 S
13	53° 07'.7	42° 03'.1	58'.0	32° 39'.1	50'.5	32° 12'.1	38'.2	221° 05'.3	13'.5
14	68° 10'.2	57° 02'.8	59'.1	47° 39'.8	51'.2	47° 14'.0	38'.4	236° 07'.9	13'.4
15	83° 12'.7	72° 02'.4	3° 00'.3 N	62° 40'.5	51'.9	62° 15'.9	38'.6	251° 10'.5	13'.4
16	98° 15'.1	87° 02'.1	01'.5	77° 41'.2	52'.7	77° 17'.8	38'.8	266° 13'.2	13'.3
17	113° 17'.6	102° 01'.8	02'.6	92° 41'.9	53'.4	92° 19'.7	39'.0	281° 15'.8	13'.3
18	128° 20'.1	117° 01'.4	03'.8	107° 42'.6	54'.1	107° 21'.7	39'.2	296° 18'.4	13'.2
19	143° 22'.5	132° 01'.1	05'.0	122° 43'.3	54'.8	122° 23'.6	39'.5	311° 21'.0	13'.2
20	158° 25'.0	147° 00'.8	06'.1	137° 44'.0	55'.6	137° 25'.5	39'.7	326° 23'.6	13'.1
21	173° 27'.4	162° 00'.4	07'.3	152° 44'.6	56'.3	152° 27'.4	39'.9	341° 26'.2	13'.0
22	188° 29'.9	177° 00'.1	08'.5	167° 45'.3	57'.0	167° 29'.3	40'.1	356° 28'.8	13'.0
23	203° 32'.4	191° 59'.8	09'.6	182° 46'.0	57'.7	182° 31'.2	40'.3	11° 31'.4	12'.9
	M.P. 09:28	v -0'.3	d 1'.2	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.6 S
Achernar	335° 28'.4	57° 10'.7 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.9	28° 59'.6 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.4	55° 53'.9 N
Alkaid	152° 59'.5	49° 15'.3 N
Alnair	27° 45'.8	46° 54'.1 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.5	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.4 N
Alpheratz	357° 45'.4	29° 09'.1 N
Altair	62° 09'.7	8° 53'.8 N
Ankaa	353° 17'.5	42° 14'.5 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.6	69° 02'.7 S
Avior	234° 18'.8	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.1	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.0 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.4 S
Dubhe	193° 53'.1	61° 41'.5 N
Elnath	278° 14'.8	28° 37'.0 N
Eltanin	90° 46'.5	51° 29'.0 N
Enif	33° 48'.7	9° 55'.6 N
Fomalhaut	15° 25'.8	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.5 S
Hadar	148° 49'.5	60° 25'.8 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.4 N
Markab	13° 40'.1	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.0	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.5	56° 41'.6 S
Polaris	318° 59'.4	89° 18'.8 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.4 S
Schedar	349° 42'.9	56° 35'.9 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.2 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.6	43° 29'.1 S
Vega	80° 39'.8	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	350° 38'.9	10:11
Mars	340° 37'.1	10:51
Jupiter	339° 24'.8	10:55
Saturn	167° 52'.0	22:18

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 35'.8	13° 58'.4 N	236° 27'.1	16'.2	3° 25'.9 S	11'.7	54'.2
195° 35'.9	59'.2	251° 02'.3	16'.2	14'.2	11'.7	
210° 36'.0	00'.0	265° 37'.5	16'.3	02'.5	11'.7	
225° 36'.1	14° 00'.8 N	280° 12'.8	16'.2	2° 50'.8 S	11'.7	
240° 36'.2	01'.6	294° 48'.0	16'.3	39'.1	11'.8	
255° 36'.3	02'.3	309° 23'.3	16'.3	27'.3	11'.7	
270° 36'.4	03'.1	323° 58'.6	16'.3	15'.6	11'.8	
285° 36'.5	03'.9	338° 33'.9	16'.3	03'.8	11'.7	54'.1
300° 36'.6	04'.7	353° 09'.2	16'.3	1° 52'.1 S	11'.8	
315° 36'.7	05'.5	7° 44'.5	16'.3	40'.3	11'.7	
330° 36'.8	06'.3	22° 19'.8	16'.3	28'.6	11'.8	
345° 36'.8	07'.1	36° 55'.1	16'.4	16'.8	11'.8	
0° 36'.9	14° 07'.9 N	51° 30'.5	16'.4	1° 05'.0 S	11'.7	54'.1
15° 37'.0	08'.7	66° 05'.9	16'.3	0° 53'.3 S	11'.8	
30° 37'.1	09'.4	80° 41'.2	16'.4	41'.5	11'.8	
45° 37'.2	10'.2	95° 16'.6	16'.4	29'.7	11'.7	
60° 37'.3	11'.0	109° 52'.0	16'.3	18'.0	11'.8	
75° 37'.4	11'.8	124° 27'.3	16'.4	06'.2	11'.8	
90° 37'.5	12'.6	139° 02'.7	16'.4	0° 05'.6 N	11'.7	
105° 37'.6	13'.4	153° 38'.1	16'.4	17'.3	11'.8	
120° 37'.7	14'.1	168° 13'.5	16'.4	29'.1	11'.7	
135° 37'.8	14'.9	182° 48'.9	16'.4	40'.8	11'.8	
150° 37'.8	15'.7	197° 24'.3	16'.4	52'.6	11'.7	54'.0
165° 37'.9	16'.5	211° 59'.7	16'.4	1° 04'.3 N	11'.8	
180° 38'.0	14° 17'.3 N	226° 35'.1	16'.3	1° 16'.1 N	11'.7	54'.0
195° 38'.1	18'.1	241° 10'.4	16'.4	27'.8	11'.8	
210° 38'.2	18'.8	255° 45'.8	16'.4	39'.6	11'.7	
225° 38'.3	19'.6	270° 21'.2	16'.4	51'.3	11'.7	
240° 38'.4	20'.4	284° 56'.6	16'.4	2° 03'.0 N	11'.7	
255° 38'.5	21'.2	299° 32'.0	16'.3	14'.7	11'.7	
270° 38'.6	22'.0	314° 07'.3	16'.4	26'.4	11'.7	
285° 38'.6	22'.7	328° 42'.7	16'.3	38'.1	11'.7	
300° 38'.7	23'.5	343° 18'.0	16'.3	49'.8	11'.6	
315° 38'.8	24'.3	357° 53'.3	16'.4	3° 01'.4 N	11'.7	
330° 38'.9	25'.1	12° 28'.7	16'.3	13'.1	11'.7	
345° 39'.0	25'.9	27° 04'.0	16'.3	24'.8	11'.6	
0° 39'.1	14° 26'.6 N	41° 39'.3	16'.3	3° 36'.4 N	11'.6	54'.0
15° 39'.2	27'.4	56° 14'.6	16'.2	48'.0	11'.6	
30° 39'.2	28'.2	70° 49'.8	16'.3	59'.6	11'.6	
45° 39'.3	29'.0	85° 25'.1	16'.3	4° 11'.2 N	11'.6	
60° 39'.4	29'.7	100° 00'.4	16'.2	22'.8	11'.5	
75° 39'.5	30'.5	114° 35'.6	16'.2	34'.3	11'.6	
90° 39'.6	31'.3	129° 10'.8	16'.2	45'.9	11'.5	
105° 39'.7	32'.1	143° 46'.0	16'.2	57'.4	11'.5	
120° 39'.8	32'.8	158° 21'.2	16'.1	5° 08'.9 N	11'.5	
135° 39'.8	33'.6	172° 56'.3	16'.2	20'.4	11'.5	
150° 39'.9	34'.4	187° 31'.5	16'.1	31'.9	11'.4	
165° 40'.0	35'.2	202° 06'.6	16'.1	43'.3	11'.5	
180° 40'.1	14° 35'.9 N	216° 41'.7	16'.1	5° 54'.8 N	11'.4	54'.0
195° 40'.2	36'.7	231° 16'.8	16'.0	6° 06'.2 N	11'.4	
210° 40'.3	37'.5	245° 51'.8	16'.0	17'.6	11'.4	
225° 40'.3	38'.3	260° 26'.8	16'.0	29'.0	11'.3	
240° 40'.4	39'.0	275° 01'.8	16'.0	40'.3	11'.3	
255° 40'.5	39'.8	289° 36'.8	15'.9	51'.6	11'.3	
270° 40'.6	40'.6	304° 11'.7	16'.0	7° 02'.9 N	11'.3	
285° 40'.7	41'.3	318° 46'.7	15'.9	14'.2	11'.2	
300° 40'.8	42'.1	333° 21'.6	15'.8	25'.4	11'.2	
315° 40'.8	42'.9	347° 56'.4	15'.9	36'.6	11'.2	
330° 40'.9	43'.6	2° 31'.3	15'.8	47'.8	11'.2	
345° 41'.0	44'.4	17° 06'.1	15'.7	59'.0	11'.1	
0° 41'.1	14° 45'.2 N	31° 40'.8	15'.8	8° 10'.1 N	11'.1	54'.0
15° 41'.2	45'.9	46° 15'.6	15'.7	21'.2	11'.1	
30° 41'.2	46'.7	60° 50'.3	15'.7	32'.3	11'.1	
45° 41'.3	47'.5	75° 25'.0	15'.6	43'.4	11'.0	
60° 41'.4	48'.2	89° 59'.6	15'.6	54'.4	11'.0	54'.1
75° 41'.5	49'.0	104° 34'.2	15'.6	9° 05'.4 N	10'.9	
90° 41'.6	49'.8	119° 08'.8	15'.5	16'.3	10'.9	
105° 41'.6	50'.5	133° 43'.3	15'.5	27'.2	10'.9	
120° 41'.7	51'.3	148° 17'.8	15'.5	38'.1	10'.8	
135° 41'.8	52'.1	162° 52'.3	15'.4	48'.9	10'.9	
150° 41'.9	52'.8	177° 26'.7	15'.4	59'.8	10'.7	
165° 42'.0	53'.6	192° 01'.1	15'.3	10° 10'.5 N	10'.8	
SD 15'.9	d 0'.8	SD	14'.7	14'.7	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 28	Moonrise 29	Moonrise 30
N 72°	-	-	02:11	02:56	02:37	02:18
N 70°	-	-	02:45	02:52	02:39	02:27
68°	-	01:30	03:08	02:48	02:41	02:34
66°	-	02:10	03:27	02:46	02:43	02:40
64°	-	02:36	03:42	02:43	02:44	02:45
62°	01:20	02:56	03:54	02:41	02:45	02:50
60°	01:55	03:13	04:05	02:40	02:46	02:54
N 58°	02:20	03:26	04:14	02:38	02:47	02:57
56°	02:39	03:38	04:22	02:37	02:48	03:00
54°	02:54	03:48	04:29	02:35	02:49	03:03
52°	03:07	03:57	04:35	02:34	02:50	03:05
50°	03:19	04:05	04:41	02:33	02:50	03:08
45°	03:41	04:21	04:53	02:31	02:52	03:13
N 40°	03:59	04:34	05:03	02:29	02:53	03:17
35°	04:13	04:45	05:12	02:27	02:54	03:21
30°	04:24	04:54	05:19	02:25	02:55	03:24
20°	04:42	05:09	05:32	02:23	02:56	03:30
N 10°	04:56	05:22	05:44	02:21	02:58	03:35
0°	05:08	05:33	05:54	02:18	02:59	03:40
S 10°	05:18	05:43	06:04	02:16	03:00	03:45
20°	05:26	05:52	06:15	02:14	03:02	03:50
30°	05:34	06:03	06:27	02:11	03:03	03:56
35°	05:38	06:08	06:35	02:10	03:04	03:59
40°	05:42	06:14	06:43	02:08	03:05	04:03
45°	05:47	06:21	06:52	02:06	03:07	04:08
S 50°	05:51	06:29	07:03	02:04	03:08	04:13
52°	05:53	06:33	07:08	02:03	03:09	04:16
54°	05:55	06:36	07:14	02:01	03:10	04:18
56°	05:56	06:41	07:20	02:00	03:11	04:21
58°	05:59	06:45	07:27	01:59	03:12	04:25
S 60°	06:01	06:50	07:35	01:57	03:13	04:29
S 62°	06:03	06:56	07:45	01:55	03:14	04:33

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 28	Moonset 29	Moonset 30
N 72°	21:50	-	-	14:30	16:14	18:03
N 70°	21:14	-	-	14:31	16:08	17:48
68°	20:50	22:32	-	14:31	16:03	17:36
66°	20:31	21:50	-	14:32	15:59	17:27
64°	20:15	21:22	-	14:33	15:55	17:18
62°	20:03	21:01	22:42	14:33	15:52	17:12
60°	19:52	20:44	22:04	14:33	15:49	17:06
N 58°	19:43	20:30	21:38	14:34	15:47	17:00
56°	19:35	20:19	21:19	14:34	15:45	16:56
54°	19:27	20:08	21:03	14:34	15:43	16:52
52°	19:21	19:59	20:49	14:35	15:41	16:48
50°	19:15	19:51	20:38	14:35	15:39	16:44
45°	19:03	19:35	20:14	14:35	15:36	16:37
N 40°	18:52	19:21	19:57	14:36	15:33	16:31
35°	18:43	19:10	19:43	14:36	15:31	16:26
30°	18:36	19:01	19:31	14:37	15:29	16:21
20°	18:23	18:46	19:13	14:37	15:25	16:13
N 10°	18:11	18:33	18:59	14:38	15:22	16:06
0°	18:01	18:22	18:47	14:38	15:18	16:00
S 10°	17:50	18:12	18:37	14:38	15:15	15:53
20°	17:39	18:02	18:28	14:39	15:12	15:46
30°	17:27	17:52	18:20	14:39	15:08	15:38
35°	17:20	17:46	18:16	14:39	15:06	15:34
40°	17:12	17:40	18:12	14:40	15:04	15:29
45°	17:02	17:33	18:08	14:40	15:01	15:23
S 50°	16:51	17:25	18:03	14:40	14:58	15:16
52°	16:46	17:21	18:01	14:41	14:56	15:13
54°	16:40	17:18	17:59	14:41	14:55	15:09
56°	16:34	17:13	17:57	14:41	14:53	15:05
58°	16:27	17:09	17:55	14:41	14:51	15:01
S 60°	16:19	17:04	17:53	14:42	14:48	14:56
S 62°	16:09	16:58	17:51	14:42	14:46	14:50

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
28	2 23	2 28	11:58	08:28	20:48	25d 20%
29	2 32	2 36	11:57	09:09	21:29	26d 13%
30	2 40	2 44	11:57	09:50	22:11	27d 7%

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2011 May 1, 2, 3 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
1 Sunday 00	218° 34'.8	206° 59'.4	3° 10'.8 N	197° 46'.7	7° 58'.5 N	197° 33'.1	7° 40'.6 N	26° 34'.1	2° 12'.9 S
01	233° 37'.3	221° 59'.1	12'.0	212° 47'.4	59'.2	212° 35'.0	40'.8	41° 36'.7	12'.8
02	248° 39'.8	236° 58'.8	13'.1	227° 48'.1	59'.9	227° 37'.0	41'.0	56° 39'.3	12'.8
03	263° 42'.2	251° 58'.4	14'.3	242° 48'.8	8° 00'.7 N	242° 38'.9	41'.2	71° 41'.9	12'.7
04	278° 44'.7	266° 58'.1	15'.5	257° 49'.5	01'.4	257° 40'.8	41'.4	86° 44'.5	12'.6
05	293° 47'.2	281° 57'.8	16'.6	272° 50'.1	02'.1	272° 42'.7	41'.6	101° 47'.1	12'.6
06	308° 49'.6	296° 57'.4	17'.8	287° 50'.8	02'.8	287° 44'.6	41'.9	116° 49'.7	12'.5
07	323° 52'.1	311° 57'.1	18'.9	302° 51'.5	03'.6	302° 46'.5	42'.1	131° 52'.3	12'.5
08	338° 54'.6	326° 56'.7	20'.1	317° 52'.2	04'.3	317° 48'.4	42'.3	146° 55'.0	12'.4
09	353° 57'.0	341° 56'.4	21'.3	332° 52'.9	05'.0	332° 50'.3	42'.5	161° 57'.6	12'.4
10	8° 59'.5	356° 56'.1	22'.4	347° 53'.6	05'.7	347° 52'.3	42'.7	177° 00'.2	12'.3
11	24° 01'.9	11° 55'.7	23'.6	2° 54'.3	06'.5	2° 54'.2	42'.9	192° 02'.8	12'.2
12	39° 04'.4	26° 55'.4	3° 24'.8 N	17° 55'.0	8° 07'.2 N	17° 56'.1	7° 43'.2 N	207° 05'.4	2° 12'.2 S
13	54° 06'.9	41° 55'.1	25'.9	32° 55'.6	07'.9	32° 58'.0	43'.4	222° 08'.0	12'.1
14	69° 09'.3	56° 54'.7	27'.1	47° 56'.3	08'.6	47° 59'.9	43'.6	237° 10'.6	12'.1
15	84° 11'.8	71° 54'.4	28'.3	62° 57'.0	09'.4	63° 01'.8	43'.8	252° 13'.2	12'.0
16	99° 14'.3	86° 54'.1	29'.4	77° 57'.7	10'.1	78° 03'.7	44'.0	267° 15'.8	12'.0
17	114° 16'.7	101° 53'.7	30'.6	92° 58'.4	10'.8	93° 05'.6	44'.2	282° 18'.5	11'.9
18	129° 19'.2	116° 53'.4	31'.7	107° 59'.1	11'.5	108° 07'.6	44'.5	297° 21'.1	11'.9
19	144° 21'.7	131° 53'.0	32'.9	122° 59'.8	12'.3	123° 09'.5	44'.7	312° 23'.7	11'.8
20	159° 24'.1	146° 52'.7	34'.1	138° 00'.5	13'.0	138° 11'.4	44'.9	327° 26'.3	11'.7
21	174° 26'.6	161° 52'.4	35'.2	153° 01'.1	13'.7	153° 13'.3	45'.1	342° 28'.9	11'.7
22	189° 29'.0	176° 52'.0	36'.4	168° 01'.8	14'.4	168° 15'.2	45'.3	357° 31'.5	11'.6
23	204° 31'.5	191° 51'.7	37'.6	183° 02'.5	15'.2	183° 17'.1	45'.5	12° 34'.1	11'.6
2 Monday 00	219° 34'.0	206° 51'.3	3° 38'.7 N	198° 03'.2	8° 15'.9 N	198° 19'.0	7° 45'.8 N	27° 36'.7	2° 11'.5 S
01	234° 36'.4	221° 51'.0	39'.9	213° 03'.9	16'.6	213° 20'.9	46'.0	42° 39'.3	11'.5
02	249° 38'.9	236° 50'.7	41'.0	228° 04'.6	17'.3	228° 22'.9	46'.2	57° 41'.9	11'.4
03	264° 41'.4	251° 50'.3	42'.2	243° 05'.3	18'.1	243° 24'.8	46'.4	72° 44'.6	11'.4
04	279° 43'.8	266° 50'.0	43'.4	258° 06'.0	18'.8	258° 26'.7	46'.6	87° 47'.2	11'.3
05	294° 46'.3	281° 49'.7	44'.5	273° 06'.6	19'.5	273° 28'.6	46'.8	102° 49'.8	11'.2
06	309° 48'.8	296° 49'.3	45'.7	288° 07'.3	20'.2	288° 30'.5	47'.1	117° 52'.4	11'.2
07	324° 51'.2	311° 49'.0	46'.9	303° 08'.0	20'.9	303° 32'.4	47'.3	132° 55'.0	11'.1
08	339° 53'.7	326° 48'.6	48'.0	318° 08'.7	21'.7	318° 34'.3	47'.5	147° 57'.6	11'.1
09	354° 56'.2	341° 48'.3	49'.2	333° 09'.4	22'.4	333° 36'.2	47'.7	163° 00'.2	11'.0
10	9° 58'.6	356° 48'.0	50'.3	348° 10'.1	23'.1	348° 38'.2	47'.9	178° 02'.8	11'.0
11	25° 01'.1	11° 47'.6	51'.5	3° 10'.8	23'.8	3° 40'.1	48'.1	193° 05'.4	10'.9
12	40° 03'.5	26° 47'.3	3° 52'.7 N	18° 11'.4	8° 24'.6 N	18° 42'.0	7° 48'.3 N	208° 08'.0	2° 10'.9 S
13	55° 06'.0	41° 46'.9	53'.8	33° 12'.1	25'.3	33° 43'.9	48'.6	223° 10'.6	10'.8
14	70° 08'.5	56° 46'.6	55'.0	48° 12'.8	26'.0	48° 45'.8	48'.8	238° 13'.2	10'.7
15	85° 10'.9	71° 46'.3	56'.1	63° 13'.5	26'.7	63° 47'.7	49'.0	253° 15'.9	10'.7
16	100° 13'.4	86° 45'.9	57'.3	78° 14'.2	27'.4	78° 49'.6	49'.2	268° 18'.5	10'.6
17	115° 15'.9	101° 45'.6	58'.5	93° 14'.9	28'.2	93° 51'.6	49'.4	283° 21'.1	10'.6
18	130° 18'.3	116° 45'.2	59'.6	108° 15'.6	28'.9	108° 53'.5	49'.6	298° 23'.7	10'.5
19	145° 20'.8	131° 44'.9	4° 00'.8 N	123° 16'.3	29'.6	123° 55'.4	49'.9	313° 26'.3	10'.5
20	160° 23'.3	146° 44'.6	01'.9	138° 16'.9	30'.3	138° 57'.3	50'.1	328° 28'.9	10'.4
21	175° 25'.7	161° 44'.2	03'.1	153° 17'.6	31'.0	153° 59'.2	50'.3	343° 31'.5	10'.4
22	190° 28'.2	176° 43'.9	04'.3	168° 18'.3	31'.8	169° 01'.1	50'.5	358° 34'.1	10'.3
23	205° 30'.7	191° 43'.5	05'.4	183° 19'.0	32'.5	184° 03'.0	50'.7	13° 36'.7	10'.3
3 Tuesday 00	220° 33'.1	206° 43'.2	4° 06'.6 N	198° 19'.7	8° 33'.2 N	199° 05'.0	7° 50'.9 N	28° 39'.3	2° 10'.2 S
01	235° 35'.6	221° 42'.9	07'.7	213° 20'.4	33'.9	214° 06'.9	51'.1	43° 41'.9	10'.1
02	250° 38'.0	236° 42'.5	08'.9	228° 21'.1	34'.6	229° 08'.8	51'.4	58° 44'.5	10'.1
03	265° 40'.5	251° 42'.2	10'.1	243° 21'.7	35'.4	244° 10'.7	51'.6	73° 47'.1	10'.0
04	280° 43'.0	266° 41'.8	11'.2	258° 22'.4	36'.1	259° 12'.6	51'.8	88° 49'.8	10'.0
05	295° 45'.4	281° 41'.5	12'.4	273° 23'.1	36'.8	274° 14'.5	52'.0	103° 52'.4	09'.9
06	310° 47'.9	296° 41'.1	13'.5	288° 23'.8	37'.5	289° 16'.4	52'.2	118° 55'.0	09'.9
07	325° 50'.4	311° 40'.8	14'.7	303° 24'.5	38'.2	304° 18'.4	52'.4	133° 57'.6	09'.8
08	340° 52'.8	326° 40'.5	15'.9	318° 25'.2	39'.0	319° 20'.3	52'.7	149° 00'.2	09'.8
09	355° 55'.3	341° 40'.1	17'.0	333° 25'.9	39'.7	334° 22'.2	52'.9	164° 02'.8	09'.7
10	10° 57'.8	356° 39'.8	18'.2	348° 26'.5	40'.4	349° 24'.1	53'.1	179° 05'.4	09'.7
11	26° 00'.2	11° 39'.4	19'.3	3° 27'.2	41'.1	4° 26'.0	53'.3	194° 08'.0	09'.6
12	41° 02'.7	26° 39'.1	4° 20'.5 N	18° 27'.9	8° 41'.8 N	19° 27'.9	7° 53'.5 N	209° 10'.6	2° 09'.6 S
13	56° 05'.1	41° 38'.8	21'.7	33° 28'.6	42'.5	34° 29'.8	53'.7	224° 13'.2	09'.5
14	71° 07'.6	56° 38'.4	22'.8	48° 29'.3	43'.3	49° 31'.8	53'.9	239° 15'.8	09'.4
15	86° 10'.1	71° 38'.1	24'.0	63° 30'.0	44'.0	64° 33'.7	54'.2	254° 18'.4	09'.4
16	101° 12'.5	86° 37'.7	25'.1	78° 30'.7	44'.7	79° 35'.6	54'.4	269° 21'.0	09'.3
17	116° 15'.0	101° 37'.4	26'.3	93° 31'.3	45'.4	94° 37'.5	54'.6	284° 23'.6	09'.3
18	131° 17'.5	116° 37'.0	27'.5	108° 32'.0	46'.1	109° 39'.4	54'.8	299° 26'.2	09'.2
19	146° 19'.9	131° 36'.7	28'.6	123° 32'.7	46'.8	124° 41'.3	55'.0	314° 28'.8	09'.2
20	161° 22'.4	146° 36'.3	29'.8	138° 33'.4	47'.6	139° 43'.2	55'.2	329° 31'.4	09'.1
21	176° 24'.9	161° 36'.0	30'.9	153° 34'.1	48'.3	154° 45'.2	55'.4	344° 34'.1	09'.1
22	191° 27'.3	176° 35'.7	32'.1	168° 34'.8	49'.0	169° 47'.1	55'.7	359° 36'.7	09'.0
23	206° 29'.8	191° 35'.3	33'.2	183° 35'.5	49'.7	184° 49'.0	55'.9	14° 39'.3	09'.0
	M.P. 09:16	v -0'.3	d 1'.2	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.6 S
Achernar	335° 28'.4	57° 10'.6 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.9	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.4	55° 53'.9 N
Alkaid	152° 59'.6	49° 15'.3 N
Alnair	27° 45'.7	46° 54'.1 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.4	29° 09'.1 N
Altair	62° 09'.6	8° 53'.8 N
Ankaa	353° 17'.5	42° 14'.5 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.6	69° 02'.7 S
Avior	234° 18'.8	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.2	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.5	45° 19'.0 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.4 S
Dubhe	193° 53'.1	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.5	51° 29'.0 N
Enif	33° 48'.7	9° 55'.6 N
Fomalhaut	15° 25'.8	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.8 S
Hamal	328° 02'.9	23° 30'.9 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.5 N
Markab	13° 40'.1	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.1	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.5	56° 41'.6 S
Polaris	318° 59'.3	89° 18'.8 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 42'.9	56° 35'.9 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 35'.2	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.6	43° 29'.1 S
Vega	80° 39'.8	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	347° 17'.4	10:13
Mars	338° 29'.2	10:47
Jupiter	338° 45'.1	10:45
Saturn	168° 02'.7	22:06

SUN				
GHA	Dec	GHA	v	Dec	d	HP
180° 42'.0	14° 54'.4 N	206° 35'.4	15'.3	10° 21'.3 N	10'.7	54'.1
195° 42'.1	55'.1	221° 09'.7	15'.3	32'.0	10'.6	
210° 42'.2	55'.9	235° 44'.0	15'.2	42'.6	10'.6	
225° 42'.3	56'.6	250° 18'.2	15'.2	53'.2	10'.6	
240° 42'.3	57'.4	264° 52'.4	15'.1	11° 03'.8 N	10'.6	
255° 42'.4	58'.2	279° 26'.5	15'.1	14'.4	10'.5	
270° 42'.5	58'.9	294° 00'.6	15'.1	24'.9	10'.4	
285° 42'.6	59'.7	308° 34'.7	15'.0	35'.3	10'.4	
300° 42'.6	15° 00'.4 N	323° 08'.7	14'.9	45'.7	10'.4	
315° 42'.7	01'.2	337° 42'.6	15'.0	56'.1	10'.3	54'.2
330° 42'.8	02'.0	352° 16'.6	14'.8	12° 06'.4 N	10'.3	
345° 42'.9	02'.7	6° 50'.4	14'.9	16'.7	10'.2	
0° 42'.9	15° 03'.5 N	21° 24'.3	14'.7	12° 26'.9 N	10'.2	54'.2
15° 43'.0	04'.2	35° 58'.0	14'.7	37'.1	10'.1	
30° 43'.1	05'.0	50° 31'.7	14'.7	47'.2	10'.1	
45° 43'.2	05'.7	65° 05'.4	14'.6	57'.3	10'.1	
60° 43'.2	06'.5	79° 39'.0	14'.6	13° 07'.4 N	10'.0	
75° 43'.3	07'.3	94° 12'.6	14'.6	17'.4	9'.9	
90° 43'.4	08'.0	108° 46'.2	14'.4	27'.3	9'.9	
105° 43'.5	08'.8	123° 19'.6	14'.5	37'.2	9'.8	
120° 43'.5	09'.5	137° 53'.1	14'.3	47'.0	9'.8	
135° 43'.6	10'.3	152° 26'.4	14'.3	56'.8	9'.7	54'.3
150° 43'.7	11'.0	166° 59'.7	14'.3	14° 06'.5 N	9'.7	
165° 43'.8	11'.8	181° 33'.0	14'.2	16'.2	9'.6	
180° 43'.8	15° 12'.5 N	196° 06'.2	14'.2	14° 25'.8 N	9'.6	54'.3
195° 43'.9	13'.3	210° 39'.4	14'.1	35'.4	9'.5	
210° 44'.0	14'.0	225° 12'.5	14'.0	44'.9	9'.4	
225° 44'.0	14'.8	239° 45'.5	14'.0	54'.3	9'.4	
240° 44'.1	15'.5	254° 18'.5	14'.0	15° 03'.7 N	9'.3	
255° 44'.2	16'.3	268° 51'.5	13'.9	13'.0	9'.3	
270° 44'.3	17'.0	283° 24'.4	13'.8	22'.3	9'.2	
285° 44'.3	17'.8	297° 57'.2	13'.7	31'.5	9'.1	54'.4
300° 44'.4	18'.5	312° 29'.9	13'.8	40'.6	9'.1	
315° 44'.5	19'.3	327° 02'.7	13'.6	49'.7	9'.0	
330° 44'.5	20'.0	341° 35'.3	13'.6	58'.7	8'.9	
345° 44'.6	20'.8	356° 07'.9	13'.6	16° 07'.6 N	8'.9	
0° 44'.7	15° 21'.5 N	10° 40'.5	13'.4	16° 16'.5 N	8'.8	54'.4
15° 44'.7	22'.3	25° 12'.9	13'.5	25'.3	8'.8	
30° 44'.8	23'.0	39° 45'.4	13'.3	34'.1	8'.7	
45° 44'.9	23'.8	54° 17'.7	13'.3	42'.8	8'.6	
60° 45'.0	24'.5	68° 50'.0	13'.3	51'.4	8'.5	54'.5
75° 45'.0	25'.3	83° 22'.3	13'.2	59'.9	8'.5	
90° 45'.1	26'.0	97° 54'.5	13'.1	17° 08'.4 N	8'.4	
105° 45'.2	26'.7	112° 26'.6	13'.0	16'.8	8'.3	
120° 45'.2	27'.5	126° 58'.6	13'.0	25'.1	8'.3	
135° 45'.3	28'.2	141° 30'.6	13'.0	33'.4	8'.1	
150° 45'.4	29'.0	156° 02'.6	12'.9	41'.5	8'.1	
165° 45'.4	29'.7	170° 34'.5	12'.8	49'.6	8'.1	
180° 45'.5	15° 30'.5 N	185° 06'.3	12'.7	17° 57'.7 N	7'.9	54'.6
195° 45'.6	31'.2	199° 38'.0	12'.7	18° 05'.6 N	7'.9	
210° 45'.6	31'.9	214° 09'.7	12'.7	13'.5	7'.8	
225° 45'.7	32'.7	228° 41'.4	12'.6	21'.3	7'.7	
240° 45'.8	33'.4	243° 13'.0	12'.5	29'.0	7'.6	
255° 45'.8	34'.2	257° 44'.5	12'.4	36'.6	7'.6	
270° 45'.9	34'.9	272° 15'.9	12'.4	44'.2	7'.4	
285° 46'.0	35'.6	286° 47'.3	12'.3	51'.6	7'.4	54'.7
300° 46'.0	36'.4	301° 18'.6	12'.3	59'.0	7'.3	
315° 46'.1	37'.1	315° 49'.9	12'.2	19° 06'.3 N	7'.3	
330° 46'.1	37'.8	330° 21'.1	12'.2	13'.6	7'.1	
345° 46'.2	38'.6	344° 52'.3	12'.0	20'.7	7'.0	
0° 46'.3	15° 39'.3 N	359° 23'.3	12'.1	19° 27'.7 N	7'.0	54'.7
15° 46'.3	40'.1	13° 54'.4	11'.9	34'.7	6'.9	
30° 46'.4	40'.8	28° 25'.3	11'.9	41'.6	6'.8	
45° 46'.5	41'.5	42° 56'.2	11'.9	48'.4	6'.7	54'.8
60° 46'.5	42'.3	57° 27'.1	11'.7	55'.1	6'.6	
75° 46'.6	43'.0	71° 57'.8	11'.7	20° 01'.7 N	6'.5	
90° 46'.7	43'.7	86° 28'.5	11'.7	08'.2	6'.4	
105° 46'.7	44'.5	100° 59'.2	11'.6	14'.6	6'.3	
120° 46'.8	45'.2	115° 29'.8	11'.5	20'.9	6'.3	
135° 46'.8	45'.9	130° 00'.3	11'.5	27'.2	6'.1	54'.9
150° 46'.9	46'.7	144° 30'.8	11'.4	33'.3	6'.1	
165° 47'.0	47'.4	159° 01'.2	11'.4	39'.4	5'.9	
SD 15'.9	d 0'.7	SD	14'.8	14'.8	14'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 1	Moonrise 2	Moonrise 3
N 72°	-	-	01:47	01:56	01:26	00:07
N 70°	-	-	02:27	02:13	01:56	01:28
68°	-	01:00	02:55	02:26	02:18	02:07
66°	-	01:51	03:15	02:37	02:35	02:34
64°	-	02:22	03:31	02:47	02:50	02:55
62°	00:53	02:45	03:45	02:55	03:02	03:12
60°	01:39	03:03	03:56	03:02	03:12	03:26
N 58°	02:07	03:18	04:06	03:08	03:21	03:38
56°	02:29	03:30	04:15	03:13	03:29	03:49
54°	02:46	03:41	04:22	03:18	03:36	03:58
52°	03:00	03:50	04:29	03:23	03:43	04:07
50°	03:12	03:59	04:35	03:27	03:48	04:14
45°	03:36	04:16	04:49	03:36	04:01	04:30
N 40°	03:54	04:30	04:59	03:43	04:11	04:44
35°	04:09	04:42	05:09	03:49	04:20	04:55
30°	04:21	04:51	05:17	03:55	04:28	05:05
20°	04:40	05:07	05:31	04:05	04:42	05:22
N 10°	04:55	05:21	05:42	04:13	04:54	05:37
0°	05:07	05:32	05:54	04:21	05:05	05:51
S 10°	05:18	05:43	06:05	04:30	05:16	06:05
20°	05:27	05:53	06:16	04:38	05:29	06:20
30°	05:36	06:05	06:29	04:49	05:43	06:38
35°	05:41	06:11	06:37	04:54	05:51	06:48
40°	05:45	06:17	06:45	05:01	06:00	07:00
45°	05:50	06:25	06:55	05:09	06:11	07:14
S 50°	05:55	06:33	07:07	05:18	06:25	07:31
52°	05:57	06:37	07:13	05:23	06:31	07:39
54°	05:59	06:41	07:19	05:28	06:38	07:48
56°	06:02	06:46	07:26	05:33	06:46	07:58
58°	06:04	06:51	07:34	05:39	06:54	08:10
S 60°	06:07	06:57	07:42	05:46	07:04	08:23
S 62°	06:10	07:03	07:52	05:54	07:16	08:39

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 1	Moonset 2	Moonset 3
N 72°	22:14	-	-	20:03	22:56	-
N 70°	21:31	-	-	19:35	21:36	-
68°	21:03	23:06	-	19:14	20:58	22:56
66°	20:42	22:08	-	18:57	20:32	22:10
64°	20:25	21:35	-	18:44	20:12	21:40
62°	20:11	21:12	23:12	18:33	19:55	21:18
60°	19:59	20:53	22:20	18:23	19:42	21:00
N 58°	19:49	20:38	21:50	18:15	19:30	20:45
56°	19:41	20:26	21:28	18:08	19:20	20:32
54°	19:33	20:15	21:11	18:01	19:11	20:21
52°	19:26	20:05	20:56	17:55	19:04	20:11
50°	19:20	19:57	20:44	17:50	18:56	20:02
45°	19:06	19:39	20:19	17:39	18:41	19:44
N 40°	18:55	19:25	20:01	17:30	18:29	19:29
35°	18:46	19:13	19:46	17:22	18:18	19:16
30°	18:38	19:03	19:33	17:15	18:09	19:05
20°	18:24	18:47	19:14	17:03	17:54	18:46
N 10°	18:12	18:34	18:59	16:52	17:40	18:30
0°	18:00	18:22	18:47	16:42	17:27	18:14
S 10°	17:49	18:11	18:36	16:32	17:14	17:59
20°	17:38	18:00	18:27	16:22	17:01	17:42
30°	17:24	17:49	18:18	16:10	16:45	17:24
35°	17:17	17:43	18:13	16:03	16:36	17:13
40°	17:08	17:36	18:08	15:56	16:26	17:00
45°	16:58	17:29	18:04	15:47	16:14	16:46
S 50°	16:46	17:20	17:58	15:36	15:59	16:28
52°	16:40	17:16	17:56	15:31	15:53	16:19
54°	16:34	17:12	17:54	15:25	15:45	16:10
56°	16:27	17:07	17:52	15:19	15:37	15:59
58°	16:20	17:02	17:49	15:13	15:27	15:47
S 60°	16:11	16:57	17:46	15:05	15:17	15:33
S 62°	16:01	16:50	17:43	14:56	15:04	15:17

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
1	2 48	2 52	11:57	10:32	22:54	28d 3%
2	2 55	2 59	11:57	11:16	23:39	29d 1%
3	3 02	3 05	11:57	12:03	24:27	0d 0%

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2011 May 4, 5, 6 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
4 00	221° 32'.3	206° 35'.0	4° 34'.4 N	198° 36'.1	8° 50'.4 N	199° 50'.9	7° 56'.1 N	29° 41'.9	2° 08'.9 S
01	236° 34'.7	221° 34'.6	35'.6	213° 36'.8	51'.1	214° 52'.8	56'.3	44° 44'.5	08'.9
02	251° 37'.2	236° 34'.3	36'.7	228° 37'.5	51'.9	229° 54'.7	56'.5	59° 47'.1	08'.8
03	266° 39'.6	251° 33'.9	37'.9	243° 38'.2	52'.6	244° 56'.6	56'.7	74° 49'.7	08'.8
04	281° 42'.1	266° 33'.6	39'.0	258° 38'.9	53'.3	259° 58'.6	57'.0	89° 52'.3	08'.7
05	296° 44'.6	281° 33'.2	40'.2	273° 39'.6	54'.0	275° 00'.5	57'.2	104° 54'.9	08'.6
06	311° 47'.0	296° 32'.9	41'.3	288° 40'.2	54'.7	290° 02'.4	57'.4	119° 57'.5	08'.6
07	326° 49'.5	311° 32'.6	42'.5	303° 40'.9	55'.4	305° 04'.3	57'.6	135° 00'.1	08'.5
08	341° 52'.0	326° 32'.2	43'.7	318° 41'.6	56'.1	320° 06'.2	57'.8	150° 02'.7	08'.5
09	356° 54'.4	341° 31'.9	44'.8	333° 42'.3	56'.9	335° 08'.1	58'.0	165° 05'.3	08'.4
10	11° 56'.9	356° 31'.5	46'.0	348° 43'.0	57'.6	350° 10'.1	58'.2	180° 07'.9	08'.4
11	26° 59'.4	11° 31'.2	47'.1	3° 43'.7	58'.3	5° 12'.0	58'.5	195° 10'.5	08'.3
12	42° 01'.8	26° 30'.8	4° 48'.3 N	18° 44'.4	8° 59'.0 N	20° 13'.9	7° 58'.7 N	210° 13'.1	2° 08'.3 S
13	57° 04'.3	41° 30'.5	49'.4	33° 45'.0	59'.7	35° 15'.8	58'.9	225° 15'.7	08'.2
14	72° 06'.8	56° 30'.1	50'.6	48° 45'.7	9° 00'.4 N	50° 17'.7	59'.1	240° 18'.3	08'.2
15	87° 09'.2	71° 29'.8	51'.7	63° 46'.4	01'.1	65° 19'.6	59'.3	255° 20'.9	08'.1
16	102° 11'.7	86° 29'.4	52'.9	78° 47'.1	01'.9	80° 21'.5	59'.5	270° 23'.5	08'.1
17	117° 14'.1	101° 29'.1	54'.1	93° 47'.8	02'.6	95° 23'.5	59'.7	285° 26'.1	08'.0
18	132° 16'.6	116° 28'.7	55'.2	108° 48'.5	03'.3	110° 25'.4	59'.9	300° 28'.7	08'.0
19	147° 19'.1	131° 28'.4	56'.4	123° 49'.2	04'.0	125° 27'.3	8° 00'.2 N	315° 31'.3	07'.9
20	162° 21'.5	146° 28'.1	57'.5	138° 49'.8	04'.7	140° 29'.2	00'.4	330° 33'.9	07'.9
21	177° 24'.0	161° 27'.7	58'.7	153° 50'.5	05'.4	155° 31'.1	00'.6	345° 36'.5	07'.8
22	192° 26'.5	176° 27'.4	59'.8	168° 51'.2	06'.1	170° 33'.0	00'.8	0° 39'.2	07'.8
23	207° 28'.9	191° 27'.0	5° 01'.0 N	183° 51'.9	06'.8	185° 35'.0	01'.0	15° 41'.8	07'.7
5 00	222° 31'.4	206° 26'.7	5° 02'.1 N	198° 52'.6	9° 07'.5 N	200° 36'.9	8° 01'.2 N	30° 44'.4	2° 07'.7 S
01	237° 33'.9	221° 26'.3	03'.3	213° 53'.3	08'.3	215° 38'.8	01'.4	45° 47'.0	07'.6
02	252° 36'.3	236° 26'.0	04'.4	228° 53'.9	09'.0	230° 40'.7	01'.7	60° 49'.6	07'.5
03	267° 38'.8	251° 25'.6	05'.6	243° 54'.6	09'.7	245° 42'.6	01'.9	75° 52'.2	07'.5
04	282° 41'.2	266° 25'.3	06'.8	258° 55'.3	10'.4	260° 44'.5	02'.1	90° 54'.8	07'.4
05	297° 43'.7	281° 24'.9	07'.9	273° 56'.0	11'.1	275° 46'.5	02'.3	105° 57'.4	07'.4
06	312° 46'.2	296° 24'.6	09'.1	288° 56'.7	11'.8	290° 48'.4	02'.5	121° 00'.0	07'.3
07	327° 48'.6	311° 24'.2	10'.2	303° 57'.4	12'.5	305° 50'.3	02'.7	136° 02'.6	07'.3
08	342° 51'.1	326° 23'.9	11'.4	318° 58'.0	13'.2	320° 52'.2	02'.9	151° 05'.2	07'.2
09	357° 53'.6	341° 23'.5	12'.5	333° 58'.7	13'.9	335° 54'.1	03'.2	166° 07'.8	07'.2
10	12° 56'.0	356° 23'.2	13'.7	348° 59'.4	14'.6	350° 56'.0	03'.4	181° 10'.4	07'.1
11	27° 58'.5	11° 22'.8	14'.8	4° 00'.1	15'.4	5° 58'.0	03'.6	196° 13'.0	07'.1
12	43° 01'.0	26° 22'.5	5° 16'.0 N	19° 00'.8	9° 16'.1 N	20° 59'.9	8° 03'.8 N	211° 15'.6	2° 07'.0 S
13	58° 03'.4	41° 22'.1	17'.1	34° 01'.5	16'.8	36° 01'.8	04'.0	226° 18'.2	07'.0
14	73° 05'.9	56° 21'.8	18'.3	49° 02'.1	17'.5	51° 03'.7	04'.2	241° 20'.8	06'.9
15	88° 08'.4	71° 21'.4	19'.4	64° 02'.8	18'.2	66° 05'.6	04'.4	256° 23'.4	06'.9
16	103° 10'.8	86° 21'.1	20'.6	79° 03'.5	18'.9	81° 07'.5	04'.6	271° 26'.0	06'.8
17	118° 13'.3	101° 20'.7	21'.7	94° 04'.2	19'.6	96° 09'.5	04'.9	286° 28'.6	06'.8
18	133° 15'.7	116° 20'.4	22'.9	109° 04'.9	20'.3	111° 11'.4	05'.1	301° 31'.2	06'.7
19	148° 18'.2	131° 20'.0	24'.0	124° 05'.6	21'.0	126° 13'.3	05'.3	316° 33'.8	06'.7
20	163° 20'.7	146° 19'.7	25'.2	139° 06'.2	21'.7	141° 15'.2	05'.5	331° 36'.4	06'.6
21	178° 23'.1	161° 19'.3	26'.3	154° 06'.9	22'.4	156° 17'.1	05'.7	346° 39'.0	06'.6
22	193° 25'.6	176° 19'.0	27'.5	169° 07'.6	23'.1	171° 19'.0	05'.9	1° 41'.6	06'.5
23	208° 28'.1	191° 18'.6	28'.6	184° 08'.3	23'.9	186° 21'.0	06'.1	16° 44'.2	06'.5
6 00	223° 30'.5	206° 18'.3	5° 29'.8 N	199° 09'.0	9° 24'.6 N	201° 22'.9	8° 06'.3 N	31° 46'.8	2° 06'.4 S
01	238° 33'.0	221° 17'.9	30'.9	214° 09'.7	25'.3	216° 24'.8	06'.6	46° 49'.4	06'.4
02	253° 35'.5	236° 17'.6	32'.1	229° 10'.3	26'.0	231° 26'.7	06'.8	61° 52'.0	06'.3
03	268° 37'.9	251° 17'.2	33'.2	244° 11'.0	26'.7	246° 28'.6	07'.0	76° 54'.6	06'.3
04	283° 40'.4	266° 16'.9	34'.4	259° 11'.7	27'.4	261° 30'.5	07'.2	91° 57'.2	06'.2
05	298° 42'.9	281° 16'.5	35'.5	274° 12'.4	28'.1	276° 32'.5	07'.4	106° 59'.8	06'.2
06	313° 45'.3	296° 16'.1	36'.7	289° 13'.1	28'.8	291° 34'.4	07'.6	122° 02'.4	06'.1
07	328° 47'.8	311° 15'.8	37'.8	304° 13'.8	29'.5	306° 36'.3	07'.8	137° 05'.0	06'.1
08	343° 50'.2	326° 15'.4	39'.0	319° 14'.4	30'.2	321° 38'.2	08'.0	152° 07'.6	06'.0
09	358° 52'.7	341° 15'.1	40'.1	334° 15'.1	30'.9	336° 40'.1	08'.3	167° 10'.2	06'.0
10	13° 55'.2	356° 14'.7	41'.3	349° 15'.8	31'.6	351° 42'.0	08'.5	182° 12'.8	05'.9
11	28° 57'.6	11° 14'.4	42'.4	4° 16'.5	32'.3	6° 44'.0	08'.7	197° 15'.4	05'.9
12	44° 00'.1	26° 14'.0	5° 43'.6 N	19° 17'.2	9° 33'.0 N	21° 45'.9	8° 08'.9 N	212° 18'.0	2° 05'.8 S
13	59° 02'.6	41° 13'.7	44'.7	34° 17'.9	33'.7	36° 47'.8	09'.1	227° 20'.6	05'.8
14	74° 05'.0	56° 13'.3	45'.9	49° 18'.5	34'.4	51° 49'.7	09'.3	242° 23'.2	05'.7
15	89° 07'.5	71° 13'.0	47'.0	64° 19'.2	35'.1	66° 51'.6	09'.5	257° 25'.8	05'.7
16	104° 10'.0	86° 12'.6	48'.2	79° 19'.9	35'.8	81° 53'.6	09'.7	272° 28'.4	05'.6
17	119° 12'.4	101° 12'.3	49'.3	94° 20'.6	36'.6	96° 55'.5	10'.0	287° 31'.0	05'.6
18	134° 14'.9	116° 11'.9	50'.5	109° 21'.3	37'.3	111° 57'.4	10'.2	302° 33'.6	05'.5
19	149° 17'.4	131° 11'.5	51'.6	124° 22'.0	38'.0	126° 59'.3	10'.4	317° 36'.2	05'.5
20	164° 19'.8	146° 11'.2	52'.8	139° 22'.6	38'.7	142° 01'.2	10'.6	332° 38'.7	05'.4
21	179° 22'.3	161° 10'.8	53'.9	154° 23'.3	39'.4	157° 03'.1	10'.8	347° 41'.3	05'.4
22	194° 24'.7	176° 10'.5	55'.1	169° 24'.0	40'.1	172° 05'.1	11'.0	2° 43'.9	05'.3
23	209° 27'.2	191° 10'.1	56'.2	184° 24'.7	40'.8	187° 07'.0	11'.2	17° 46'.5	05'.3
	M.P. 09:04	v -0'.4	d 1'.2	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.6 S
Achernar	335° 28'.4	57° 10'.6 S
Acrux	173° 10'.6	63° 10'.0 S
Adhara	255° 13'.9	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.4	55° 53'.9 N
Alkaid	152° 59'.6	49° 15'.3 N
Alnair	27° 45'.7	46° 54'.1 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.4	29° 09'.1 N
Altair	62° 09'.6	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.5 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.5	69° 02'.7 S
Avior	234° 18'.8	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.2	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.5	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.4 S
Dubhe	193° 53'.1	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.5	51° 29'.1 N
Enif	33° 48'.7	9° 55'.6 N
Fomalhaut	15° 25'.8	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.8 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.5 N
Markab	13° 40'.0	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.1	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.1 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.5	56° 41'.6 S
Polaris	318° 58'.9	89° 18'.8 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 42'.8	56° 35'.9 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.6	43° 29'.1 S
Vega	80° 39'.7	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	343° 55'.3	10:14
Mars	336° 21'.2	10:44
Jupiter	338° 05'.5	10:36
Saturn	168° 13'.0	21:53

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 47'.0	15° 48'.1 N	173° 31'.6	11'.3	20° 45'.3 N	5'.9	54'.9
195° 47'.1	48'.9	188° 01'.9	11'.2	51'.2	5'.7	
210° 47'.1	49'.6	202° 32'.1	11'.2	56'.9	5'.7	
225° 47'.2	50'.3	217° 02'.3	11'.1	21° 02'.6 N	5'.6	
240° 47'.3	51'.0	231° 32'.4	11'.0	08'.2	5'.4	55'.0
255° 47'.3	51'.8	246° 02'.4	11'.0	13'.6	5'.4	
270° 47'.4	52'.5	260° 32'.4	11'.0	19'.0	5'.3	
285° 47'.4	53'.2	275° 02'.4	10'.9	24'.3	5'.1	
300° 47'.5	53'.9	289° 32'.3	10'.8	29'.4	5'.1	
315° 47'.6	54'.7	304° 02'.1	10'.8	34'.5	4'.9	
330° 47'.6	55'.4	318° 31'.9	10'.7	39'.4	4'.9	55'.1
345° 47'.7	56'.1	333° 01'.6	10'.6	44'.3	4'.7	
0° 47'.7	15° 56'.9 N	347° 31'.2	10'.6	21° 49'.0 N	4'.6	55'.1
15° 47'.8	57'.6	2° 00'.8	10'.6	53'.6	4'.6	
30° 47'.8	58'.3	16° 30'.4	10'.5	58'.2	4'.4	
45° 47'.9	59'.0	30° 59'.9	10'.4	22° 02'.6 N	4'.3	
60° 48'.0	59'.8	45° 29'.3	10'.4	06'.9	4'.2	55'.2
75° 48'.0	16° 00'.5 N	59° 58'.7	10'.4	11'.1	4'.1	
90° 48'.1	01'.2	74° 28'.1	10'.3	15'.2	4'.0	
105° 48'.1	01'.9	88° 57'.4	10'.2	19'.2	3'.9	
120° 48'.2	02'.6	103° 26'.6	10'.2	23'.1	3'.7	
135° 48'.2	03'.4	117° 55'.8	10'.1	26'.8	3'.7	55'.3
150° 48'.3	04'.1	132° 24'.9	10'.1	30'.5	3'.5	
165° 48'.4	04'.8	146° 54'.0	10'.1	34'.0	3'.5	
180° 48'.4	16° 05'.5 N	161° 23'.1	10'.0	22° 37'.5 N	3'.3	55'.3
195° 48'.5	06'.2	175° 52'.1	9'.9	40'.8	3'.2	
210° 48'.5	07'.0	190° 21'.0	9'.9	44'.0	3'.1	
225° 48'.6	07'.7	204° 49'.9	9'.9	47'.1	2'.9	55'.4
240° 48'.6	08'.4	219° 18'.8	9'.8	50'.0	2'.9	
255° 48'.7	09'.1	233° 47'.6	9'.8	52'.9	2'.7	
270° 48'.7	09'.8	248° 16'.4	9'.7	55'.6	2'.6	
285° 48'.8	10'.5	262° 45'.1	9'.7	58'.2	2'.5	
300° 48'.8	11'.3	277° 13'.8	9'.6	23° 00'.7 N	2'.4	55'.5
315° 48'.9	12'.0	291° 42'.4	9'.6	03'.1	2'.3	
330° 48'.9	12'.7	306° 11'.0	9'.6	05'.4	2'.1	
345° 49'.0	13'.4	320° 39'.6	9'.5	07'.5	2'.1	
0° 49'.1	16° 14'.1 N	335° 08'.1	9'.5	23° 09'.6 N	1'.9	55'.5
15° 49'.1	14'.8	349° 36'.6	9'.5	11'.5	1'.7	
30° 49'.2	15'.5	4° 05'.1	9'.4	13'.2	1'.7	55'.6
45° 49'.2	16'.3	18° 33'.5	9'.4	14'.9	1'.5	
60° 49'.3	17'.0	33° 01'.9	9'.3	16'.4	1'.5	
75° 49'.3	17'.7	47° 30'.2	9'.3	17'.9	1'.3	
90° 49'.4	18'.4	61° 58'.5	9'.3	19'.2	1'.1	
105° 49'.4	19'.1	76° 26'.8	9'.2	20'.3	1'.1	55'.7
120° 49'.5	19'.8	90° 55'.0	9'.3	21'.4	0'.9	
135° 49'.5	20'.5	105° 23'.3	9'.2	22'.3	0'.8	
150° 49'.6	21'.2	119° 51'.5	9'.1	23'.1	0'.7	
165° 49'.6	21'.9	134° 19'.6	9'.1	23'.8	0'.5	
180° 49'.7	16° 22'.7 N	148° 47'.7	9'.2	23° 24'.3 N	0'.5	55'.8
195° 49'.7	23'.4	163° 15'.9	9'.0	24'.8	0'.3	
210° 49'.8	24'.1	177° 43'.9	9'.1	25'.1	0'.1	
225° 49'.8	24'.8	192° 12'.0	9'.0	25'.2	0'.1	
240° 49'.9	25'.5	206° 40'.0	9'.0	25'.3	0'.1	
255° 49'.9	26'.2	221° 08'.0	9'.0	25'.2	0'.2	55'.9
270° 50'.0	26'.9	235° 36'.0	9'.0	25'.0	0'.3	
285° 50'.0	27'.6	250° 04'.0	8'.9	24'.7	0'.5	
300° 50'.0	28'.3	264° 31'.9	9'.0	24'.2	0'.5	
315° 50'.1	29'.0	278° 59'.9	8'.9	23'.7	0'.8	
330° 50'.1	29'.7	293° 27'.8	8'.9	22'.9	0'.8	56'.0
345° 50'.2	30'.4	307° 55'.7	8'.9	22'.1	1'.0	
0° 50'.2	16° 31'.1 N	322° 23'.6	8'.8	23° 21'.1 N	1'.0	56'.0
15° 50'.3	31'.8	336° 51'.4	8'.9	20'.1	1'.3	
30° 50'.3	32'.5	351° 19'.3	8'.8	18'.8	1'.3	56'.1
45° 50'.4	33'.2	5° 47'.1	8'.8	17'.5	1'.5	
60° 50'.4	33'.9	20° 14'.9	8'.9	16'.0	1'.6	
75° 50'.5	34'.6	34° 42'.8	8'.8	14'.4	1'.7	
90° 50'.5	35'.3	49° 10'.6	8'.8	12'.7	1'.9	
105° 50'.6	36'.0	63° 38'.4	8'.8	10'.8	2'.0	56'.2
120° 50'.6	36'.7	78° 06'.2	8'.7	08'.8	2'.1	
135° 50'.6	37'.4	92° 33'.9	8'.8	06'.7	2'.2	
150° 50'.7	38'.1	107° 01'.7	8'.8	04'.5	2'.4	
165° 50'.7	38'.8	121° 29'.5	8'.8	02'.1	2'.5	
SD 15'.9	d 0'.7	SD	15'.0	15'.1	15'.3	

MOON						
GHA	v	Dec	d	HP
173° 31'.6	11'.3	20° 45'.3 N	5'.9	54'.9
188° 01'.9	11'.2	51'.2	5'.7	
202° 32'.1	11'.2	56'.9	5'.7	
217° 02'.3	11'.1	21° 02'.6 N	5'.6	
231° 32'.4	11'.0	08'.2	5'.4	55'.0
246° 02'.4	11'.0	13'.6	5'.4	
260° 32'.4	11'.0	19'.0	5'.3	
275° 02'.4	10'.9	24'.3	5'.1	
289° 32'.3	10'.8	29'.4	5'.1	
304° 02'.1	10'.8	34'.5	4'.9	
318° 31'.9	10'.7	39'.4	4'.9	55'.1
333° 01'.6	10'.6	44'.3	4'.7	
347° 31'.2	10'.6	21° 49'.0 N	4'.6	55'.1
2° 00'.8	10'.6	53'.6	4'.6	
16° 30'.4	10'.5	58'.2	4'.4	
30° 59'.9	10'.4	22° 02'.6 N	4'.3	
45° 29'.3	10'.4	06'.9	4'.2	55'.2
59° 58'.7	10'.4	11'.1	4'.1	
74° 28'.1	10'.3	15'.2	4'.0	
88° 57'.4	10'.2	19'.2	3'.9	
103° 26'.6	10'.2	23'.1	3'.7	
117° 55'.8	10'.1	26'.8	3'.7	55'.3
132° 24'.9	10'.1	30'.5	3'.5	
146° 54'.0	10'.1	34'.0	3'.5	
161° 23'.1	10'.0	22° 37'.5 N	3'.3	55'.3
175° 52'.1	9'.9	40'.8	3'.2	
190° 21'.0	9'.9	44'.0	3'.1	
204° 49'.9	9'.9	47'.1	2'.9	55'.4
219° 18'.8	9'.8	50'.0	2'.9	
233° 47'.6	9'.8	52'.9	2'.7	
248° 16'.4	9'.7	55'.6	2'.6	
262° 45'.1	9'.7	58'.2	2'.5	
277° 13'.8	9'.6	23° 00'.7 N	2'.4	55'.5
291° 42'.4	9'.6	03'.1	2'.3	
306° 11'.0	9'.6	05'.4	2'.1	
320° 39'.6	9'.5	07'.5	2'.1	
335° 08'.1	9'.5	23° 09'.6 N	1'.9	55'.5
349° 36'.6	9'.5	11'.5	1'.7	
4° 05'.1	9'.4	13'.2	1'.7	55'.6
18° 33'.5	9'.4	14'.9	1'.5	
33° 01'.9	9'.3	16'.4	1'.5	
47° 30'.2	9'.3	17'.9	1'.3	
61° 58'.5	9'.3	19'.2	1'.1	
76° 26'.8	9'.2	20'.3	1'.1	55'.7
90° 55'.0	9'.3	21'.4	0'.9	
105° 23'.3	9'.2	22'.3	0'.8	
119° 51'.5	9'.1	23'.1	0'.7	
134° 19'.6	9'.1	23'.8	0'.5	
148° 47'.7	9'.2	23° 24'.3 N	0'.5	55'.8
163° 15'.9	9'.0	24'.8	0'.3	
177° 43'.9	9'.1	25'.1	0'.1	
192° 12'.0	9'.0	25'.2	0'.1	
206° 40'.0	9'.0	25'.3	0'.1	
221° 08'.0	9'.0	25'.2	0'.2	55'.9
235° 36'.0	9'.0	25'.0	0'.3	
250° 04'.0	8'.9	24'.7	0'.5	
264° 31'.9	9'.0	24'.2	0'.5	
278° 59'.9	8'.9	23'.7	0'.8	
293° 27'.8	8'.9	22'.9	0'.8	56'.0
307° 55'.7	8'.9	22'.1	1'.0	
322° 23'.6	8'.8	23° 21'.1 N	1'.0	56'.0
336° 51'.4	8'.9	20'.1	1'.3	
351° 19'.3	8'.8	18'.8	1'.3	56'.1
5° 47'.1	8'.8	17'.5	1'.5	
20° 14'.9	8'.9	16'.0	1'.6	
34° 42'.8	8'.8	14'.4	1'.7	
49° 10'.6	8'.8	12'.7	1'.9	
63° 38'.4	8'.8	10'.8	2'.0	56'.2
78° 06'.2	8'.7	08'.8	2'.1	
92° 33'.9	8'.8	06'.7	2'.2	
107° 01'.7	8'.8	04'.5	2'.4	
121° 29'.5	8'.8	02'.1	2'.5	
SD	15'.0	15'.1	15'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 4	Moonrise 5	Moonrise 6
N 72°	-	-	01:18	-	-	-
N 70°	-	-	02:09	-	-	-
68°	-	-	02:40	01:48	-	-
66°	-	01:31	03:03	02:35	02:41	03:10
64°	-	02:08	03:21	03:05	03:25	04:05
62°	-	02:33	03:36	03:28	03:55	04:38
60°	01:21	02:53	03:48	03:47	04:17	05:03
N 58°	01:55	03:09	03:59	04:02	04:35	05:22
56°	02:18	03:22	04:08	04:15	04:51	05:38
54°	02:37	03:34	04:16	04:27	05:04	05:52
52°	02:52	03:44	04:24	04:37	05:15	06:04
50°	03:05	03:53	04:30	04:46	05:26	06:15
45°	03:31	04:11	04:44	05:05	05:47	06:37
N 40°	03:50	04:26	04:56	05:21	06:05	06:55
35°	04:05	04:38	05:06	05:34	06:19	07:10
30°	04:18	04:49	05:14	05:46	06:32	07:23
20°	04:38	05:06	05:29	06:06	06:54	07:46
N 10°	04:54	05:20	05:42	06:23	07:13	08:05
0°	05:07	05:32	05:53	06:40	07:31	08:23
S 10°	05:18	05:43	06:05	06:56	07:48	08:41
20°	05:28	05:54	06:17	07:14	08:07	09:01
30°	05:38	06:06	06:31	07:34	08:29	09:23
35°	05:43	06:13	06:39	07:46	08:42	09:36
40°	05:48	06:20	06:48	08:00	08:57	09:52
45°	05:53	06:28	06:59	08:16	09:15	10:10
S 50°	05:59	06:37	07:12	08:36	09:37	10:32
52°	06:01	06:42	07:18	08:46	09:48	10:43
54°	06:04	06:46	07:25	08:56	10:00	10:55
56°	06:07	06:51

2011 May 7, 8, 9 (Sat, Sun, Monday)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
7 Saturday									
00	224° 29'.7	206° 09'.8	5° 57'.3 N	199° 25'.4	9° 41'.5 N	202° 08'.9	8° 11'.4 N	32° 49'.1	2° 05'.2 S
01	239° 32'.1	221° 09'.4	58'.5	214° 26'.0	42'.2	217° 10'.8	11'.6	47° 51'.7	05'.2
02	254° 34'.6	236° 09'.1	59'.6	229° 26'.7	42'.9	232° 12'.7	11'.9	62° 54'.3	05'.1
03	269° 37'.1	251° 08'.7	6° 00'.8 N	244° 27'.4	43'.6	247° 14'.7	12'.1	77° 56'.9	05'.1
04	284° 39'.5	266° 08'.3	01'.9	259° 28'.1	44'.3	262° 16'.6	12'.3	92° 59'.5	05'.0
05	299° 42'.0	281° 08'.0	03'.1	274° 28'.8	45'.0	277° 18'.5	12'.5	108° 02'.1	05'.0
06	314° 44'.5	296° 07'.6	04'.2	289° 29'.5	45'.7	292° 20'.4	12'.7	123° 04'.7	04'.9
07	329° 46'.9	311° 07'.3	05'.4	304° 30'.1	46'.4	307° 22'.3	12'.9	138° 07'.3	04'.9
08	344° 49'.4	326° 06'.9	06'.5	319° 30'.8	47'.1	322° 24'.2	13'.1	153° 09'.9	04'.8
09	359° 51'.9	341° 06'.6	07'.6	334° 31'.5	47'.8	337° 26'.2	13'.3	168° 12'.5	04'.8
10	14° 54'.3	356° 06'.2	08'.8	349° 32'.2	48'.5	352° 28'.1	13'.5	183° 15'.1	04'.7
11	29° 56'.8	11° 05'.8	09'.9	4° 32'.9	49'.2	7° 30'.0	13'.8	198° 17'.7	04'.7
12	44° 59'.2	26° 05'.5	6° 11'.1 N	19° 33'.6	9° 49'.9 N	22° 31'.9	8° 14'.0 N	213° 20'.3	2° 04'.6 S
13	60° 01'.7	41° 05'.1	12'.2	34° 34'.2	50'.6	37° 33'.8	14'.2	228° 22'.9	04'.6
14	75° 04'.2	56° 04'.8	13'.4	49° 34'.9	51'.3	52° 35'.8	14'.4	243° 25'.5	04'.5
15	90° 06'.6	71° 04'.4	14'.5	64° 35'.6	52'.0	67° 37'.7	14'.6	258° 28'.1	04'.5
16	105° 09'.1	86° 04'.0	15'.7	79° 36'.3	52'.7	82° 39'.6	14'.8	273° 30'.7	04'.4
17	120° 11'.6	101° 03'.7	16'.8	94° 37'.0	53'.4	97° 41'.5	15'.0	288° 33'.3	04'.4
18	135° 14'.0	116° 03'.3	17'.9	109° 37'.6	54'.1	112° 43'.4	15'.2	303° 35'.9	04'.4
19	150° 16'.5	131° 03'.0	19'.1	124° 38'.3	54'.8	127° 45'.4	15'.4	318° 38'.5	04'.3
20	165° 19'.0	146° 02'.6	20'.2	139° 39'.0	55'.5	142° 47'.3	15'.7	333° 41'.1	04'.3
21	180° 21'.4	161° 02'.2	21'.4	154° 39'.7	56'.2	157° 49'.2	15'.9	348° 43'.6	04'.2
22	195° 23'.9	176° 01'.9	22'.5	169° 40'.4	56'.9	172° 51'.1	16'.1	3° 46'.2	04'.2
23	210° 26'.3	191° 01'.5	23'.6	184° 41'.0	57'.6	187° 53'.0	16'.3	18° 48'.8	04'.1
8 Sunday									
00	225° 28'.8	206° 01'.2	6° 24'.8 N	199° 41'.7	9° 58'.3 N	202° 55'.0	8° 16'.5 N	33° 51'.4	2° 04'.1 S
01	240° 31'.3	221° 00'.8	25'.9	214° 42'.4	59'.0	217° 56'.9	16'.7	48° 54'.0	04'.0
02	255° 33'.7	236° 00'.4	27'.1	229° 43'.1	59'.7	232° 58'.8	16'.9	63° 56'.6	04'.0
03	270° 36'.2	251° 00'.1	28'.2	244° 43'.8	10° 00'.4 N	248° 00'.7	17'.1	78° 59'.2	03'.9
04	285° 38'.7	265° 59'.7	29'.4	259° 44'.5	01'.1	263° 02'.6	17'.3	94° 01'.8	03'.9
05	300° 41'.1	280° 59'.4	30'.5	274° 45'.1	01'.8	278° 04'.6	17'.6	109° 04'.4	03'.8
06	315° 43'.6	295° 59'.0	31'.6	289° 45'.8	02'.5	293° 06'.5	17'.8	124° 07'.0	03'.8
07	330° 46'.1	310° 58'.6	32'.8	304° 46'.5	03'.2	308° 08'.4	18'.0	139° 09'.6	03'.7
08	345° 48'.5	325° 58'.3	33'.9	319° 47'.2	03'.9	323° 10'.3	18'.2	154° 12'.2	03'.7
09	0° 51'.0	340° 57'.9	35'.1	334° 47'.9	04'.5	338° 12'.2	18'.4	169° 14'.8	03'.6
10	15° 53'.5	355° 57'.5	36'.2	349° 48'.5	05'.2	353° 14'.2	18'.6	184° 17'.4	03'.6
11	30° 55'.9	10° 57'.2	37'.3	4° 49'.2	05'.9	8° 16'.1	18'.8	199° 20'.0	03'.5
12	45° 58'.4	25° 56'.8	6° 38'.5 N	19° 49'.9	10° 06'.6 N	23° 18'.0	8° 19'.0 N	214° 22'.6	2° 03'.5 S
13	61° 00'.8	40° 56'.4	39'.6	34° 50'.6	07'.3	38° 19'.9	19'.2	229° 25'.1	03'.4
14	76° 03'.3	55° 56'.1	40'.7	49° 51'.3	08'.0	53° 21'.8	19'.4	244° 27'.7	03'.4
15	91° 05'.8	70° 55'.7	41'.9	64° 51'.9	08'.7	68° 23'.8	19'.7	259° 30'.3	03'.4
16	106° 08'.2	85° 55'.4	43'.0	79° 52'.6	09'.4	83° 25'.7	19'.9	274° 32'.9	03'.3
17	121° 10'.7	100° 55'.0	44'.2	94° 53'.3	10'.1	98° 27'.6	20'.1	289° 35'.5	03'.3
18	136° 13'.2	115° 54'.6	45'.3	109° 54'.0	10'.8	113° 29'.5	20'.3	304° 38'.1	03'.2
19	151° 15'.6	130° 54'.3	46'.4	124° 54'.7	11'.5	128° 31'.4	20'.5	319° 40'.7	03'.2
20	166° 18'.1	145° 53'.9	47'.6	139° 55'.3	12'.2	143° 33'.4	20'.7	334° 43'.3	03'.1
21	181° 20'.6	160° 53'.5	48'.7	154° 56'.0	12'.9	158° 35'.3	20'.9	349° 45'.9	03'.1
22	196° 23'.0	175° 53'.2	49'.8	169° 56'.7	13'.6	173° 37'.2	21'.1	4° 48'.5	03'.0
23	211° 25'.5	190° 52'.8	51'.0	184° 57'.4	14'.3	188° 39'.1	21'.3	19° 51'.1	03'.0
9 Monday									
00	226° 28'.0	205° 52'.4	6° 52'.1 N	199° 58'.1	10° 15'.0 N	203° 41'.0	8° 21'.5 N	34° 53'.7	2° 02'.9 S
01	241° 30'.4	220° 52'.1	53'.3	214° 58'.7	15'.7	218° 43'.0	21'.8	49° 56'.2	02'.9
02	256° 32'.9	235° 51'.7	54'.4	229° 59'.4	16'.4	233° 44'.9	22'.0	64° 58'.8	02'.8
03	271° 35'.3	250° 51'.3	55'.5	245° 00'.1	17'.0	248° 46'.8	22'.2	80° 01'.4	02'.8
04	286° 37'.8	265° 51'.0	56'.7	260° 00'.8	17'.7	263° 48'.7	22'.4	95° 04'.0	02'.7
05	301° 40'.3	280° 50'.6	57'.8	275° 01'.5	18'.4	278° 50'.6	22'.6	110° 06'.6	02'.7
06	316° 42'.7	295° 50'.2	58'.9	290° 02'.1	19'.1	293° 52'.6	22'.8	125° 09'.2	02'.7
07	331° 45'.2	310° 49'.9	7° 00'.1 N	305° 02'.8	19'.8	308° 54'.5	23'.0	140° 11'.8	02'.6
08	346° 47'.7	325° 49'.5	01'.2	320° 03'.5	20'.5	323° 56'.4	23'.2	155° 14'.4	02'.6
09	1° 50'.1	340° 49'.1	02'.3	335° 04'.2	21'.2	338° 58'.3	23'.4	170° 17'.0	02'.5
10	16° 52'.6	355° 48'.8	03'.5	350° 04'.9	21'.9	354° 00'.3	23'.6	185° 19'.6	02'.5
11	31° 55'.1	10° 48'.4	04'.6	5° 05'.5	22'.6	9° 02'.2	23'.8	200° 22'.2	02'.4
12	46° 57'.5	25° 48'.0	7° 05'.7 N	20° 06'.2	10° 23'.3 N	24° 04'.1	8° 24'.1 N	215° 24'.7	2° 02'.4 S
13	62° 00'.0	40° 47'.7	06'.9	35° 06'.9	24'.0	39° 06'.0	24'.3	230° 27'.3	02'.3
14	77° 02'.5	55° 47'.3	08'.0	50° 07'.6	24'.7	54° 07'.9	24'.5	245° 29'.9	02'.3
15	92° 04'.9	70° 46'.9	09'.1	65° 08'.3	25'.3	69° 09'.9	24'.7	260° 32'.5	02'.2
16	107° 07'.4	85° 46'.6	10'.3	80° 08'.9	26'.0	84° 11'.8	24'.9	275° 35'.1	02'.2
17	122° 09'.8	100° 46'.2	11'.4	95° 09'.6	26'.7	99° 13'.7	25'.1	290° 37'.7	02'.2
18	137° 12'.3	115° 45'.8	12'.5	110° 10'.3	27'.4	114° 15'.6	25'.3	305° 40'.3	02'.1
19	152° 14'.8	130° 45'.4	13'.7	125° 11'.0	28'.1	129° 17'.6	25'.5	320° 42'.9	02'.1
20	167° 17'.2	145° 45'.1	14'.8	140° 11'.6	28'.8	144° 19'.5	25'.7	335° 45'.5	02'.0
21	182° 19'.7	160° 44'.7	15'.9	155° 12'.3	29'.5	159° 21'.4	25'.9	350° 48'.1	02'.0
22	197° 22'.2	175° 44'.3	17'.1	170° 13'.0	30'.2	174° 23'.3	26'.1	5° 50'.6	01'.9
23	212° 24'.6	190° 44'.0	18'.2	185° 13'.7	30'.9	189° 25'.2	26'.4	20° 53'.2	01'.9
	M.P. 08:53	v -0'.4	d 1'.1	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.6 S
Achernar	335° 28'.4	57° 10'.6 S
Acrux	173° 10'.6	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.5	55° 53'.9 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.7	46° 54'.1 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.4	29° 09'.1 N
Altair	62° 09'.6	8° 53'.9 N
Ankaa	353° 17'.5	42° 14'.5 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.5	69° 02'.8 S
Avior	234° 18'.9	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.2	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.5	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.7	17° 55'.4 S
Dubhe	193° 53'.1	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.4	51° 29'.1 N
Enif	33° 48'.7	9° 55'.6 N
Fomalhaut	15° 25'.8	29° 33'.5 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.5	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.5 N
Markab	13° 40'.0	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.1	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.0 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.6 S
Polaris	318° 58'.5	89° 18'.8 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.4	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.0	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 42'.8	56° 35'.8 N
Shaula	96° 23'.6	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.6	43° 29'.1 S
Vega	80° 39'.7	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	340° 32'.3	10:16
Mars	334° 12'.9	10:41
Jupiter	337° 26'.1	10:27
Saturn	168° 22'.6	21:41

SUN

GHA	Dec
180° 50'.8	16° 39'.5 N
195° 50'.8	40'.2
210° 50'.9	40'.9
225° 50'.9	41'.6
240° 50'.9	42'.3
255° 51'.0	43'.0
270° 51'.0	43'.7
285° 51'.1	44'.4
300° 51'.1	45'.1
315° 51'.2	45'.8
330° 51'.2	46'.5
345° 51'.2	47'.2
0° 51'.3	16° 47'.8 N
15° 51'.3	48'.5
30° 51'.4	49'.2
45° 51'.4	49'.9
60° 51'.4	50'.6
75° 51'.5	51'.3
90° 51'.5	52'.0
105° 51'.6	52'.7
120° 51'.6	53'.4
135° 51'.6	54'.0
150° 51'.7	54'.7
165° 51'.7	55'.4
180° 51'.8	16° 56'.1 N
195° 51'.8	56'.8
210° 51'.8	57'.5
225° 51'.9	58'.2
240° 51'.9	58'.8
255° 51'.9	59'.5
270° 52'.0	17° 00'.2 N
285° 52'.0	00'.9
300° 52'.0	01'.6
315° 52'.1	02'.2
330° 52'.1	02'.9
345° 52'.2	03'.6
0° 52'.2	17° 04'.3 N
15° 52'.2	05'.0
30° 52'.3	05'.6
45° 52'.3	06'.3
60° 52'.3	07'.0
75° 52'.4	07'.7
90° 52'.4	08'.4
105° 52'.4	09'.0
120° 52'.5	09'.7
135° 52'.5	10'.4
150° 52'.5	11'.1
165° 52'.6	11'.7
180° 52'.6	17° 12'.4 N
195° 52'.6	13'.1
210° 52'.7	13'.7
225° 52'.7	14'.4
240° 52'.7	15'.1
255° 52'.7	15'.8
270° 52'.8	16'.4
285° 52'.8	17'.1
300° 52'.8	17'.8
315° 52'.9	18'.4
330° 52'.9	19'.1
345° 52'.9	19'.8
0° 53'.0	17° 20'.4 N
15° 53'.0	21'.1
30° 53'.0	21'.8
45° 53'.0	22'.4
60° 53'.1	23'.1
75° 53'.1	23'.8
90° 53'.1	24'.4
105° 53'.2	25'.1
120° 53'.2	25'.8
135° 53'.2	26'.4
150° 53'.2	27'.1
165° 53'.3	27'.7
SD 15'.8	d 0'.7

MOON

GHA	v	Dec	d	HP
135° 57'.3	8'.7	22° 59'.6 N	2'.6	56'.3
150° 25'.0	8'.8	57'.0	2'.8	
164° 52'.8	8'.8	54'.2	2'.9	
179° 20'.6	8'.8	51'.3	3'.0	
193° 48'.4	8'.7	48'.3	3'.1	56'.4
208° 16'.1	8'.8	45'.2	3'.3	
222° 43'.9	8'.8	41'.9	3'.4	
237° 11'.7	8'.7	38'.5	3'.5	
251° 39'.4	8'.8	35'.0	3'.6	
266° 07'.2	8'.8	31'.4	3'.8	56'.5
280° 35'.0	8'.8	27'.6	3'.9	
295° 02'.8	8'.8	23'.7	4'.0	
309° 30'.6	8'.8	22° 19'.7 N	4'.2	56'.5
323° 58'.4	8'.8	15'.5	4'.3	56'.6
338° 26'.2	8'.9	11'.2	4'.4	
352° 54'.1	8'.8	06'.8	4'.5	
7° 21'.9	8'.9	02'.3	4'.6	
21° 49'.8	8'.8	21° 57'.7 N	4'.8	56'.7
36° 17'.6	8'.9	52'.9	4'.9	
50° 45'.5	8'.9	48'.0	5'.0	
65° 13'.4	8'.9	43'.0	5'.2	
79° 41'.3	8'.9	37'.8	5'.3	56'.8
94° 09'.2	8'.9	32'.5	5'.4	
108° 37'.1	9'.0	27'.1	5'.5	
123° 05'.1	9'.0	21° 21'.6 N	5'.6	56'.8
137° 33'.1	9'.0	16'.0	5'.8	
152° 01'.1	9'.0	10'.2	5'.9	56'.9
166° 29'.1	9'.0	04'.3	6'.0	
180° 57'.1	9'.0	20° 58'.3 N	6'.1	
195° 25'.1	9'.1	52'.2	6'.2	
209° 53'.2	9'.1	46'.0	6'.4	57'.0
224° 21'.3	9'.1	39'.6	6'.5	
238° 49'.4	9'.1	33'.1	6'.6	
253° 17'.5	9'.1	26'.5	6'.7	
267° 45'.6	9'.2	19'.8	6'.8	57'.1
282° 13'.8	9'.2	13'.0	7'.0	
296° 42'.0	9'.2	20° 06'.0 N	7'.0	57'.1
311° 10'.2	9'.3	19° 59'.0 N	7'.2	
325° 38'.5	9'.2	51'.8	7'.3	57'.2
340° 06'.7	9'.3	44'.5	7'.4	
354° 35'.0	9'.3	37'.1	7'.6	
9° 03'.3	9'.4	29'.5	7'.6	
23° 31'.7	9'.3	21'.9	7'.7	57'.3
38° 00'.0	9'.4	14'.2	7'.9	
52° 28'.4	9'.5	06'.3	8'.0	
66° 56'.9	9'.4	18° 58'.3 N	8'.1	
81° 25'.3	9'.5	50'.2	8'.1	57'.4
95° 53'.8	9'.5	42'.1	8'.3	
110° 22'.3	9'.5	18° 33'.8 N	8'.5	57'.4
124° 50'.8	9'.5	25'.3	8'.5	57'.5
139° 19'.3	9'.6	16'.8	8'.6	
153° 47'.9	9'.6	08'.2	8'.7	
168° 16'.5	9'.7	17° 59'.5 N	8'.9	
182° 45'.2	9'.6	50'.6	8'.9	57'.6
197° 13'.8	9'.7	41'.7	9'.1	
211° 42'.5	9'.7	32'.6	9'.1	
226° 11'.2	9'.8	23'.5	9'.3	
240° 40'.0	9'.7	14'.2	9'.3	57'.7
255° 08'.7	9'.8	04'.9	9'.5	
269° 37'.5	9'.8	16° 55'.4 N	9'.5	
284° 06'.3	9'.9	16° 45'.9 N	9'.7	57'.7
298° 35'.2	9'.9	36'.2	9'.7	57'.8
313° 04'.1	9'.9	26'.5	9'.9	
327° 33'.0	9'.9	16'.6	9'.9	
342° 01'.9	10'.0	06'.7	10'.0	
356° 30'.9	10'.0	15° 56'.7 N	10'.2	57'.9
10° 59'.9	10'.0	46'.5	10'.2	
25° 28'.9	10'.0	36'.3	10'.3	
39° 57'.9	10'.1	26'.0	10'.5	58'.0
54° 27'.0	10'.1	15'.5	10'.5	
68° 56'.1	10'.1	05'.0	10'.6	
83° 25'.2	10'.1	14° 54'.4 N	10'.7	
SD 15'.4	d 15'.6		15'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 7	Moonrise 8	Moonrise 9
N 72°	-	-	00:34	-	-	05:39
N 70°	-	-	01:49	-	-	06:55
68°	-	-	02:26	-	05:22	07:32
66°	-	01:07	02:51	04:27	06:10	07:58
64°	-	01:53	03:11	05:13	06:41	08:18
62°	-	02:22	03:27	05:42	07:04	08:34
60°	01:00	02:43	03:41	06:05	07:22	08:48
N 58°	01:41	03:01	03:52	06:23	07:37	08:59
56°	02:08	03:15	04:02	06:39	07:50	09:09
54°	02:28	03:27	04:11	06:52	08:02	09:18
52°	02:44	03:38	04:18	07:03	08:12	09:26
50°	02:58	03:47	04:25	07:13	08:20	09:33
45°	03:25	04:07	04:40	07:35	08:39	09:48
N 40°	03:46	04:22	04:52	07:52	08:54	10:00
35°	04:02	04:35	05:03	08:07	09:07	10:11
30°	04:15	04:46	05:12	08:19	09:19	10:20
20°	04:36	05:04	05:27	08:41	09:38	10:36
N 10°	04:53	05:19	05:41	08:59	09:54	10:49
0°	05:06	05:31	05:53	09:17	10:10	11:02
S 10°	05:18	05:43	06:05	09:34	10:25	11:15
20°	05:29	05:55	06:18	09:53	10:42	11:28
30°	05:39	06:08	06:33	10:14	11:01	11:44
35°	05:45	06:15	06:42	10:26	11:12	11:53
40°	05:50	06:23	06:51	10:41	11:24	12:03
45°	05:56	06:31	07:03	10:58	11:39	12:15
S 50°	06:03	06:41	07:16	11:19	11:57	12:29
52°	06:05	06:46	07:23	11:29	12:06	12:36
54°	06:08	06:51	07:30	11:40	12:16	12:43
56°	06:11	06:56	07:38	11:53	12:26	12:52
58°	06:15	07:02	07:46	12:08	12:39	13:01
S 60°	06:18	07:09	07:57	12:25	12:53	13:11
S 62°	06:22	07:17	08:08	12:47	13:10	13:24

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 7	Moonset 8	Moonset 9
N 72°	-	-	-	-	-	04:14
N 70°	22:10	-	-	-	-	02:58
68°	21:31	-	-	-	02:40	02:19
66°	21:05	22:55	-	01:43	01:51	01:52
64°	20:44	22:05	-	00:57	01:20	01:31
62°	20:28	21:35	-	00:27	00:56	01:14
60°	20:14	21:12	23:01	00:04	00:37	01:00
N 58°	20:03	20:55	22:16	-	00:22	00:48
56°	19:53	20:40	21:48	-	00:08	00:37
54°	19:44	20:27	21:27	23:57	-	00:28
52°	19:36	20:16	21:11	23:46	-	00:20
50°	19:29	20:07	20:56	23:37	-	00:12
45°	19:14	19:47	20:29	23:18	23:56	24:29
N 40°	19:01	19:31	20:08	23:02	23:43	24:19
35°	18:51	19:18	19:52	22:48	23:31	24:10
30°	18:42	19:07	19:38	22:37	23:21	24:03
20°	18:26	18:49	19:17	22:16	23:04	23:49
N 10°	18:13	18:35	19:00	21:59	22:49	23:38
0°	18:00	18:22	18:47	21:42	22:35	23:27
S 10°	17:48	18:10	18:35	21:26	22:21	23:16
20°	17:34	17:57	18:24	21:08	22:05	23:04
30°	17:20	17:45	18:13	20:47	21:48	22:50
35°	17:11	17:38	18:08	20:35	21:37	22:42
40°	17:01	17:30	18:02	20:21	21:26	22:33
45°	16:50	17:21	17:56	20:05	21:11	22:22
S 50°	16:36	17:11	17:50	19:44	20:54	22:09
52°	16:30	17:06	17:47	19:34	20:46	22:03
54°	16:23	17:01	17:44	19:23	20:37	21:56
56°	16:15	16:56	17:41	19:11	20:27	21:48
58°	16:06	16:50	17:38	18:56	20:15	21:40
S 60°	15:56	16:43	17:34	18:39	20:01	21:30
S 62°	15:44	16:35	17:30	18:18	19:45	21:18

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
7	3 23	3 25	11:57	15:29	03:03	4d 17%
8	3 27	3 29	11:57	16:22	03:56	5d 25%
9	3 30	3 32	11:56	17:14	04:49	6d 35%

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2011 May 10, 11, 12 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
10 Tuesday 00	227° 27'.1	205° 43'.6	7° 19'.3 N	200° 14'.4	10° 31'.5 N	204° 27'.2	8° 26'.6 N	35° 55'.8	2° 01'.8 S
01	242° 29'.6	220° 43'.2	20'.4	215° 15'.0	32'.2	219° 29'.1	26'.8	50° 58'.4	01'.8
02	257° 32'.0	235° 42'.8	21'.6	230° 15'.7	32'.9	234° 31'.0	27'.0	66° 01'.0	01'.7
03	272° 34'.5	250° 42'.5	22'.7	245° 16'.4	33'.6	249° 32'.9	27'.2	81° 03'.6	01'.7
04	287° 36'.9	265° 42'.1	23'.8	260° 17'.1	34'.3	264° 34'.9	27'.4	96° 06'.2	01'.7
05	302° 39'.4	280° 41'.7	25'.0	275° 17'.8	35'.0	279° 36'.8	27'.6	111° 08'.8	01'.6
06	317° 41'.9	295° 41'.4	26'.1	290° 18'.4	35'.7	294° 38'.7	27'.8	126° 11'.3	01'.6
07	332° 44'.3	310° 41'.0	27'.2	305° 19'.1	36'.4	309° 40'.6	28'.0	141° 13'.9	01'.5
08	347° 46'.8	325° 40'.6	28'.4	320° 19'.8	37'.0	324° 42'.5	28'.2	156° 16'.5	01'.5
09	2° 49'.3	340° 40'.2	29'.5	335° 20'.5	37'.7	339° 44'.5	28'.4	171° 19'.1	01'.4
10	17° 51'.7	355° 39'.9	30'.6	350° 21'.2	38'.4	354° 46'.4	28'.6	186° 21'.7	01'.4
11	32° 54'.2	10° 39'.5	31'.7	5° 21'.8	39'.1	9° 48'.3	28'.9	201° 24'.3	01'.3
12	47° 56'.7	25° 39'.1	7° 32'.9 N	20° 22'.5	10° 39'.8 N	24° 50'.2	8° 29'.1 N	216° 26'.9	2° 01'.3 S
13	62° 59'.1	40° 38'.7	34'.0	35° 23'.2	40'.5	39° 52'.2	29'.3	231° 29'.5	01'.3
14	78° 01'.6	55° 38'.4	35'.1	50° 23'.9	41'.2	54° 54'.1	29'.5	246° 32'.0	01'.2
15	93° 04'.1	70° 38'.0	36'.2	65° 24'.5	41'.8	69° 56'.0	29'.7	261° 34'.6	01'.2
16	108° 06'.5	85° 37'.6	37'.4	80° 25'.2	42'.5	84° 57'.9	29'.9	276° 37'.2	01'.1
17	123° 09'.0	100° 37'.2	38'.5	95° 25'.9	43'.2	99° 59'.9	30'.1	291° 39'.8	01'.1
18	138° 11'.4	115° 36'.9	39'.6	110° 26'.6	43'.9	115° 01'.8	30'.3	306° 42'.4	01'.0
19	153° 13'.9	130° 36'.5	40'.7	125° 27'.3	44'.6	130° 03'.7	30'.5	321° 45'.0	01'.0
20	168° 16'.4	145° 36'.1	41'.9	140° 27'.9	45'.3	145° 05'.6	30'.7	336° 47'.6	00'.9
21	183° 18'.8	160° 35'.7	43'.0	155° 28'.6	46'.0	160° 07'.5	30'.9	351° 50'.1	00'.9
22	198° 21'.3	175° 35'.4	44'.1	170° 29'.3	46'.6	175° 09'.5	31'.1	6° 52'.7	00'.9
23	213° 23'.8	190° 35'.0	45'.2	185° 30'.0	47'.3	190° 11'.4	31'.3	21° 55'.3	00'.8
11 Wednesday 00	228° 26'.2	205° 34'.6	7° 46'.4 N	200° 30'.6	10° 48'.0 N	205° 13'.3	8° 31'.6 N	36° 57'.9	2° 00'.8 S
01	243° 28'.7	220° 34'.2	47'.5	215° 31'.3	48'.7	220° 15'.2	31'.8	52° 00'.5	00'.7
02	258° 31'.2	235° 33'.9	48'.6	230° 32'.0	49'.4	235° 17'.2	32'.0	67° 03'.1	00'.7
03	273° 33'.6	250° 33'.5	49'.7	245° 32'.7	50'.1	250° 19'.1	32'.2	82° 05'.7	00'.6
04	288° 36'.1	265° 33'.1	50'.9	260° 33'.4	50'.7	265° 21'.0	32'.4	97° 08'.2	00'.6
05	303° 38'.6	280° 32'.7	52'.0	275° 34'.0	51'.4	280° 22'.9	32'.6	112° 10'.8	00'.5
06	318° 41'.0	295° 32'.3	53'.1	290° 34'.7	52'.1	295° 24'.9	32'.8	127° 13'.4	00'.5
07	333° 43'.5	310° 32'.0	54'.2	305° 35'.4	52'.8	310° 26'.8	33'.0	142° 16'.0	00'.5
08	348° 45'.9	325° 31'.6	55'.4	320° 36'.1	53'.5	325° 28'.7	33'.2	157° 18'.6	00'.4
09	3° 48'.4	340° 31'.2	56'.5	335° 36'.7	54'.1	340° 30'.6	33'.4	172° 21'.2	00'.4
10	18° 50'.9	355° 30'.8	57'.6	350° 37'.4	54'.8	355° 32'.6	33'.6	187° 23'.8	00'.3
11	33° 53'.3	10° 30'.4	58'.7	5° 38'.1	55'.5	10° 34'.5	33'.8	202° 26'.3	00'.3
12 Thursday 00	48° 55'.8	25° 30'.1	7° 59'.8 N	20° 38'.8	10° 56'.2 N	25° 36'.4	8° 34'.0 N	217° 28'.9	2° 00'.2 S
01	63° 58'.3	40° 29'.7	8° 01'.0 N	35° 39'.4	56'.9	40° 38'.3	34'.2	232° 31'.5	00'.2
02	79° 00'.7	55° 29'.3	02'.1	50° 40'.1	57'.6	55° 40'.3	34'.5	247° 34'.1	00'.2
03	94° 03'.2	70° 28'.9	03'.2	65° 40'.8	58'.2	70° 42'.2	34'.7	262° 36'.7	00'.1
04	109° 05'.7	85° 28'.5	04'.3	80° 41'.5	58'.9	85° 44'.1	34'.9	277° 39'.3	00'.1
05	124° 08'.1	100° 28'.2	05'.4	95° 42'.2	59'.6	100° 46'.0	35'.1	292° 41'.8	00'.0
06	139° 10'.6	115° 27'.8	06'.6	110° 42'.8	11° 00'.3 N	115° 48'.0	35'.3	307° 44'.4	00'.0
07	154° 13'.0	130° 27'.4	07'.7	125° 43'.5	01'.0	130° 49'.9	35'.5	322° 47'.0	1° 59'.9 S
08	169° 15'.5	145° 27'.0	08'.8	140° 44'.2	01'.6	145° 51'.8	35'.7	337° 49'.6	59'.9
09	184° 18'.0	160° 26'.6	09'.9	155° 44'.9	02'.3	160° 53'.7	35'.9	352° 52'.2	59'.9
10	199° 20'.4	175° 26'.2	11'.0	170° 45'.5	03'.0	175° 55'.7	36'.1	7° 54'.8	59'.8
11	214° 22'.9	190° 25'.9	12'.2	185° 46'.2	03'.7	190° 57'.6	36'.3	22° 57'.3	59'.8
12	229° 25'.4	205° 25'.5	8° 13'.3 N	200° 46'.9	11° 04'.3 N	205° 59'.5	8° 36'.5 N	37° 59'.9	1° 59'.7 S
01	244° 27'.8	220° 25'.1	14'.4	215° 47'.6	05'.0	221° 01'.4	36'.7	53° 02'.5	59'.7
02	259° 30'.3	235° 24'.7	15'.5	230° 48'.2	05'.7	236° 03'.4	36'.9	68° 05'.1	59'.6
03	274° 32'.8	250° 24'.3	16'.6	245° 48'.9	06'.4	251° 05'.3	37'.1	83° 07'.7	59'.6
04	289° 35'.2	265° 23'.9	17'.7	260° 49'.6	07'.1	266° 07'.2	37'.3	98° 10'.3	59'.6
05	304° 37'.7	280° 23'.6	18'.9	275° 50'.3	07'.7	281° 09'.1	37'.6	113° 12'.8	59'.5
06	319° 40'.2	295° 23'.2	20'.0	290° 50'.9	08'.4	296° 11'.1	37'.8	128° 15'.4	59'.5
07	334° 42'.6	310° 22'.8	21'.1	305° 51'.6	09'.1	311° 13'.0	38'.0	143° 18'.0	59'.4
08	349° 45'.1	325° 22'.4	22'.2	320° 52'.3	09'.8	326° 14'.9	38'.2	158° 20'.6	59'.4
09	4° 47'.5	340° 22'.0	23'.3	335° 53'.0	10'.4	341° 16'.8	38'.4	173° 23'.2	59'.4
10	19° 50'.0	355° 21'.6	24'.4	350° 53'.6	11'.1	356° 18'.8	38'.6	188° 25'.7	59'.3
11	34° 52'.5	10° 21'.2	25'.6	5° 54'.3	11'.8	11° 20'.7	38'.8	203° 28'.3	59'.3
12	49° 54'.9	25° 20'.9	8° 26'.7 N	20° 55'.0	11° 12'.5 N	26° 22'.6	8° 39'.0 N	218° 30'.9	1° 59'.2 S
13	64° 57'.4	40° 20'.5	27'.8	35° 55'.7	13'.2	41° 24'.5	39'.2	233° 33'.5	59'.2
14	79° 59'.9	55° 20'.1	28'.9	50° 56'.4	13'.8	56° 26'.5	39'.4	248° 36'.1	59'.1
15	95° 02'.3	70° 19'.7	30'.0	65° 57'.0	14'.5	71° 28'.4	39'.6	263° 38'.7	59'.1
16	110° 04'.8	85° 19'.3	31'.1	80° 57'.7	15'.2	86° 30'.3	39'.8	278° 41'.2	59'.1
17	125° 07'.3	100° 18'.9	32'.2	95° 58'.4	15'.9	101° 32'.2	40'.0	293° 43'.8	59'.0
18	140° 09'.7	115° 18'.5	33'.3	110° 59'.1	16'.5	116° 34'.2	40'.2	308° 46'.4	59'.0
19	155° 12'.2	130° 18'.2	34'.5	125° 59'.7	17'.2	131° 36'.1	40'.4	323° 49'.0	58'.9
20	170° 14'.7	145° 17'.8	35'.6	141° 00'.4	17'.9	146° 38'.0	40'.6	338° 51'.6	58'.9
21	185° 17'.1	160° 17'.4	36'.7	156° 01'.1	18'.6	161° 39'.9	40'.8	353° 54'.1	58'.9
22	200° 19'.6	175° 17'.0	37'.8	171° 01'.8	19'.2	176° 41'.9	41'.0	8° 56'.7	58'.8
23	215° 22'.0	190° 16'.6	38'.9	186° 02'.4	19'.9	191° 43'.8	41'.3	23° 59'.3	58'.8
	M.P. 08:41	v -0'.4	d 1'.1	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.5 S
Achernar	335° 28'.3	57° 10'.6 S
Acrux	173° 10'.6	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.5	55° 53'.9 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.6	46° 54'.1 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.3	29° 09'.1 N
Altair	62° 09'.6	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.5 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.5	69° 02'.8 S
Avior	234° 18'.9	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.2	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.4	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.4 S
Dubhe	193° 53'.1	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.4	51° 29'.1 N
Enif	33° 48'.6	9° 55'.6 N
Fomalhaut	15° 25'.7	29° 33'.5 S
Gacrux	172° 02'.2	57° 10'.9 S
Gienah	175° 53'.6	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.5	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.5 N
Markab	13° 40'.0	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.2	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.0 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.6 S
Polaris	318° 58'.3	89° 18'.8 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.5 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 42'.8	56° 35'.8 N
Shaula	96° 23'.6	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.6	43° 29'.1 S
Vega	80° 39'.7	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	337° 08'.4	10:18
Mars	332° 04'.4	10:37
Jupiter	336° 47'.1	10:18
Saturn	168° 31'.7	21:28

SUN						
GHA		Dec				
180° 53'.3	17° 28'.4 N	97° 54'.3	10'.2	14° 43'.7 N	10'.7	58'.1
195° 53'.3	29'.1	112° 23'.5	10'.2	33'.0	10'.9	
210° 53'.3	29'.7	126° 52'.7	10'.2	22'.1	11'.0	
225° 53'.4	30'.4	141° 21'.9	10'.2	11'.1	11'.0	
240° 53'.4	31'.0	155° 51'.1	10'.3	00'.1	11'.1	58'.2
255° 53'.4	31'.7	170° 20'.4	10'.3	13° 49'.0 N	11'.2	
270° 53'.4	32'.4	184° 49'.7	10'.3	37'.8	11'.3	
285° 53'.5	33'.0	199° 19'.0	10'.3	26'.5	11'.4	
300° 53'.5	33'.7	213° 48'.3	10'.4	15'.1	11'.5	58'.3
315° 53'.5	34'.3	228° 17'.7	10'.3	03'.6	11'.5	
330° 53'.5	35'.0	242° 47'.0	10'.4	12° 52'.1 N	11'.6	
345° 53'.6	35'.7	257° 16'.4	10'.4	40'.5	11'.7	58'.4
0° 53'.6	17° 36'.3 N	271° 45'.8	10'.5	12° 28'.8 N	11'.8	58'.4
15° 53'.6	37'.0	286° 15'.3	10'.4	17'.0	11'.8	
30° 53'.6	37'.6	300° 44'.7	10'.5	05'.2	12'.0	
45° 53'.7	38'.3	315° 14'.2	10'.5	11° 53'.2 N	12'.0	58'.5
60° 53'.7	38'.9	329° 43'.7	10'.5	41'.2	12'.0	
75° 53'.7	39'.6	344° 13'.2	10'.5	29'.2	12'.2	
90° 53'.7	40'.2	358° 42'.7	10'.6	17'.0	12'.2	
105° 53'.7	40'.9	13° 12'.3	10'.5	04'.8	12'.3	58'.6
120° 53'.8	41'.5	27° 41'.8	10'.6	10° 52'.5 N	12'.4	
135° 53'.8	42'.2	42° 11'.4	10'.6	40'.1	12'.4	
150° 53'.8	42'.8	56° 41'.0	10'.6	27'.7	12'.5	58'.7
165° 53'.8	43'.5	71° 10'.6	10'.6	15'.2	12'.5	
180° 53'.9	17° 44'.1 N	85° 40'.2	10'.6	10° 02'.7 N	12'.7	58'.7
195° 53'.9	44'.8	100° 09'.8	10'.6	9° 50'.0 N	12'.7	
210° 53'.9	45'.4	114° 39'.4	10'.7	37'.3	12'.7	58'.8
225° 53'.9	46'.1	129° 09'.1	10'.6	24'.6	12'.8	
240° 53'.9	46'.7	143° 38'.7	10'.7	11'.8	12'.9	
255° 54'.0	47'.4	158° 08'.4	10'.7	8° 58'.9 N	13'.0	
270° 54'.0	48'.0	172° 38'.1	10'.7	45'.9	13'.0	58'.9
285° 54'.0	48'.7	187° 07'.8	10'.7	32'.9	13'.0	
300° 54'.0	49'.3	201° 37'.5	10'.7	19'.9	13'.1	
315° 54'.0	49'.9	216° 07'.2	10'.7	06'.8	13'.2	
330° 54'.0	50'.6	230° 36'.9	10'.7	7° 53'.6 N	13'.2	59'.0
345° 54'.1	51'.2	245° 06'.6	10'.7	40'.4	13'.3	
0° 54'.1	17° 51'.9 N	259° 36'.3	10'.7	7° 27'.1 N	13'.3	59'.0
15° 54'.1	52'.5	274° 06'.0	10'.8	13'.8	13'.4	
30° 54'.1	53'.2	288° 35'.8	10'.7	00'.4	13'.4	59'.1
45° 54'.1	53'.8	303° 05'.5	10'.7	6° 47'.0 N	13'.5	
60° 54'.1	54'.4	317° 35'.2	10'.7	33'.5	13'.5	
75° 54'.2	55'.1	332° 04'.9	10'.8	20'.0	13'.6	59'.2
90° 54'.2	55'.7	346° 34'.7	10'.7	06'.4	13'.6	
105° 54'.2	56'.4	1° 04'.4	10'.7	5° 52'.8 N	13'.7	
120° 54'.2	57'.0	15° 34'.1	10'.7	39'.1	13'.7	
135° 54'.2	57'.6	30° 03'.8	10'.7	25'.4	13'.7	59'.3
150° 54'.2	58'.3	44° 33'.5	10'.7	11'.7	13'.8	
165° 54'.3	58'.9	59° 03'.2	10'.8	4° 57'.9 N	13'.8	
180° 54'.3	17° 59'.5 N	73° 33'.0	10'.6	4° 44'.1 N	13'.9	59'.3
195° 54'.3	18° 00'.2 N	88° 02'.6	10'.7	30'.2	13'.9	59'.4
210° 54'.3	00'.8	102° 32'.3	10'.7	16'.3	13'.9	
225° 54'.3	01'.5	117° 02'.0	10'.7	02'.4	14'.0	
240° 54'.3	02'.1	131° 31'.7	10'.7	3° 48'.4 N	14'.0	
255° 54'.3	02'.7	146° 01'.4	10'.6	34'.4	14'.0	
270° 54'.4	03'.4	160° 31'.0	10'.6	20'.4	14'.1	59'.5
285° 54'.4	04'.0	175° 00'.6	10'.7	06'.3	14'.0	
300° 54'.4	04'.6	189° 30'.3	10'.6	2° 52'.3 N	14'.2	
315° 54'.4	05'.2	203° 59'.9	10'.6	38'.1	14'.1	
330° 54'.4	05'.9	218° 29'.5	10'.6	24'.0	14'.2	59'.6
345° 54'.4	06'.5	232° 59'.1	10'.5	09'.8	14'.2	
0° 54'.4	18° 07'.1 N	247° 28'.6	10'.6	1° 55'.6 N	14'.2	59'.6
15° 54'.4	07'.8	261° 58'.2	10'.5	41'.4	14'.2	
30° 54'.5	08'.4	276° 27'.7	10'.5	27'.2	14'.3	59'.7
45° 54'.5	09'.0	290° 57'.2	10'.5	12'.9	14'.2	
60° 54'.5	09'.7	305° 26'.7	10'.4	0° 58'.7 N	14'.3	
75° 54'.5	10'.3	319° 56'.1	10'.5	44'.4	14'.3	
90° 54'.5	10'.9	334° 25'.6	10'.4	30'.1	14'.3	
105° 54'.5	11'.5	348° 55'.0	10'.4	15'.8	14'.4	59'.8
120° 54'.5	12'.2	3° 24'.4	10'.4	01'.4	14'.3	
135° 54'.5	12'.8	17° 53'.8	10'.3	0° 12'.9 S	14'.3	
150° 54'.5	13'.4	32° 23'.1	10'.3	27'.2	14'.4	
165° 54'.6	14'.0	46° 52'.4	10'.3	41'.6	14'.4	59'.9
SD 15'.8	d 0'.6	SD	15'.9	16'.1	16'.2	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 10	Moonrise 11	Moonrise 12
N 72°	-	-	-	08:46	11:04	13:15
N 70°	-	-	01:26	09:12	11:16	13:17
68°	-	-	02:11	09:31	11:25	13:18
66°	-	00:31	02:40	09:46	11:33	13:20
64°	-	01:36	03:01	09:59	11:39	13:21
62°	-	02:09	03:19	10:09	11:45	13:22
60°	00:28	02:33	03:33	10:18	11:50	13:23
N 58°	01:26	02:52	03:45	10:26	11:54	13:24
56°	01:57	03:08	03:56	10:33	11:58	13:25
54°	02:19	03:21	04:05	10:39	12:01	13:25
52°	02:37	03:32	04:13	10:44	12:04	13:26
50°	02:52	03:42	04:21	10:49	12:07	13:26
45°	03:20	04:03	04:36	11:00	12:13	13:28
N 40°	03:42	04:19	04:49	11:09	12:18	13:29
35°	03:59	04:32	05:00	11:16	12:22	13:29
30°	04:13	04:44	05:10	11:23	12:26	13:30
20°	04:35	05:02	05:26	11:34	12:33	13:32
N 10°	04:52	05:18	05:40	11:44	12:38	13:33
0°	05:06	05:31	05:53	11:53	12:44	13:34
S 10°	05:18	05:44	06:06	12:03	12:49	13:35
20°	05:30	05:56	06:20	12:12	12:55	13:36
30°	05:41	06:10	06:35	12:24	13:01	13:38
35°	05:47	06:17	06:44	12:30	13:05	13:39
40°	05:53	06:25	06:54	12:37	13:09	13:39
45°	05:59	06:35	07:06	12:46	13:14	13:41
S 50°	06:06	06:45	07:21	12:56	13:20	13:42
52°	06:09	06:50	07:27	13:01	13:22	13:42
54°	06:13	06:56	07:35	13:06	13:25	13:43
56°	06:16	07:01	07:43	13:12	13:28	13:44
58°	06:20	07:08	07:53	13:18	13:32	13:45
S 60°	06:24	07:15	08:03	13:25	13:36	13:45
S 62°	06:28	07:23	08:16	13:33	13:40	13:46

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 10	Moonset 11	Moonset 12
N 72°	-	-	-	02:56	02:24	02:01
N 70°	22:34	-	-	02:29	02:10	01:55
68°	21:46	-	-	02:08	01:59	01:51
66°	21:16	23:50	-	01:51	01:49	01:47
64°	20:54	22:22	-	01:38	01:41	01:44
62°	20:36	21:47	-	01:26	01:34	01:41
60°	20:22	21:22	23:50	01:16	01:28	01:38
N 58°	20:09	21:03	22:31	01:08	01:23	01:36
56°	19:58	20:47	21:59	01:00	01:18	01:34
54°	19:49	20:33	21:36	00:53	01:14	01:32
52°	19:41	20:22	21:18	00:47	01:10	01:30
50°	19:33	20:12	21:03	00:41	01:06	01:29
45°	19:17	19:51	20:34	00:29	00:58	01:25
N 40°	19:04	19:35	20:12	00:19	00:52	01:23
35°	18:53	19:21	19:55	00:10	00:46	01:20
30°	18:44	19:10	19:41	00:03	00:41	01:18
20°	18:27	18:51	19:18	-	00:32	01:14
N 10°	18:13	18:35	19:01	-	00:25	01:11
0°	18:00	18:22	18:47	-	00:17	01:07
S 10°	17:47	18:09	18:34	-	00:10	01:04
20°	17:33	17:56	18:23	-	00:02	01:01
30°	17:17	17:43	18:11	23:53	-	00:57
35°	17:08	17:35	18:06	23:48	-	00:54
40°	16:58	17:27	18:00	23:42	-	00:51
45°	16:46	17:18	17:53	23:34	-	00:48
S 50°	16:32	17:07	17:46	23:26	-	00:45
52°	16:25	17:02	17:43	23:22	-	00:43
54°	16:17	16:57	17:40	23:18	-	00:41
56°	16:09	16:51	17:36	23:13	-	00:39
58°	15:59	16:44	17:32	23:07	-	00:36
S 60°	15:49	16:37	17:28	23:01	-	00:34
S 62°	15:36	16:29	17:24	22:54	-	00:31

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
10	3 33	3 34	11:56	18:05	05:40	7d 46%
11	3 35	3 36	11:56	18:56	06:30	8d 57%
12	3 37	3 38	11:56	19:46	07:21	9d 68%

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2011 May 13, 14, 15 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.5	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
13 00	230° 24'.5	205° 16'.2	8° 40'.0 N	201° 03'.1	11° 20'.6 N	206° 45'.7	8° 41'.5 N	39° 01'.9	1° 58'.7 S
01	245° 27'.0	220° 15'.8	41'.1	216° 03'.8	21'.2	221° 47'.6	41'.7	54° 04'.5	58'.7
02	260° 29'.4	235° 15'.4	42'.2	231° 04'.5	21'.9	236° 49'.6	41'.9	69° 07'.0	58'.7
03	275° 31'.9	250° 15'.0	43'.3	246° 05'.1	22'.6	251° 51'.5	42'.1	84° 09'.6	58'.6
04	290° 34'.4	265° 14'.6	44'.5	261° 05'.8	23'.3	266° 53'.4	42'.3	99° 12'.2	58'.6
05	305° 36'.8	280° 14'.3	45'.6	276° 06'.5	23'.9	281° 55'.4	42'.5	114° 14'.8	58'.5
06	320° 39'.3	295° 13'.9	46'.7	291° 07'.2	24'.6	296° 57'.3	42'.7	129° 17'.3	58'.5
07	335° 41'.8	310° 13'.5	47'.8	306° 07'.8	25'.3	311° 59'.2	42'.9	144° 19'.9	58'.5
08	350° 44'.2	325° 13'.1	48'.9	321° 08'.5	26'.0	327° 01'.1	43'.1	159° 22'.5	58'.4
09	5° 46'.7	340° 12'.7	50'.0	336° 09'.2	26'.6	342° 03'.1	43'.3	174° 25'.1	58'.4
10	20° 49'.1	355° 12'.3	51'.1	351° 09'.9	27'.3	357° 05'.0	43'.5	189° 27'.7	58'.3
11	35° 51'.6	10° 11'.9	52'.2	6° 10'.5	28'.0	12° 06'.9	43'.7	204° 30'.2	58'.3
12	50° 54'.1	25° 11'.5	8° 53'.3 N	21° 11'.2	11° 28'.6 N	27° 08'.8	8° 43'.9 N	219° 32'.8	1° 58'.2 S
13	65° 56'.5	40° 11'.1	54'.4	36° 11'.9	29'.3	42° 10'.8	44'.1	234° 35'.4	58'.2
14	80° 59'.0	55° 10'.7	55'.5	51° 12'.5	30'.0	57° 12'.7	44'.3	249° 38'.0	58'.2
15	96° 01'.5	70° 10'.3	56'.6	66° 13'.2	30'.6	72° 14'.6	44'.5	264° 40'.6	58'.1
16	111° 03'.9	85° 09'.9	57'.7	81° 13'.9	31'.3	87° 16'.6	44'.7	279° 43'.1	58'.1
17	126° 06'.4	100° 09'.5	58'.8	96° 14'.6	32'.0	102° 18'.5	44'.9	294° 45'.7	58'.0
18	141° 08'.9	115° 09'.1	59'.9	111° 15'.2	32'.7	117° 20'.4	45'.1	309° 48'.3	58'.0
19	156° 11'.3	130° 08'.8	9° 01'.1 N	126° 15'.9	33'.3	132° 22'.3	45'.3	324° 50'.9	58'.0
20	171° 13'.8	145° 08'.4	02'.2	141° 16'.6	34'.0	147° 24'.3	45'.6	339° 53'.4	57'.9
21	186° 16'.3	160° 08'.0	03'.3	156° 17'.3	34'.7	162° 26'.2	45'.8	354° 56'.0	57'.9
22	201° 18'.7	175° 07'.6	04'.4	171° 17'.9	35'.3	177° 28'.1	46'.0	9° 58'.6	57'.9
23	216° 21'.2	190° 07'.2	05'.5	186° 18'.6	36'.0	192° 30'.1	46'.2	25° 01'.2	57'.8
14 00	231° 23'.6	205° 06'.8	9° 06'.6 N	201° 19'.3	11° 36'.7 N	207° 32'.0	8° 46'.4 N	40° 03'.7	1° 57'.8 S
01	246° 26'.1	220° 06'.4	07'.7	216° 20'.0	37'.3	222° 33'.9	46'.6	55° 06'.3	57'.7
02	261° 28'.6	235° 06'.0	08'.8	231° 20'.6	38'.0	237° 35'.8	46'.8	70° 08'.9	57'.7
03	276° 31'.0	250° 05'.6	09'.9	246° 21'.3	38'.7	252° 37'.8	47'.0	85° 11'.5	57'.7
04	291° 33'.5	265° 05'.2	11'.0	261° 22'.0	39'.3	267° 39'.7	47'.2	100° 14'.1	57'.6
05	306° 36'.0	280° 04'.8	12'.1	276° 22'.7	40'.0	282° 41'.6	47'.4	115° 16'.6	57'.6
06	321° 38'.4	295° 04'.4	13'.2	291° 23'.3	40'.7	297° 43'.6	47'.6	130° 19'.2	57'.5
07	336° 40'.9	310° 04'.0	14'.3	306° 24'.0	41'.3	312° 45'.5	47'.8	145° 21'.8	57'.5
08	351° 43'.4	325° 03'.6	15'.4	321° 24'.7	42'.0	327° 47'.4	48'.0	160° 24'.4	57'.5
09	6° 45'.8	340° 03'.2	16'.5	336° 25'.3	42'.7	342° 49'.3	48'.2	175° 26'.9	57'.4
10	21° 48'.3	355° 02'.8	17'.6	351° 26'.0	43'.3	357° 51'.3	48'.4	190° 29'.5	57'.4
11	36° 50'.7	10° 02'.4	18'.7	6° 26'.7	44'.0	12° 53'.2	48'.6	205° 32'.1	57'.3
12	51° 53'.2	25° 02'.0	9° 19'.8 N	21° 27'.4	11° 44'.7 N	27° 55'.1	8° 48'.8 N	220° 34'.7	1° 57'.3 S
13	66° 55'.7	40° 01'.6	20'.9	36° 28'.0	45'.3	42° 57'.1	49'.0	235° 37'.2	57'.3
14	81° 58'.1	55° 01'.2	22'.0	51° 28'.7	46'.0	57° 59'.0	49'.2	250° 39'.8	57'.2
15	97° 00'.6	70° 00'.8	23'.1	66° 29'.4	46'.7	73° 00'.9	49'.4	265° 42'.4	57'.2
16	112° 03'.1	85° 00'.4	24'.2	81° 30'.1	47'.3	88° 02'.8	49'.6	280° 45'.0	57'.1
17	127° 05'.5	100° 00'.0	25'.3	96° 30'.7	48'.0	103° 04'.8	49'.8	295° 47'.5	57'.1
18	142° 08'.0	114° 59'.6	26'.4	111° 31'.4	48'.7	118° 06'.7	50'.0	310° 50'.1	57'.1
19	157° 10'.5	129° 59'.2	27'.5	126° 32'.1	49'.3	133° 08'.6	50'.2	325° 52'.7	57'.0
20	172° 12'.9	144° 58'.8	28'.6	141° 32'.7	50'.0	148° 10'.6	50'.4	340° 55'.3	57'.0
21	187° 15'.4	159° 58'.4	29'.7	156° 33'.4	50'.7	163° 12'.5	50'.6	355° 57'.8	57'.0
22	202° 17'.9	174° 58'.0	30'.8	171° 34'.1	51'.3	178° 14'.4	50'.8	11° 00'.4	56'.9
23	217° 20'.3	189° 57'.6	31'.9	186° 34'.8	52'.0	193° 16'.3	51'.1	26° 03'.0	56'.9
15 00	232° 22'.8	204° 57'.2	9° 32'.9 N	201° 35'.4	11° 52'.6 N	208° 18'.3	8° 51'.3 N	41° 05'.5	1° 56'.8 S
01	247° 25'.2	219° 56'.8	34'.0	216° 36'.1	53'.3	223° 20'.2	51'.5	56° 08'.1	56'.8
02	262° 27'.7	234° 56'.4	35'.1	231° 36'.8	54'.0	238° 22'.1	51'.7	71° 10'.7	56'.8
03	277° 30'.2	249° 56'.0	36'.2	246° 37'.5	54'.6	253° 24'.1	51'.9	86° 13'.3	56'.7
04	292° 32'.6	264° 55'.6	37'.3	261° 38'.1	55'.3	268° 26'.0	52'.1	101° 15'.8	56'.7
05	307° 35'.1	279° 55'.1	38'.4	276° 38'.8	56'.0	283° 27'.9	52'.3	116° 18'.4	56'.7
06	322° 37'.6	294° 54'.7	39'.5	291° 39'.5	56'.6	298° 29'.9	52'.5	131° 21'.0	56'.6
07	337° 40'.0	309° 54'.3	40'.6	306° 40'.1	57'.3	313° 31'.8	52'.7	146° 23'.6	56'.6
08	352° 42'.5	324° 53'.9	41'.7	321° 40'.8	57'.9	328° 33'.7	52'.9	161° 26'.1	56'.5
09	7° 45'.0	339° 53'.5	42'.8	336° 41'.5	58'.6	343° 35'.6	53'.1	176° 28'.7	56'.5
10	22° 47'.4	354° 53'.1	43'.9	351° 42'.2	59'.3	358° 37'.6	53'.3	191° 31'.3	56'.5
11	37° 49'.9	9° 52'.7	45'.0	6° 42'.8	59'.9	13° 39'.5	53'.5	206° 33'.8	56'.4
12	52° 52'.4	24° 52'.3	9° 46'.1 N	21° 43'.5	12° 00'.6 N	28° 41'.4	8° 53'.7 N	221° 36'.4	1° 56'.4 S
13	67° 54'.8	39° 51'.9	47'.2	36° 44'.2	01'.2	43° 43'.4	53'.9	236° 39'.0	56'.4
14	82° 57'.3	54° 51'.5	48'.2	51° 44'.8	01'.9	58° 45'.3	54'.1	251° 41'.6	56'.3
15	97° 59'.7	69° 51'.1	49'.3	66° 45'.5	02'.6	73° 47'.2	54'.3	266° 44'.1	56'.3
16	113° 02'.2	84° 50'.7	50'.4	81° 46'.2	03'.2	88° 49'.2	54'.5	281° 46'.7	56'.2
17	128° 04'.7	99° 50'.3	51'.5	96° 46'.9	03'.9	103° 51'.1	54'.7	296° 49'.3	56'.2
18	143° 07'.1	114° 49'.9	52'.6	111° 47'.5	04'.5	118° 53'.0	54'.9	311° 51'.8	56'.2
19	158° 09'.6	129° 49'.4	53'.7	126° 48'.2	05'.2	133° 55'.0	55'.1	326° 54'.4	56'.1
20	173° 12'.1	144° 49'.0	54'.8	141° 48'.9	05'.9	148° 56'.9	55'.3	341° 57'.0	56'.1
21	188° 14'.5	159° 48'.6	55'.9	156° 49'.5	06'.5	163° 58'.8	55'.5	356° 59'.6	56'.1
22	203° 17'.0	174° 48'.2	56'.9	171° 50'.2	07'.2	179° 00'.7	55'.7	12° 02'.1	56'.0
23	218° 19'.5	189° 47'.8	58'.0	186° 50'.9	07'.8	194° 02'.7	55'.9	27° 04'.7	56'.0
	M.P. 08:29	v -0'.4	d 1'.1	v 0'.7	d 0'.7	v 1'.9	d 0'.2	v 2'.6	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.5 S
Achernar	335° 28'.3	57° 10'.6 S
Acrux	173° 10'.6	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.5	55° 53'.9 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.6	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.3	29° 09'.1 N
Altair	62° 09'.6	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.5 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.4	69° 02'.8 S
Avior	234° 18'.9	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.2	52° 42'.4 S
Capella	280° 37'.1	46° 00'.6 N
Deneb	49° 32'.4	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.4 S
Dubhe	193° 53'.2	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.4	51° 29'.1 N
Enif	33° 48'.6	9° 55'.6 N
Fomalhaut	15° 25'.7	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.5	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.5 N
Markab	13° 40'.0	15° 15'.9 N
Menkar	314° 17'.0	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.7 S
Miaplacidus	221° 40'.2	69° 46'.3 S
Mirfak	308° 43'.1	49° 54'.0 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.6 S
Polaris	318° 58'.0	89° 18'.8 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.6	12° 33'.0 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.0 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 42'.7	56° 35'.8 N
Shaula	96° 23'.6	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.7	43° 29'.1 S
Vega	80° 39'.7	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	333° 43'.1	10:20
Mars	329° 55'.6	10:34
Jupiter	336° 08'.3	10:09
Saturn	168° 40'.1	21:16

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 54'.6	18° 14'.7 N	61° 21'.7	10'.3	0° 56'.0 S	14'.3	59'.9
195° 54'.6	15'.3	75° 51'.0	10'.2	1° 10'.3 S	14'.4	
210° 54'.6	15'.9	90° 20'.2	10'.2	24'.7	14'.4	
225° 54'.6	16'.5	104° 49'.4	10'.1	39'.1	14'.4	
240° 54'.6	17'.1	119° 18'.5	10'.2	53'.5	14'.3	60'.0
255° 54'.6	17'.8	133° 47'.7	10'.1	2° 07'.8 S	14'.4	
270° 54'.6	18'.4	148° 16'.8	10'.0	22'.2	14'.4	
285° 54'.6	19'.0	162° 45'.8	10'.0	36'.6	14'.4	
300° 54'.6	19'.6	177° 14'.8	10'.0	51'.0	14'.3	
315° 54'.6	20'.2	191° 43'.8	10'.0	3° 05'.3 S	14'.4	60'.1
330° 54'.6	20'.9	206° 12'.8	9'.9	19'.7	14'.3	
345° 54'.6	21'.5	220° 41'.7	9'.9	34'.0	14'.3	
0° 54'.7	18° 22'.1 N	235° 10'.6	9'.8	3° 48'.3 S	14'.4	60'.1
15° 54'.7	22'.7	249° 39'.4	9'.8	4° 02'.7 S	14'.3	
30° 54'.7	23'.3	264° 08'.2	9'.7	17'.0	14'.3	
45° 54'.7	24'.0	278° 36'.9	9'.7	31'.3	14'.2	60'.2
60° 54'.7	24'.6	293° 05'.6	9'.7	45'.5	14'.3	
75° 54'.7	25'.2	307° 34'.3	9'.6	59'.8	14'.2	
90° 54'.7	25'.8	322° 02'.9	9'.6	5° 14'.0 S	14'.2	
105° 54'.7	26'.4	336° 31'.5	9'.5	28'.2	14'.2	
120° 54'.7	27'.0	351° 00'.0	9'.5	42'.4	14'.2	
135° 54'.7	27'.6	5° 28'.5	9'.4	56'.6	14'.1	60'.3
150° 54'.7	28'.2	19° 56'.9	9'.4	6° 10'.7 S	14'.1	
165° 54'.7	28'.9	34° 25'.3	9'.3	24'.8	14'.1	
180° 54'.7	18° 29'.5 N	48° 53'.6	9'.3	6° 38'.9 S	14'.0	60'.3
195° 54'.7	30'.1	63° 21'.9	9'.2	52'.9	14'.0	
210° 54'.7	30'.7	77° 50'.1	9'.2	7° 06'.9 S	14'.0	
225° 54'.7	31'.3	92° 18'.3	9'.1	20'.9	14'.0	
240° 54'.7	31'.9	106° 46'.4	9'.1	34'.9	13'.9	
255° 54'.7	32'.5	121° 14'.5	9'.0	48'.8	13'.8	60'.4
270° 54'.7	33'.1	135° 42'.5	8'.9	8° 02'.6 S	13'.8	
285° 54'.7	33'.7	150° 10'.4	8'.9	16'.4	13'.8	
300° 54'.7	34'.3	164° 38'.3	8'.9	30'.2	13'.8	
315° 54'.7	34'.9	179° 06'.2	8'.8	44'.0	13'.6	
330° 54'.7	35'.5	193° 34'.0	8'.7	57'.6	13'.7	
345° 54'.7	36'.1	208° 01'.7	8'.7	9° 11'.3 S	13'.6	
0° 54'.7	18° 36'.8 N	222° 29'.4	8'.6	9° 24'.9 S	13'.5	60'.4
15° 54'.7	37'.4	236° 57'.0	8'.5	38'.4	13'.5	
30° 54'.7	38'.0	251° 24'.5	8'.5	51'.9	13'.4	60'.5
45° 54'.7	38'.6	265° 52'.0	8'.5	10° 05'.3 S	13'.4	
60° 54'.7	39'.2	280° 19'.5	8'.3	18'.7	13'.3	
75° 54'.7	39'.8	294° 46'.8	8'.3	32'.0	13'.2	
90° 54'.7	40'.4	309° 14'.1	8'.3	45'.2	13'.2	
105° 54'.7	41'.0	323° 41'.4	8'.2	58'.4	13'.1	
120° 54'.7	41'.6	338° 08'.6	8'.1	11° 11'.5 S	13'.1	
135° 54'.7	42'.2	352° 35'.7	8'.0	24'.6	13'.0	
150° 54'.7	42'.8	7° 02'.7	8'.0	37'.6	12'.9	
165° 54'.7	43'.4	21° 29'.7	8'.0	50'.5	12'.8	
180° 54'.7	18° 44'.0 N	35° 56'.7	7'.8	12° 03'.3 S	12'.8	60'.5
195° 54'.7	44'.6	50° 23'.5	7'.8	16'.1	12'.7	
210° 54'.7	45'.2	64° 50'.3	7'.8	28'.8	12'.7	
225° 54'.7	45'.8	79° 17'.1	7'.6	41'.5	12'.5	
240° 54'.7	46'.3	93° 43'.7	7'.6	54'.0	12'.5	
255° 54'.7	46'.9	108° 10'.3	7'.6	13° 06'.5 S	12'.4	
270° 54'.7	47'.5	122° 36'.9	7'.4	18'.9	12'.3	
285° 54'.7	48'.1	137° 03'.3	7'.4	31'.2	12'.2	
300° 54'.7	48'.7	151° 29'.7	7'.4	43'.4	12'.1	
315° 54'.7	49'.3	165° 56'.1	7'.2	55'.5	12'.1	
330° 54'.7	49'.9	180° 22'.3	7'.3	14° 07'.6 S	11'.9	60'.6
345° 54'.7	50'.5	194° 48'.6	7'.1	19'.5	11'.9	
0° 54'.7	18° 51'.1 N	209° 14'.7	7'.1	14° 31'.4 S	11'.8	60'.6
15° 54'.7	51'.7	223° 40'.8	7'.0	43'.2	11'.7	
30° 54'.7	52'.3	238° 06'.8	6'.9	54'.9	11'.5	60'.5
45° 54'.7	52'.9	252° 32'.7	6'.9	15° 06'.4 S	11'.5	
60° 54'.7	53'.4	266° 58'.6	6'.8	17'.9	11'.4	
75° 54'.6	54'.0	281° 24'.4	6'.7	29'.3	11'.3	
90° 54'.6	54'.6	295° 50'.1	6'.7	40'.6	11'.2	
105° 54'.6	55'.2	310° 15'.8	6'.6	51'.8	11'.1	
120° 54'.6	55'.8	324° 41'.4	6'.5	16° 02'.9 S	10'.9	
135° 54'.6	56'.4	339° 06'.9	6'.5	13'.8	10'.9	
150° 54'.6	57'.0	353° 32'.4	6'.4	24'.7	10'.7	
165° 54'.6	57'.6	7° 57'.8	6'.4	35'.4	10'.7	
SD 15'.8	d 0'.6	SD	16'.4	16'.5	16'.5	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 13	Moonrise 14	Moonrise 15
N 72°	-	-	-	15:26	17:48	20:41
N 70°	-	-	00:58	15:19	17:29	19:53
68°	-	-	01:55	15:13	17:14	19:22
66°	-	-	02:28	15:09	17:02	19:00
64°	-	01:18	02:52	15:05	16:52	18:42
62°	-	01:57	03:10	15:01	16:43	18:28
60°	-	02:24	03:26	14:58	16:36	18:16
N 58°	01:10	02:44	03:39	14:56	16:30	18:05
56°	01:46	03:01	03:50	14:53	16:24	17:56
54°	02:10	03:15	04:00	14:51	16:19	17:48
52°	02:30	03:27	04:08	14:49	16:15	17:41
50°	02:45	03:37	04:16	14:48	16:10	17:35
45°	03:16	03:59	04:33	14:44	16:02	17:21
N 40°	03:38	04:16	04:46	14:41	15:54	17:10
35°	03:56	04:30	04:58	14:38	15:48	17:00
30°	04:10	04:41	05:08	14:36	15:43	16:52
20°	04:33	05:01	05:25	14:32	15:34	16:37
N 10°	04:51	05:17	05:39	14:28	15:25	16:25
0°	05:06	05:31	05:53	14:25	15:18	16:13
S 10°	05:19	05:44	06:06	14:22	15:10	16:02
20°	05:31	05:57	06:21	14:18	15:02	15:50
30°	05:43	06:12	06:37	14:15	14:54	15:36
35°	05:49	06:19	06:46	14:13	14:48	15:28
40°	05:55	06:28	06:57	14:10	14:43	15:19
45°	06:02	06:38	07:10	14:07	14:36	15:08
S 50°	06:10	06:49	07:25	14:04	14:28	14:56
52°	06:13	06:54	07:32	14:03	14:24	14:50
54°	06:17	07:00	07:40	14:01	14:20	14:44
56°	06:21	07:06	07:49	13:59	14:16	14:36
58°	06:25	07:13	07:59	13:57	14:11	14:28
S 60°	06:29	07:21	08:10	13:55	14:06	14:19
S 62°	06:34	07:30	08:24	13:52	14:00	14:09

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 13	Moonset 14	Moonset 15
N 72°	-	-	-	01:39	01:17	00:48 23:53
N 70°	23:06	-	-	01:41	01:27	01:09
68°	22:03	-	-	01:43	01:35	01:26
66°	21:28	-	-	01:44	01:42	01:39
64°	21:04	22:41	-	01:46	01:48	01:51
62°	20:44	21:59	-	01:47	01:53	02:01
60°	20:29	21:32	-	01:48	01:57	02:09
N 58°	20:15	21:11	22:49	01:48	02:01	02:16
56°	20:04	20:54	22:10	01:49	02:05	02:23
54°	19:54	20:40	21:45	01:50	02:08	02:29
52°	19:45	20:27	21:25	01:50	02:11	02:34
50°	19:37	20:17	21:09	01:51	02:14	02:39
45°	19:21	19:55	20:38	01:52	02:19	02:50
N 40°	19:07	19:38	20:15	01:53	02:24	02:58
35°	18:56	19:24	19:58	01:54	02:28	03:06
30°	18:46	19:12	19:43	01:55	02:32	03:13
20°	18:28	18:52	19:20	01:56	02:39	03:24
N 10°	18:14	18:36	19:02	01:57	02:44	03:34
0°	18:00	18:22	18:47	01:58	02:50	03:44
S 10°	17:46	18:08	18:34	01:59	02:55	03:53
20°	17:32	17:55	18:22	02:00	03:01	04:04
30°	17:15	17:41	18:10	02:01	03:07	04:15
35°	17:06	17:33	18:04	02:02	03:11	04:22
40°	16:55	17:24	17:57	02:03	03:16	04:30
45°	16:43	17:14	17:50	02:04	03:21	04:39
S 50°	16:27	17:03	17:42	02:05	03:27	04:50
52°	16:20	16:58	17:39	02:05	03:29	04:55
54°	16:12	16:52	17:35	02:06	03:32	05:01
56°	16:03	16:46	17:31	02:06	03:36	05:07
58°	15:53	16:39	17:27	02:07	03:40	05:14
S 60°	15:42	16:31	17:23	02:08	03:44	05:22
S 62°	15:28	16:22	17:18	02:08	03:49	05:32

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
13	3 38	3 39	11:56	20:37	08:11	10d 79%
14	3 39	3 39	11:56	21:31	09:04	11d 88%
15	3 39	3 39	11:56	22:27	09:58	12d 94%

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2011 May 16, 17, 18 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
16 Monday 00	233° 21'.9	204° 47'.4	9° 59'.1 N	201° 51'.6	12° 08'.5 N	209° 04'.6	8° 56'.1 N	42° 07'.3	1° 55'.9 S
01	248° 24'.4	219° 47'.0	10° 00'.2 N	216° 52'.2	09'.1	224° 06'.5	56'.3	57° 09'.8	55'.9
02	263° 26'.8	234° 46'.6	01'.3	231° 52'.9	09'.8	239° 08'.5	56'.5	72° 12'.4	55'.9
03	278° 29'.3	249° 46'.2	02'.4	246° 53'.6	10'.5	254° 10'.4	56'.7	87° 15'.0	55'.8
04	293° 31'.8	264° 45'.7	03'.5	261° 54'.2	11'.1	269° 12'.3	56'.9	102° 17'.5	55'.8
05	308° 34'.2	279° 45'.3	04'.5	276° 54'.9	11'.8	284° 14'.3	57'.1	117° 20'.1	55'.8
06	323° 36'.7	294° 44'.9	05'.6	291° 55'.6	12'.4	299° 16'.2	57'.3	132° 22'.7	55'.7
07	338° 39'.2	309° 44'.5	06'.7	306° 56'.2	13'.1	314° 18'.1	57'.5	147° 25'.3	55'.7
08	353° 41'.6	324° 44'.1	07'.8	321° 56'.9	13'.7	329° 20'.1	57'.7	162° 27'.8	55'.7
09	8° 44'.1	339° 43'.7	08'.9	336° 57'.6	14'.4	344° 22'.0	57'.9	177° 30'.4	55'.6
10	23° 46'.6	354° 43'.3	10'.0	351° 58'.3	15'.1	359° 23'.9	58'.1	192° 33'.0	55'.6
11	38° 49'.0	9° 42'.8	11'.1	6° 58'.9	15'.7	14° 25'.9	58'.3	207° 35'.5	55'.6
12	53° 51'.5	24° 42'.4	10° 12'.1 N	21° 59'.6	12° 16'.4 N	29° 27'.8	8° 58'.5 N	222° 38'.1	1° 55'.5 S
13	68° 54'.0	39° 42'.0	13'.2	37° 00'.3	17'.0	44° 29'.7	58'.7	237° 40'.7	55'.5
14	83° 56'.4	54° 41'.6	14'.3	52° 00'.9	17'.7	59° 31'.7	58'.9	252° 43'.2	55'.4
15	98° 58'.9	69° 41'.2	15'.4	67° 01'.6	18'.3	74° 33'.6	59'.1	267° 45'.8	55'.4
16	114° 01'.3	84° 40'.8	16'.5	82° 02'.3	19'.0	89° 35'.5	59'.3	282° 48'.4	55'.4
17	129° 03'.8	99° 40'.4	17'.5	97° 02'.9	19'.6	104° 37'.5	59'.5	297° 50'.9	55'.3
18	144° 06'.3	114° 39'.9	18'.6	112° 03'.6	20'.3	119° 39'.4	59'.7	312° 53'.5	55'.3
19	159° 08'.7	129° 39'.5	19'.7	127° 04'.3	20'.9	134° 41'.3	59'.9	327° 56'.1	55'.3
20	174° 11'.2	144° 39'.1	20'.8	142° 05'.0	21'.6	149° 43'.3	9° 00'.1 N	342° 58'.6	55'.2
21	189° 13'.7	159° 38'.7	21'.9	157° 05'.6	22'.2	164° 45'.2	00'.3	358° 01'.2	55'.2
22	204° 16'.1	174° 38'.3	22'.9	172° 06'.3	22'.9	179° 47'.1	00'.5	13° 03'.8	55'.2
23	219° 18'.6	189° 37'.8	24'.0	187° 07'.0	23'.6	194° 49'.0	00'.7	28° 06'.3	55'.1
17 Tuesday 00	234° 21'.1	204° 37'.4	10° 25'.1 N	202° 07'.6	12° 24'.2 N	209° 51'.0	9° 00'.9 N	43° 08'.9	1° 55'.1 S
01	249° 23'.5	219° 37'.0	26'.2	217° 08'.3	24'.9	224° 52'.9	01'.1	58° 11'.5	55'.1
02	264° 26'.0	234° 36'.6	27'.2	232° 09'.0	25'.5	239° 54'.8	01'.3	73° 14'.1	55'.0
03	279° 28'.5	249° 36'.2	28'.3	247° 09'.6	26'.2	254° 56'.8	01'.5	88° 16'.6	55'.0
04	294° 30'.9	264° 35'.7	29'.4	262° 10'.3	26'.8	269° 58'.7	01'.7	103° 19'.2	55'.0
05	309° 33'.4	279° 35'.3	30'.5	277° 11'.0	27'.5	285° 00'.6	01'.9	118° 21'.7	54'.9
06	324° 35'.8	294° 34'.9	31'.5	292° 11'.6	28'.1	300° 02'.6	02'.1	133° 24'.3	54'.9
07	339° 38'.3	309° 34'.5	32'.6	307° 12'.3	28'.8	315° 04'.5	02'.3	148° 26'.9	54'.8
08	354° 40'.8	324° 34'.1	33'.7	322° 13'.0	29'.4	330° 06'.4	02'.5	163° 29'.4	54'.8
09	9° 43'.2	339° 33'.6	34'.8	337° 13'.6	30'.1	345° 08'.4	02'.7	178° 32'.0	54'.8
10	24° 45'.7	354° 33'.2	35'.8	352° 14'.3	30'.7	0° 10'.3	03'.0	193° 34'.6	54'.7
11	39° 48'.2	9° 32'.8	36'.9	7° 15'.0	31'.4	15° 12'.2	03'.2	208° 37'.1	54'.7
12	54° 50'.6	24° 32'.4	10° 38'.0 N	22° 15'.7	12° 32'.0 N	30° 14'.2	9° 03'.4 N	223° 39'.7	1° 54'.7 S
13	69° 53'.1	39° 32'.0	39'.1	37° 16'.3	32'.7	45° 16'.1	03'.6	238° 42'.3	54'.6
14	84° 55'.6	54° 31'.5	40'.1	52° 17'.0	33'.3	60° 18'.1	03'.8	253° 44'.8	54'.6
15	99° 58'.0	69° 31'.1	41'.2	67° 17'.7	34'.0	75° 20'.0	04'.0	268° 47'.4	54'.6
16	115° 00'.5	84° 30'.7	42'.3	82° 18'.3	34'.6	90° 21'.9	04'.2	283° 50'.0	54'.5
17	130° 03'.0	99° 30'.3	43'.3	97° 19'.0	35'.3	105° 23'.9	04'.4	298° 52'.5	54'.5
18	145° 05'.4	114° 29'.8	44'.4	112° 19'.7	35'.9	120° 25'.8	04'.6	313° 55'.1	54'.5
19	160° 07'.9	129° 29'.4	45'.5	127° 20'.3	36'.6	135° 27'.7	04'.8	328° 57'.7	54'.4
20	175° 10'.3	144° 29'.0	46'.6	142° 21'.0	37'.2	150° 29'.7	05'.0	344° 00'.2	54'.4
21	190° 12'.8	159° 28'.6	47'.6	157° 21'.7	37'.8	165° 31'.6	05'.1	359° 02'.8	54'.4
22	205° 15'.3	174° 28'.1	48'.7	172° 22'.3	38'.5	180° 33'.5	05'.3	14° 05'.4	54'.3
23	220° 17'.7	189° 27'.7	49'.8	187° 23'.0	39'.1	195° 35'.5	05'.5	29° 07'.9	54'.3
18 Wednesday 00	235° 20'.2	204° 27'.3	10° 50'.8 N	202° 23'.7	12° 39'.8 N	210° 37'.4	9° 05'.7 N	44° 10'.5	1° 54'.3 S
01	250° 22'.7	219° 26'.8	51'.9	217° 24'.3	40'.4	225° 39'.3	05'.9	59° 13'.1	54'.2
02	265° 25'.1	234° 26'.4	53'.0	232° 25'.0	41'.1	240° 41'.3	06'.1	74° 15'.6	54'.2
03	280° 27'.6	249° 26'.0	54'.0	247° 25'.7	41'.7	255° 43'.2	06'.3	89° 18'.2	54'.2
04	295° 30'.1	264° 25'.6	55'.1	262° 26'.3	42'.4	270° 45'.1	06'.5	104° 20'.7	54'.1
05	310° 32'.5	279° 25'.1	56'.2	277° 27'.0	43'.0	285° 47'.1	06'.7	119° 23'.3	54'.1
06	325° 35'.0	294° 24'.7	57'.2	292° 27'.7	43'.7	300° 49'.0	06'.9	134° 25'.9	54'.1
07	340° 37'.4	309° 24'.3	58'.3	307° 28'.3	44'.3	315° 50'.9	07'.1	149° 28'.4	54'.0
08	355° 39'.9	324° 23'.8	59'.4	322° 29'.0	45'.0	330° 52'.9	07'.3	164° 31'.0	54'.0
09	10° 42'.4	339° 23'.4	11° 00'.4 N	337° 29'.7	45'.6	345° 54'.8	07'.5	179° 33'.6	54'.0
10	25° 44'.8	354° 23'.0	01'.5	352° 30'.3	46'.2	0° 56'.7	07'.7	194° 36'.1	53'.9
11	40° 47'.3	9° 22'.5	02'.6	7° 31'.0	46'.9	15° 58'.7	07'.9	209° 38'.7	53'.9
12	55° 49'.8	24° 22'.1	11° 03'.6 N	22° 31'.7	12° 47'.5 N	31° 00'.6	9° 08'.1 N	224° 41'.2	1° 53'.9 S
13	70° 52'.2	39° 21'.7	04'.7	37° 32'.3	48'.2	46° 02'.6	08'.3	239° 43'.8	53'.8
14	85° 54'.7	54° 21'.3	05'.7	52° 33'.0	48'.8	61° 04'.5	08'.5	254° 46'.4	53'.8
15	100° 57'.2	69° 20'.8	06'.8	67° 33'.7	49'.5	76° 06'.4	08'.7	269° 48'.9	53'.8
16	115° 59'.6	84° 20'.4	07'.9	82° 34'.3	50'.1	91° 08'.4	08'.9	284° 51'.5	53'.7
17	131° 02'.1	99° 20'.0	08'.9	97° 35'.0	50'.7	106° 10'.3	09'.1	299° 54'.1	53'.7
18	146° 04'.6	114° 19'.5	10'.0	112° 35'.7	51'.4	121° 12'.2	09'.3	314° 56'.6	53'.7
19	161° 07'.0	129° 19'.1	11'.1	127° 36'.3	52'.0	136° 14'.2	09'.5	329° 59'.2	53'.6
20	176° 09'.5	144° 18'.7	12'.1	142° 37'.0	52'.7	151° 16'.1	09'.7	345° 01'.7	53'.6
21	191° 11'.9	159° 18'.2	13'.2	157° 37'.7	53'.3	166° 18'.0	09'.9	0° 04'.3	53'.6
22	206° 14'.4	174° 17'.8	14'.2	172° 38'.3	54'.0	181° 20'.0	10'.1	15° 06'.9	53'.6
23	221° 16'.9	189° 17'.3	15'.3	187° 39'.0	54'.6	196° 21'.9	10'.3	30° 09'.4	53'.5
	M.P. 08:17	v -0'.4	d 1'.1	v 0'.7	d 0'.6	v 1'.9	d 0'.2	v 2'.6	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.5 S
Achernar	335° 28'.3	57° 10'.6 S
Acrux	173° 10'.7	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.5	55° 53'.9 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.6	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.3	29° 09'.1 N
Altair	62° 09'.5	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.4	69° 02'.8 S
Avior	234° 18'.9	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.3	52° 42'.4 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.4 S
Dubhe	193° 53'.2	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.4	51° 29'.1 N
Enif	33° 48'.6	9° 55'.6 N
Fomalhaut	15° 25'.7	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.5	34° 22'.6 S
Kochab	137° 18'.6	74° 06'.5 N
Markab	13° 39'.9	15° 15'.9 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.3	69° 46'.3 S
Mirfak	308° 43'.0	49° 54'.0 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.6 S
Polaris	318° 57'.3	89° 18'.7 N
Pollux	243° 29'.7	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.0 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.7	56° 35'.8 N
Shaula	96° 23'.6	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.7	43° 29'.1 S
Vega	80° 39'.7	38° 47'.5 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	330° 16'.4	10:22
Mars	327° 46'.6	10:31
Jupiter	335° 29'.9	09:59
Saturn	168° 47'.9	21:04

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 54'.6	18° 58'.1 N	22° 23'.2	6'.3	16° 46'.1 S	10'.5	60'.5
195° 54'.6	58'.7	36° 48'.5	6'.2	56'.6	10'.4	
210° 54'.6	59'.3	51° 13'.7	6'.1	17° 07'.0 S	10'.3	
225° 54'.6	59'.9	65° 38'.8	6'.1	17'.3	10'.2	
240° 54'.6	19° 00'.5 N	80° 03'.9	6'.1	27'.5	10'.1	
255° 54'.5	01'.1	94° 29'.0	6'.0	37'.6	9'.9	
270° 54'.5	01'.6	108° 54'.0	5'.9	47'.5	9'.8	
285° 54'.5	02'.2	123° 18'.9	5'.8	57'.3	9'.7	
300° 54'.5	02'.8	137° 43'.7	5'.8	18° 07'.0 S	9'.6	
315° 54'.5	03'.4	152° 08'.5	5'.8	16'.6	9'.5	60'.4
330° 54'.5	04'.0	166° 33'.3	5'.6	26'.1	9'.3	
345° 54'.5	04'.5	180° 57'.9	5'.7	35'.4	9'.2	
0° 54'.5	19° 05'.1 N	195° 22'.6	5'.5	18° 44'.6 S	9'.0	60'.4
15° 54'.5	05'.7	209° 47'.1	5'.5	53'.6	9'.0	
30° 54'.5	06'.3	224° 11'.6	5'.5	19° 02'.6 S	8'.8	
45° 54'.4	06'.8	238° 36'.1	5'.4	11'.4	8'.6	
60° 54'.4	07'.4	253° 00'.5	5'.3	20'.0	8'.6	
75° 54'.4	08'.0	267° 24'.8	5'.3	28'.6	8'.3	
90° 54'.4	08'.6	281° 49'.1	5'.3	36'.9	8'.3	60'.3
105° 54'.4	09'.1	296° 13'.4	5'.2	45'.2	8'.1	
120° 54'.4	09'.7	310° 37'.6	5'.2	53'.3	8'.0	
135° 54'.4	10'.3	325° 01'.8	5'.1	20° 01'.3 S	7'.8	
150° 54'.4	10'.9	339° 25'.9	5'.0	09'.1	7'.7	
165° 54'.3	11'.4	353° 49'.9	5'.1	16'.8	7'.6	
180° 54'.3	19° 12'.0 N	8° 14'.0	4'.9	20° 24'.4 S	7'.4	60'.3
195° 54'.3	12'.6	22° 37'.9	5'.0	31'.8	7'.2	60'.2
210° 54'.3	13'.1	37° 01'.9	4'.9	39'.0	7'.1	
225° 54'.3	13'.7	51° 25'.8	4'.8	46'.1	7'.0	
240° 54'.3	14'.3	65° 49'.6	4'.9	53'.1	6'.8	
255° 54'.3	14'.8	80° 13'.5	4'.8	59'.9	6'.7	
270° 54'.2	15'.4	94° 37'.3	4'.7	21° 06'.6 S	6'.5	60'.1
285° 54'.2	16'.0	109° 01'.0	4'.7	13'.1	6'.3	
300° 54'.2	16'.5	123° 24'.7	4'.7	19'.4	6'.2	
315° 54'.2	17'.1	137° 48'.4	4'.7	25'.6	6'.1	
330° 54'.2	17'.7	152° 12'.1	4'.6	31'.7	5'.9	
345° 54'.2	18'.2	166° 35'.7	4'.6	37'.6	5'.8	
0° 54'.1	19° 18'.8 N	180° 59'.3	4'.6	21° 43'.4 S	5'.5	60'.0
15° 54'.1	19'.4	195° 22'.9	4'.6	48'.9	5'.5	
30° 54'.1	19'.9	209° 46'.5	4'.5	54'.4	5'.3	
45° 54'.1	20'.5	224° 10'.0	4'.6	59'.7	5'.1	
60° 54'.1	21'.1	238° 33'.6	4'.5	22° 04'.8 S	4'.9	59'.9
75° 54'.1	21'.6	252° 57'.1	4'.5	09'.7	4'.9	
90° 54'.0	22'.2	267° 20'.6	4'.5	14'.6	4'.6	
105° 54'.0	22'.7	281° 44'.1	4'.4	19'.2	4'.5	
120° 54'.0	23'.3	296° 07'.5	4'.5	23'.7	4'.3	
135° 54'.0	23'.9	310° 31'.0	4'.4	28'.0	4'.2	59'.8
150° 54'.0	24'.4	324° 54'.4	4'.5	32'.2	4'.0	
165° 53'.9	25'.0	339° 17'.9	4'.4	36'.2	3'.8	
180° 53'.9	19° 25'.5 N	353° 41'.3	4'.5	22° 40'.0 S	3'.7	59'.8
195° 53'.9	26'.1	8° 04'.8	4'.4	43'.7	3'.6	59'.7
210° 53'.9	26'.6	22° 28'.2	4'.5	47'.3	3'.3	
225° 53'.9	27'.2	36° 51'.7	4'.4	50'.6	3'.2	
240° 53'.8	27'.8	51° 15'.1	4'.5	53'.8	3'.1	59'.6
255° 53'.8	28'.3	65° 38'.6	4'.4	56'.9	2'.8	
270° 53'.8	28'.9	80° 02'.0	4'.5	59'.7	2'.8	
285° 53'.8	29'.4	94° 25'.5	4'.5	23° 02'.5 S	2'.5	
300° 53'.8	30'.0	108° 49'.0	4'.5	05'.0	2'.4	59'.5
315° 53'.7	30'.5	123° 12'.5	4'.5	07'.4	2'.2	
330° 53'.7	31'.1	137° 36'.0	4'.5	09'.6	2'.1	
345° 53'.7	31'.6	151° 59'.5	4'.6	11'.7	1'.9	
0° 53'.7	19° 32'.2 N	166° 23'.1	4'.5	23° 13'.6 S	1'.8	59'.4
15° 53'.6	32'.7	180° 46'.6	4'.6	15'.4	1'.5	
30° 53'.6	33'.3	195° 10'.2	4'.7	16'.9	1'.5	
45° 53'.6	33'.8	209° 33'.9	4'.6	18'.4	1'.2	59'.3
60° 53'.6	34'.4	223° 57'.5	4'.7	19'.6	1'.1	
75° 53'.5	34'.9	238° 21'.2	4'.7	20'.7	1'.0	
90° 53'.5	35'.5	252° 44'.9	4'.7	21'.7	0'.8	59'.2
105° 53'.5	36'.0	267° 08'.6	4'.8	22'.5	0'.6	
120° 53'.5	36'.6	281° 32'.4	4'.8	23'.1	0'.4	
135° 53'.4	37'.1	295° 56'.2	4'.9	23'.5	0'.3	59'.1
150° 53'.4	37'.6	310° 20'.1	4'.9	23'.8	0'.2	
165° 53'.4	38'.2	324° 44'.0	4'.9	24'.0	0'.0	
SD 15'.8	d 0'.6	SD	16'.5	16'.4	16'.2	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 16	Moonrise 17	Moonrise 18
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	01:38	21:47	-	-
66°	-	-	02:16	21:03	23:05	24:38
64°	-	00:56	02:42	20:34	22:18	23:36
62°	-	01:44	03:02	20:12	21:47	23:01
60°	-	02:14	03:19	19:54	21:24	22:36
N 58°	00:50	02:36	03:32	19:39	21:06	22:16
56°	01:34	02:54	03:44	19:27	20:50	22:00
54°	02:02	03:09	03:55	19:16	20:37	21:46
52°	02:22	03:21	04:04	19:06	20:25	21:33
50°	02:39	03:32	04:12	18:58	20:15	21:22
45°	03:11	03:55	04:29	18:39	19:54	21:00
N 40°	03:35	04:13	04:43	18:24	19:36	20:42
35°	03:53	04:27	04:55	18:12	19:22	20:26
30°	04:08	04:39	05:06	18:01	19:09	20:13
20°	04:32	05:00	05:23	17:43	18:48	19:50
N 10°	04:50	05:16	05:39	17:26	18:29	19:31
0°	05:05	05:31	05:53	17:12	18:12	19:13
S 10°	05:19	05:45	06:07	16:57	17:55	18:54
20°	05:32	05:59	06:22	16:41	17:36	18:35
30°	05:44	06:13	06:39	16:23	17:15	18:13
35°	05:51	06:22	06:49	16:12	17:03	17:59
40°	05:58	06:31	07:00	16:00	16:49	17:44
45°	06:05	06:41	07:13	15:46	16:32	17:26
S 50°	06:13	06:53	07:29	15:30	16:12	17:04
52°	06:17	06:58	07:36	15:22	16:02	16:53
54°	06:21	07:04	07:45	15:13	15:51	16:42
56°	06:25	07:11	07:54	15:03	15:39	16:28
58°	06:29	07:18	08:05	14:52	15:25	16:12
S 60°	06:34	07:27	08:17	14:39	15:08	15:53
S 62°	06:40	07:36	08:31	14:24	14:48	15:29

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 16	Moonset 17	Moonset 18
N 72°	-	-	-	-	-	-
N 70°	-	-	-	00:42	-	-
68°	22:20	-	-	01:14	00:53	-
66°	21:40	-	-	01:38	01:37	01:42
64°	21:13	23:06	-	01:56	02:07	02:30
62°	20:53	22:12	-	02:12	02:30	03:01
60°	20:36	21:42	-	02:25	02:48	03:24
N 58°	20:22	21:19	23:11	02:36	03:03	03:43
56°	20:10	21:01	22:22	02:46	03:16	03:58
54°	19:59	20:46	21:54	02:55	03:28	04:12
52°	19:50	20:33	21:32	03:02	03:38	04:24
50°	19:42	20:22	21:15	03:09	03:47	04:34
45°	19:24	19:59	20:43	03:24	04:06	04:56
N 40°	19:10	19:41	20:19	03:37	04:22	05:14
35°	18:58	19:26	20:01	03:48	04:35	05:29
30°	18:47	19:14	19:45	03:57	04:47	05:42
20°	18:30	18:53	19:21	04:13	05:06	06:04
N 10°	18:14	18:37	19:03	04:27	05:24	06:23
0°	18:00	18:22	18:47	04:41	05:40	06:41
S 10°	17:46	18:08	18:34	04:54	05:56	06:59
20°	17:31	17:54	18:21	05:08	06:14	07:18
30°	17:14	17:39	18:08	05:25	06:34	07:40
35°	17:04	17:31	18:02	05:34	06:45	07:53
40°	16:53	17:22	17:55	05:45	06:59	08:08
45°	16:39	17:11	17:47	05:58	07:15	08:26
S 50°	16:23	16:59	17:39	06:14	07:35	08:48
52°	16:16	16:54	17:35	06:21	07:44	08:58
54°	16:08	16:48	17:31	06:30	07:55	09:10
56°	15:58	16:41	17:27	06:39	08:07	09:24
58°	15:48	16:34	17:23	06:50	08:20	09:40
S 60°	15:35	16:25	17:18	07:02	08:37	09:59
S 62°	15:21	16:16	17:12	07:16	08:57	10:23

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
16	3 38	3 38	11:56	23:26	10:56	13d 99%
17	3 37	3 37	11:56	24:26	11:56	14d Full
18	3 36	3 35	11:56	00:26	12:57	15d 99%

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2011 May 19, 20, 21 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
19 Thursday 00	236° 19'.3	204° 16'.9	11° 16'.3 N	202° 39'.7	12° 55'.2 N	211° 23'.8	9° 10'.5 N	45° 12'.0	1° 53'.5 S
01	251° 21'.8	219° 16'.5	17'.4	217° 40'.3	55'.9	226° 25'.8	10'.7	60° 14'.5	53'.5
02	266° 24'.3	234° 16'.0	18'.5	232° 41'.0	56'.5	241° 27'.7	10'.9	75° 17'.1	53'.4
03	281° 26'.7	249° 15'.6	19'.5	247° 41'.7	57'.2	256° 29'.7	11'.1	90° 19'.7	53'.4
04	296° 29'.2	264° 15'.2	20'.6	262° 42'.3	57'.8	271° 31'.6	11'.3	105° 22'.2	53'.4
05	311° 31'.7	279° 14'.7	21'.6	277° 43'.0	58'.4	286° 33'.5	11'.5	120° 24'.8	53'.3
06	326° 34'.1	294° 14'.3	22'.7	292° 43'.7	59'.1	301° 35'.5	11'.7	135° 27'.3	53'.3
07	341° 36'.6	309° 13'.9	23'.7	307° 44'.3	59'.7	316° 37'.4	11'.9	150° 29'.9	53'.3
08	356° 39'.1	324° 13'.4	24'.8	322° 45'.0	13° 00'.4 N	331° 39'.3	12'.1	165° 32'.5	53'.2
09	11° 41'.5	339° 13'.0	25'.9	337° 45'.7	01'.0	346° 41'.3	12'.3	180° 35'.0	53'.2
10	26° 44'.0	354° 12'.5	26'.9	352° 46'.3	01'.6	1° 43'.2	12'.5	195° 37'.6	53'.2
11	41° 46'.4	9° 12'.1	28'.0	7° 47'.0	02'.3	16° 45'.2	12'.7	210° 40'.1	53'.1
12	56° 48'.9	24° 11'.7	11° 29'.0 N	22° 47'.7	13° 02'.9 N	31° 47'.1	9° 12'.9 N	225° 42'.7	1° 53'.1 S
13	71° 51'.4	39° 11'.2	30'.1	37° 48'.3	03'.6	46° 49'.0	13'.1	240° 45'.3	53'.1
14	86° 53'.8	54° 10'.8	31'.1	52° 49'.0	04'.2	61° 51'.0	13'.3	255° 47'.8	53'.0
15	101° 56'.3	69° 10'.3	32'.2	67° 49'.7	04'.8	76° 52'.9	13'.5	270° 50'.4	53'.0
16	116° 58'.8	84° 09'.9	33'.2	82° 50'.3	05'.5	91° 54'.8	13'.7	285° 52'.9	53'.0
17	132° 01'.2	99° 09'.5	34'.3	97° 51'.0	06'.1	106° 56'.8	13'.9	300° 55'.5	53'.0
18	147° 03'.7	114° 09'.0	35'.3	112° 51'.6	06'.7	121° 58'.7	14'.1	315° 58'.0	52'.9
19	162° 06'.2	129° 08'.6	36'.4	127° 52'.3	07'.4	137° 00'.7	14'.3	331° 00'.6	52'.9
20	177° 08'.6	144° 08'.1	37'.4	142° 53'.0	08'.0	152° 02'.6	14'.5	346° 03'.2	52'.9
21	192° 11'.1	159° 07'.7	38'.5	157° 53'.6	08'.6	167° 04'.5	14'.7	1° 05'.7	52'.8
22	207° 13'.6	174° 07'.2	39'.5	172° 54'.3	09'.3	182° 06'.5	14'.9	16° 08'.3	52'.8
23	222° 16'.0	189° 06'.8	40'.6	187° 55'.0	09'.9	197° 08'.4	15'.1	31° 10'.8	52'.8
20 Friday 00	237° 18'.5	204° 06'.3	11° 41'.6 N	202° 55'.6	13° 10'.6 N	212° 10'.3	9° 15'.3 N	46° 13'.4	1° 52'.7 S
01	252° 20'.9	219° 05'.9	42'.7	217° 56'.3	11'.2	227° 12'.3	15'.5	61° 16'.0	52'.7
02	267° 23'.4	234° 05'.5	43'.7	232° 57'.0	11'.8	242° 14'.2	15'.7	76° 18'.5	52'.7
03	282° 25'.9	249° 05'.0	44'.8	247° 57'.6	12'.5	257° 16'.2	15'.9	91° 21'.1	52'.6
04	297° 28'.3	264° 04'.6	45'.8	262° 58'.3	13'.1	272° 18'.1	16'.1	106° 23'.6	52'.6
05	312° 30'.8	279° 04'.1	46'.8	277° 59'.0	13'.7	287° 20'.0	16'.3	121° 26'.2	52'.6
06	327° 33'.3	294° 03'.7	47'.9	292° 59'.6	14'.4	302° 22'.0	16'.5	136° 28'.7	52'.6
07	342° 35'.7	309° 03'.2	48'.9	308° 00'.3	15'.0	317° 23'.9	16'.7	151° 31'.3	52'.5
08	357° 38'.2	324° 02'.8	50'.0	323° 00'.9	15'.6	332° 25'.9	16'.8	166° 33'.8	52'.5
09	12° 40'.7	339° 02'.3	51'.0	338° 01'.6	16'.3	347° 27'.8	17'.0	181° 36'.4	52'.5
10	27° 43'.1	354° 01'.9	52'.1	353° 02'.3	16'.9	2° 29'.7	17'.2	196° 39'.0	52'.4
11	42° 45'.6	9° 01'.4	53'.1	8° 02'.9	17'.5	17° 31'.7	17'.4	211° 41'.5	52'.4
12	57° 48'.1	24° 01'.0	11° 54'.2 N	23° 03'.6	13° 18'.2 N	32° 33'.6	9° 17'.6 N	226° 44'.1	1° 52'.4 S
13	72° 50'.5	39° 00'.5	55'.2	38° 04'.3	18'.8	47° 35'.5	17'.8	241° 46'.6	52'.3
14	87° 53'.0	54° 00'.1	56'.2	53° 04'.9	19'.4	62° 37'.5	18'.0	256° 49'.2	52'.3
15	102° 55'.4	68° 59'.6	57'.3	68° 05'.6	20'.1	77° 39'.4	18'.2	271° 51'.7	52'.3
16	117° 57'.9	83° 59'.2	58'.3	83° 06'.2	20'.7	92° 41'.4	18'.4	286° 54'.3	52'.3
17	133° 00'.4	98° 58'.7	59'.4	98° 06'.9	21'.3	107° 43'.3	18'.6	301° 56'.8	52'.2
18	148° 02'.8	113° 58'.3	12° 00'.4 N	113° 07'.6	21'.9	122° 45'.2	18'.8	316° 59'.4	52'.2
19	163° 05'.3	128° 57'.8	01'.4	128° 08'.2	22'.6	137° 47'.2	19'.0	332° 02'.0	52'.2
20	178° 07'.8	143° 57'.4	02'.5	143° 08'.9	23'.2	152° 49'.1	19'.2	347° 04'.5	52'.1
21	193° 10'.2	158° 56'.9	03'.5	158° 09'.6	23'.8	167° 51'.1	19'.4	2° 07'.1	52'.1
22	208° 12'.7	173° 56'.5	04'.6	173° 10'.2	24'.5	182° 53'.0	19'.6	17° 09'.6	52'.1
23	223° 15'.2	188° 56'.0	05'.6	188° 10'.9	25'.1	197° 54'.9	19'.8	32° 12'.2	52'.1
21 Saturday 00	238° 17'.6	203° 55'.6	12° 06'.6 N	203° 11'.5	13° 25'.7 N	212° 56'.9	9° 20'.0 N	47° 14'.7	1° 52'.0 S
01	253° 20'.1	218° 55'.1	07'.7	218° 12'.2	26'.4	227° 58'.8	20'.2	62° 17'.3	52'.0
02	268° 22'.6	233° 54'.7	08'.7	233° 12'.9	27'.0	243° 00'.8	20'.4	77° 19'.8	52'.0
03	283° 25'.0	248° 54'.2	09'.7	248° 13'.5	27'.6	258° 02'.7	20'.6	92° 22'.4	51'.9
04	298° 27'.5	263° 53'.7	10'.8	263° 14'.2	28'.2	273° 04'.6	20'.8	107° 24'.9	51'.9
05	313° 29'.9	278° 53'.3	11'.8	278° 14'.9	28'.9	288° 06'.6	21'.0	122° 27'.5	51'.9
06	328° 32'.4	293° 52'.8	12'.8	293° 15'.5	29'.5	303° 08'.5	21'.2	137° 30'.0	51'.9
07	343° 34'.9	308° 52'.4	13'.9	308° 16'.2	30'.1	318° 10'.5	21'.4	152° 32'.6	51'.8
08	358° 37'.3	323° 51'.9	14'.9	323° 16'.8	30'.8	333° 12'.4	21'.6	167° 35'.2	51'.8
09	13° 39'.8	338° 51'.5	15'.9	338° 17'.5	31'.4	348° 14'.3	21'.8	182° 37'.7	51'.8
10	28° 42'.3	353° 51'.0	17'.0	353° 18'.2	32'.0	3° 16'.3	21'.9	197° 40'.3	51'.7
11	43° 44'.7	8° 50'.5	18'.0	8° 18'.8	32'.6	18° 18'.2	22'.1	212° 42'.8	51'.7
12	58° 47'.2	23° 50'.1	12° 19'.0 N	23° 19'.5	13° 33'.3 N	33° 20'.2	9° 22'.3 N	227° 45'.4	1° 51'.7 S
13	73° 49'.7	38° 49'.6	20'.1	38° 20'.2	33'.9	48° 22'.1	22'.5	242° 47'.9	51'.7
14	88° 52'.1	53° 49'.2	21'.1	53° 20'.8	34'.5	63° 24'.0	22'.7	257° 50'.5	51'.6
15	103° 54'.6	68° 48'.7	22'.1	68° 21'.5	35'.1	78° 26'.0	22'.9	272° 53'.0	51'.6
16	118° 57'.0	83° 48'.3	23'.2	83° 22'.1	35'.8	93° 27'.9	23'.1	287° 55'.6	51'.6
17	133° 59'.5	98° 47'.8	24'.2	98° 22'.8	36'.4	108° 29'.9	23'.3	302° 58'.1	51'.5
18	149° 02'.0	113° 47'.3	25'.2	113° 23'.5	37'.0	123° 31'.8	23'.5	318° 00'.7	51'.5
19	164° 04'.4	128° 46'.9	26'.2	128° 24'.1	37'.6	138° 33'.8	23'.7	333° 03'.2	51'.5
20	179° 06'.9	143° 46'.4	27'.3	143° 24'.8	38'.3	153° 35'.7	23'.9	348° 05'.8	51'.5
21	194° 09'.4	158° 45'.9	28'.3	158° 25'.4	38'.9	168° 37'.6	24'.1	3° 08'.3	51'.4
22	209° 11'.8	173° 45'.5	29'.3	173° 26'.1	39'.5	183° 39'.6	24'.3	18° 10'.9	51'.4
23	224° 14'.3	188° 45'.0	30'.3	188° 26'.8	40'.1	198° 41'.5	24'.5	33° 13'.4	51'.4
	M.P. 08:05	v -0'.4	d 1'.0	v 0'.7	d 0'.6	v 1'.9	d 0'.2	v 2'.6	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.9	40° 15'.5 S
Achernar	335° 28'.3	57° 10'.5 S
Acrux	173° 10'.7	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.8 N
Alioth	166° 21'.5	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.5	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.3	29° 09'.1 N
Altair	62° 09'.5	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.4	69° 02'.8 S
Avior	234° 19'.0	59° 33'.2 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.3	52° 42'.4 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.3 S
Dubhe	193° 53'.2	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.4	51° 29'.1 N
Enif	33° 48'.6	9° 55'.6 N
Fomalhaut	15° 25'.7	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.4	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.5 N
Markab	13° 39'.9	15° 16'.0 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.3	69° 46'.3 S
Mirfak	308° 43'.0	49° 54'.0 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.6 S
Polaris	318° 56'.5	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.1	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.7	56° 35'.8 N
Shaula	96° 23'.6	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.7	43° 29'.1 S
Vega	80° 39'.6	38° 47'.5 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	326° 47'.9	10:24
Mars	325° 37'.1	10:28
Jupiter	334° 51'.9	09:50
Saturn	168° 54'.9	20:52

SUN				MOON					
GHA	Dec			GHA	v	Dec	d	HP	
180° 53'.4	19° 38'.7 N			339° 07'.9	5'.0	23° 24'.0 S	0'.2	59'.1	
195° 53'.3	39'.3			353° 31'.9	5'.0	23'.8	0'.3	59'.0	
210° 53'.3	39'.8			7° 55'.9	5'.1	23'.5	0'.5		
225° 53'.3	40'.4			22° 20'.0	5'.1	23'.0	0'.6		
240° 53'.3	40'.9			36° 44'.1	5'.2	22'.4	0'.8	58'.9	
255° 53'.2	41'.4			51° 08'.3	5'.2	21'.6	1'.0		
270° 53'.2	42'.0			65° 32'.5	5'.3	20'.6	1'.1		
285° 53'.2	42'.5			79° 56'.8	5'.4	19'.5	1'.2	58'.8	
300° 53'.2	43'.1			94° 21'.2	5'.4	18'.3	1'.4		
315° 53'.1	43'.6			108° 45'.6	5'.5	16'.9	1'.6		
330° 53'.1	44'.1			123° 10'.1	5'.5	15'.3	1'.7	58'.7	
345° 53'.1	44'.7			137° 34'.6	5'.6	13'.6	1'.9		
0° 53'.0	19° 45'.2 N			151° 59'.2	5'.6	23° 11'.7 S	2'.0	58'.7	
15° 53'.0	45'.7			166° 23'.8	5'.7	09'.7	2'.1	58'.6	
30° 53'.0	46'.3			180° 48'.5	5'.8	07'.6	2'.3		
45° 53'.0	46'.8			195° 13'.3	5'.9	05'.3	2'.5	58'.5	
60° 52'.9	47'.4			209° 38'.2	5'.9	02'.8	2'.5		
75° 52'.9	47'.9			224° 03'.1	6'.0	00'.3	2'.8		
90° 52'.9	48'.4			238° 28'.1	6'.1	22° 57'.5 S	2'.9	58'.4	
105° 52'.8	49'.0			252° 53'.2	6'.1	54'.6	3'.0		
120° 52'.8	49'.5			267° 18'.3	6'.3	51'.6	3'.1		
135° 52'.8	50'.0			281° 43'.6	6'.3	48'.5	3'.3	58'.3	
150° 52'.7	50'.5			296° 08'.9	6'.4	45'.2	3'.5		
165° 52'.7	51'.1			310° 34'.3	6'.4	41'.7	3'.5		
180° 52'.7	19° 51'.6 N			324° 59'.7	6'.6	22° 38'.2 S	3'.8	58'.2	
195° 52'.7	52'.1			339° 25'.3	6'.6	34'.4	3'.8		
210° 52'.6	52'.7			353° 50'.9	6'.7	30'.6	4'.0		
225° 52'.6	53'.2			8° 16'.6	6'.8	26'.6	4'.1	58'.1	
240° 52'.6	53'.7			22° 42'.4	6'.8	22'.5	4'.3		
255° 52'.5	54'.2			37° 08'.2	7'.0	18'.2	4'.3		
270° 52'.5	54'.8			51° 34'.2	7'.1	13'.9	4'.5	58'.0	
285° 52'.5	55'.3			66° 00'.3	7'.1	09'.4	4'.7		
300° 52'.4	55'.8			80° 26'.4	7'.2	04'.7	4'.7	57'.9	
315° 52'.4	56'.3			94° 52'.6	7'.3	22° 00'.0 S	4'.9		
330° 52'.4	56'.9			109° 18'.9	7'.4	55'.1	5'.0		
345° 52'.3	57'.4			123° 45'.3	7'.5	50'.1	5'.2	57'.8	
0° 52'.3	19° 57'.9 N			138° 11'.8	7'.6	21° 44'.9 S	5'.2	57'.8	
15° 52'.3	58'.4			152° 38'.4	7'.7	39'.7	5'.4		
30° 52'.2	59'.0			167° 05'.1	7'.7	34'.3	5'.5	57'.7	
45° 52'.2	59'.5			181° 31'.8	7'.9	28'.8	5'.6		
60° 52'.2	00'.0			195° 58'.7	8'.0	23'.2	5'.8		
75° 52'.1	20° 00'.5 N			210° 25'.7	8'.0	17'.4	5'.8	57'.6	
90° 52'.1	01'.0			224° 52'.7	8'.2	11'.6	6'.0		
105° 52'.0	01'.6			239° 19'.9	8'.2	05'.6	6'.1	57'.5	
120° 52'.0	02'.1			253° 47'.1	8'.3	20° 59'.5 S	6'.2		
135° 52'.0	02'.6			268° 14'.4	8'.5	53'.3	6'.3		
150° 51'.9	03'.1			282° 41'.9	8'.5	47'.0	6'.4	57'.4	
165° 51'.9	03'.6			297° 09'.4	8'.6	40'.6	6'.5		
180° 51'.9	20° 04'.1 N			311° 37'.0	8'.7	20° 34'.1 S	6'.7	57'.4	
195° 51'.8	04'.7			326° 04'.7	8'.8	27'.4	6'.7	57'.3	
210° 51'.8	05'.2			340° 32'.5	9'.0	20'.7	6'.8		
225° 51'.7	05'.7			355° 00'.5	9'.0	13'.9	7'.0		
240° 51'.7	06'.2			9° 28'.5	9'.1	06'.9	7'.0	57'.2	
255° 51'.7	06'.7			23° 56'.6	9'.2	19° 59'.9 S	7'.2		
270° 51'.6	07'.2			38° 24'.8	9'.3	52'.7	7'.2	57'.1	
285° 51'.6	07'.7			52° 53'.1	9'.4	45'.5	7'.4		
300° 51'.6	08'.2			67° 21'.5	9'.5	38'.1	7'.4		
315° 51'.5	08'.8			81° 50'.0	9'.6	30'.7	7'.6	57'.0	
330° 51'.5	09'.3			96° 18'.6	9'.7	23'.1	7'.6		
345° 51'.4	09'.8			110° 47'.3	9'.8	15'.5	7'.7		
0° 51'.4	20° 10'.3 N			125° 16'.1	9'.9	19° 07'.8 S	7'.8	56'.9	
15° 51'.4	10'.8			139° 45'.0	10'.0	19° 00'.0 S	7'.9		
30° 51'.3	11'.3			154° 14'.0	10'.0	52'.1	8'.0		
45° 51'.3	11'.8			168° 43'.0	10'.2	44'.1	8'.1	56'.8	
60° 51'.2	12'.3			183° 12'.2	10'.3	36'.0	8'.2		
75° 51'.2	12'.8			197° 41'.5	10'.4	27'.8	8'.2		
90° 51'.2	13'.3			212° 10'.9	10'.4	19'.6	8'.4	56'.7	
105° 51'.1	13'.8			226° 40'.3	10'.6	11'.2	8'.4		
120° 51'.1	14'.3			241° 09'.9	10'.6	02'.8	8'.5	56'.6	
135° 51'.0	14'.8			255° 39'.5	10'.8	17° 54'.3 S	8'.6		
150° 51'.0	15'.3			270° 09'.3	10'.8	45'.7	8'.6		
165° 50'.9	15'.8			284° 39'.1	11'.0	37'.1	8'.8	56'.5	
SD 15'.8	d 0'.5			SD	16'.0	15'.7	15'.5		

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 19	Moonrise 20	Moonrise 21
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	01:19	-	-	01:48
66°	-	-	02:04	00:38	01:03	01:06
64°	-	00:21	02:33	-	00:18	00:37
62°	-	01:31	02:55	23:48	-	00:15
60°	-	02:04	03:12	23:26	23:57	24:17
N 58°	00:19	02:28	03:27	23:08	23:42	24:06
56°	01:22	02:47	03:39	22:52	23:29	23:56
54°	01:53	03:03	03:50	22:39	23:18	23:47
52°	02:15	03:16	04:00	22:27	23:08	23:39
50°	02:33	03:28	04:08	22:17	22:59	23:32
45°	03:07	03:51	04:26	21:55	22:40	23:17
N 40°	03:31	04:10	04:41	21:38	22:25	23:04
35°	03:50	04:25	04:53	21:23	22:12	22:53
30°	04:06	04:38	05:04	21:10	22:01	22:44
20°	04:30	04:59	05:22	20:49	21:41	22:28
N 10°	04:49	05:16	05:38	20:30	21:24	22:13
0°	05:05	05:31	05:53	20:12	21:08	22:00
S 10°	05:20	05:45	06:08	19:54	20:52	21:46
20°	05:33	06:00	06:23	19:35	20:35	21:32
30°	05:46	06:15	06:41	19:13	20:15	21:16
35°	05:53	06:24	06:51	19:00	20:03	21:06
40°	06:00	06:33	07:02	18:46	19:50	20:55
45°	06:08	06:44	07:16	18:28	19:34	20:42
S 50°	06:17	06:57	07:33	18:06	19:15	20:26
52°	06:21	07:02	07:41	17:56	19:06	20:19
54°	06:25	07:09	07:49	17:44	18:55	20:10
56°	06:29	07:16	07:59	17:31	18:44	20:01
58°	06:34	07:23	08:10	17:15	18:30	19:50
S 60°	06:39	07:32	08:23	16:56	18:14	19:38
S 62°	06:45	07:42	08:38	16:33	17:55	19:23

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 19	Moonset 20	Moonset 21
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	22:40	-	-	-	-	05:04
66°	21:53	-	-	02:17	03:54	05:46
64°	21:23	-	-	03:18	04:39	06:14
62°	21:00	22:26	-	03:53	05:08	06:35
60°	20:43	21:51	-	04:18	05:30	06:53
N 58°	20:28	21:27	-	04:38	05:48	07:07
56°	20:15	21:07	22:35	04:54	06:03	07:20
54°	20:04	20:51	22:03	05:09	06:16	07:30
52°	19:54	20:38	21:40	05:21	06:28	07:40
50°	19:46	20:26	21:21	05:32	06:38	07:48
45°	19:27	20:02	20:47	05:54	06:59	08:06
N 40°	19:13	19:44	20:23	06:13	07:16	08:21
35°	19:00	19:29	20:03	06:28	07:30	08:33
30°	18:49	19:16	19:48	06:41	07:43	08:44
20°	18:31	18:55	19:23	07:04	08:04	09:03
N 10°	18:15	18:37	19:04	07:23	08:22	09:18
0°	18:00	18:22	18:48	07:41	08:39	09:33
S 10°	17:45	18:08	18:33	07:59	08:56	09:48
20°	17:30	17:53	18:20	08:19	09:14	10:04
30°	17:12	17:38	18:07	08:41	09:35	10:22
35°	17:02	17:29	18:00	08:54	09:47	10:32
40°	16:50	17:20	17:53	09:09	10:01	10:44
45°	16:36	17:09	17:45	09:27	10:17	10:58
S 50°	16:20	16:56	17:36	09:49	10:37	11:15
52°	16:12	16:50	17:32	10:00	10:47	11:23
54°	16:03	16:44	17:28	10:11	10:58	11:31
56°	15:53	16:37	17:23	10:25	11:10	11:41
58°	15:42	16:29	17:18	10:41	11:24	11:52
S 60°	15:29	16:20	17:13	11:00	11:40	12:05
S 62°	15:14	16:10	17:07	11:23	12:00	12:21

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
19	3 34	3 32	11:56	01:27	13:57	16d 95%
20	3 31	3 29	11:57	02:26	14:54	17d 88%
21	3 28	3 26	11:57	03:21	15:47	18d 81%

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2011 May 22, 23, 24 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
22 Sunday 00	239° 16'.8	203° 44'.6	12° 31'.4 N	203° 27'.4	13° 40'.8 N	213° 43'.5	9° 24'.7 N	48° 16'.0	1° 51'.4 S
01	254° 19'.2	218° 44'.1	32'.4	218° 28'.1	41'.4	228° 45'.4	24'.9	63° 18'.5	51'.3
02	269° 21'.7	233° 43'.6	33'.4	233° 28'.7	42'.0	243° 47'.3	25'.1	78° 21'.1	51'.3
03	284° 24'.2	248° 43'.2	34'.4	248° 29'.4	42'.6	258° 49'.3	25'.3	93° 23'.6	51'.3
04	299° 26'.6	263° 42'.7	35'.5	263° 30'.1	43'.3	273° 51'.2	25'.5	108° 26'.2	51'.2
05	314° 29'.1	278° 42'.2	36'.5	278° 30'.7	43'.9	288° 53'.2	25'.7	123° 28'.7	51'.2
06	329° 31'.5	293° 41'.8	37'.5	293° 31'.4	44'.5	303° 55'.1	25'.8	138° 31'.3	51'.2
07	344° 34'.0	308° 41'.3	38'.5	308° 32'.0	45'.1	318° 57'.1	26'.0	153° 33'.8	51'.2
08	359° 36'.5	323° 40'.8	39'.6	323° 32'.7	45'.7	333° 59'.0	26'.2	168° 36'.4	51'.1
09	14° 38'.9	338° 40'.4	40'.6	338° 33'.4	46'.4	349° 00'.9	26'.4	183° 38'.9	51'.1
10	29° 41'.4	353° 39'.9	41'.6	353° 34'.0	47'.0	4° 02'.9	26'.6	198° 41'.5	51'.1
11	44° 43'.9	8° 39'.4	42'.6	8° 34'.7	47'.6	19° 04'.8	26'.8	213° 44'.0	51'.1
12	59° 46'.3	23° 39'.0	12° 43'.6 N	23° 35'.3	13° 48'.2 N	34° 06'.8	9° 27'.0 N	228° 46'.6	1° 51'.0 S
13	74° 48'.8	38° 38'.5	44'.7	38° 36'.0	48'.8	49° 08'.7	27'.2	243° 49'.1	51'.0
14	89° 51'.3	53° 38'.0	45'.7	53° 36'.7	49'.5	64° 10'.7	27'.4	258° 51'.7	51'.0
15	104° 53'.7	68° 37'.6	46'.7	68° 37'.3	50'.1	79° 12'.6	27'.6	273° 54'.2	51'.0
16	119° 56'.2	83° 37'.1	47'.7	83° 38'.0	50'.7	94° 14'.5	27'.8	288° 56'.8	50'.9
17	134° 58'.7	98° 36'.6	48'.7	98° 38'.6	51'.3	109° 16'.5	28'.0	303° 59'.3	50'.9
18	150° 01'.1	113° 36'.2	49'.7	113° 39'.3	51'.9	124° 18'.4	28'.2	319° 01'.9	50'.9
19	165° 03'.6	128° 35'.7	50'.8	128° 40'.0	52'.6	139° 20'.4	28'.4	334° 04'.4	50'.8
20	180° 06'.0	143° 35'.2	51'.8	143° 40'.6	53'.2	154° 22'.3	28'.6	349° 07'.0	50'.8
21	195° 08'.5	158° 34'.7	52'.8	158° 41'.3	53'.8	169° 24'.3	28'.8	4° 09'.5	50'.8
22	210° 11'.0	173° 34'.3	53'.8	173° 41'.9	54'.4	184° 26'.2	28'.9	19° 12'.1	50'.8
23	225° 13'.4	188° 33'.8	54'.8	188° 42'.6	55'.0	199° 28'.1	29'.1	34° 14'.6	50'.7
23 Monday 00	240° 15'.9	203° 33'.3	12° 55'.8 N	203° 43'.3	13° 55'.7 N	214° 30'.1	9° 29'.3 N	49° 17'.1	1° 50'.7 S
01	255° 18'.4	218° 32'.9	56'.8	218° 43'.9	56'.3	229° 32'.0	29'.5	64° 19'.7	50'.7
02	270° 20'.8	233° 32'.4	57'.9	233° 44'.6	56'.9	244° 34'.0	29'.7	79° 22'.2	50'.7
03	285° 23'.3	248° 31'.9	58'.9	248° 45'.2	57'.5	259° 35'.9	29'.9	94° 24'.8	50'.6
04	300° 25'.8	263° 31'.4	59'.9	263° 45'.9	58'.1	274° 37'.9	30'.1	109° 27'.3	50'.6
05	315° 28'.2	278° 31'.0	13° 00'.9 N	278° 46'.6	58'.7	289° 39'.8	30'.3	124° 29'.9	50'.6
06	330° 30'.7	293° 30'.5	01'.9	293° 47'.2	59'.4	304° 41'.8	30'.5	139° 32'.4	50'.6
07	345° 33'.2	308° 30'.0	02'.9	308° 47'.9	14° 00'.0 N	319° 43'.7	30'.7	154° 35'.0	50'.5
08	0° 35'.6	323° 29'.5	03'.9	323° 48'.5	00'.6	334° 45'.6	30'.9	169° 37'.5	50'.5
09	15° 38'.1	338° 29'.1	04'.9	338° 49'.2	01'.2	349° 47'.6	31'.1	184° 40'.1	50'.5
10	30° 40'.5	353° 28'.6	05'.9	353° 49'.8	01'.8	4° 49'.5	31'.3	199° 42'.6	50'.5
11	45° 43'.0	8° 28'.1	06'.9	8° 50'.5	02'.4	19° 51'.5	31'.5	214° 45'.2	50'.4
12	60° 45'.5	23° 27'.6	13° 08'.0 N	23° 51'.2	14° 03'.0 N	34° 53'.4	9° 31'.7 N	229° 47'.7	1° 50'.4 S
13	75° 47'.9	38° 27'.1	09'.0	38° 51'.8	03'.7	49° 55'.4	31'.8	244° 50'.2	50'.4
14	90° 50'.4	53° 26'.7	10'.0	53° 52'.5	04'.3	64° 57'.3	32'.0	259° 52'.8	50'.4
15	105° 52'.9	68° 26'.2	11'.0	68° 53'.1	04'.9	79° 59'.3	32'.2	274° 55'.3	50'.3
16	120° 55'.3	83° 25'.7	12'.0	83° 53'.8	05'.5	95° 01'.2	32'.4	289° 57'.9	50'.3
17	135° 57'.8	98° 25'.2	13'.0	98° 54'.4	06'.1	110° 03'.1	32'.6	305° 00'.4	50'.3
18	151° 00'.3	113° 24'.7	14'.0	113° 55'.1	06'.7	125° 05'.1	32'.8	320° 03'.0	50'.3
19	166° 02'.7	128° 24'.3	15'.0	128° 55'.8	07'.3	140° 07'.0	33'.0	335° 05'.5	50'.2
20	181° 05'.2	143° 23'.8	16'.0	143° 56'.4	08'.0	155° 09'.0	33'.2	350° 08'.1	50'.2
21	196° 07'.6	158° 23'.3	17'.0	158° 57'.1	08'.6	170° 10'.9	33'.4	5° 10'.6	50'.2
22	211° 10'.1	173° 22'.8	18'.0	173° 57'.7	09'.2	185° 12'.9	33'.6	20° 13'.2	50'.2
23	226° 12'.6	188° 22'.3	19'.0	188° 58'.4	09'.8	200° 14'.8	33'.8	35° 15'.7	50'.1
24 Tuesday 00	241° 15'.0	203° 21'.9	13° 20'.0 N	203° 59'.1	14° 10'.4 N	215° 16'.8	9° 34'.0 N	50° 18'.2	1° 50'.1 S
01	256° 17'.5	218° 21'.4	21'.0	218° 59'.7	11'.0	230° 18'.7	34'.2	65° 20'.8	50'.1
02	271° 20'.0	233° 20'.9	22'.0	234° 00'.4	11'.6	245° 20'.7	34'.3	80° 23'.3	50'.1
03	286° 22'.4	248° 20'.4	23'.0	249° 01'.0	12'.2	260° 22'.6	34'.5	95° 25'.9	50'.1
04	301° 24'.9	263° 19'.9	24'.0	264° 01'.7	12'.8	275° 24'.6	34'.7	110° 28'.4	50'.0
05	316° 27'.4	278° 19'.4	25'.0	279° 02'.3	13'.5	290° 26'.5	34'.9	125° 31'.0	50'.0
06	331° 29'.8	293° 18'.9	26'.0	294° 03'.0	14'.1	305° 28'.4	35'.1	140° 33'.5	50'.0
07	346° 32'.3	308° 18'.5	27'.0	309° 03'.6	14'.7	320° 30'.4	35'.3	155° 36'.0	50'.0
08	1° 34'.8	323° 18'.0	28'.0	324° 04'.3	15'.3	335° 32'.3	35'.5	170° 38'.6	49'.9
09	16° 37'.2	338° 17'.5	29'.0	339° 05'.0	15'.9	350° 34'.3	35'.7	185° 41'.1	49'.9
10	31° 39'.7	353° 17'.0	30'.0	354° 05'.6	16'.5	5° 36'.2	35'.9	200° 43'.7	49'.9
11	46° 42'.1	8° 16'.5	31'.0	9° 06'.3	17'.1	20° 38'.2	36'.1	215° 46'.2	49'.9
12	61° 44'.6	23° 16'.0	13° 32'.0 N	24° 06'.9	14° 17'.7 N	35° 40'.1	9° 36'.3 N	230° 48'.8	1° 49'.8 S
13	76° 47'.1	38° 15'.5	33'.0	39° 07'.6	18'.3	50° 42'.1	36'.5	245° 51'.3	49'.8
14	91° 49'.5	53° 15'.1	34'.0	54° 08'.2	18'.9	65° 44'.0	36'.6	260° 53'.8	49'.8
15	106° 52'.0	68° 14'.6	35'.0	69° 08'.9	19'.5	80° 46'.0	36'.8	275° 56'.4	49'.8
16	121° 54'.5	83° 14'.1	35'.9	84° 09'.6	20'.1	95° 47'.9	37'.0	290° 58'.9	49'.7
17	136° 56'.9	98° 13'.6	36'.9	99° 10'.2	20'.8	110° 49'.9	37'.2	306° 01'.5	49'.7
18	151° 59'.4	113° 13'.1	37'.9	114° 10'.9	21'.4	125° 51'.8	37'.4	321° 04'.0	49'.7
19	167° 01'.9	128° 12'.6	38'.9	129° 11'.5	22'.0	140° 53'.8	37'.6	336° 06'.5	49'.7
20	182° 04'.3	143° 12'.1	39'.9	144° 12'.2	22'.6	155° 55'.7	37'.8	351° 09'.1	49'.7
21	197° 06'.8	158° 11'.6	40'.9	159° 12'.8	23'.2	170° 57'.6	38'.0	6° 11'.6	49'.6
22	212° 09'.3	173° 11'.1	41'.9	174° 13'.5	23'.8	185° 59'.6	38'.2	21° 14'.2	49'.6
23	227° 11'.7	188° 10'.6	42'.9	189° 14'.1	24'.4	201° 01'.5	38'.4	36° 16'.7	49'.6
	M.P. 07:54	v -0'.5	d 1'.0	v 0'.7	d 0'.6	v 1'.9	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.5 S
Achernar	335° 28'.3	57° 10'.5 S
Acrux	173° 10'.7	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.5	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.5	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.2	29° 09'.1 N
Altair	62° 09'.5	8° 53'.9 N
Ankaa	353° 17'.4	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.3	69° 02'.8 S
Avior	234° 19'.0	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.3	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.6	17° 55'.3 S
Dubhe	193° 53'.3	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.3	51° 29'.1 N
Enif	33° 48'.5	9° 55'.6 N
Fomalhaut	15° 25'.6	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.8	23° 30'.9 N
Kaus Aust.	83° 45'.4	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.6 N
Markab	13° 39'.9	15° 16'.0 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.4	69° 46'.3 S
Mirfak	308° 43'.0	49° 54'.0 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.6 S
Polaris	318° 56'.0	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.1	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.6	56° 35'.8 N
Shaula	96° 23'.5	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.7	43° 29'.1 S
Vega	80° 39'.6	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	323° 17'.4	10:26
Mars	323° 27'.4	10:25
Jupiter	334° 14'.2	09:41
Saturn	169° 01'.2	20:39

SUN				
GHA		Dec		
180° 50'.9	20° 16'.3 N	299° 09'.1	11'.0	17° 28'.3 S
195° 50'.9	16'.8	313° 39'.1	11'.2	19'.5
210° 50'.8	17'.3	328° 09'.3	11'.2	10'.6
225° 50'.8	17'.8	342° 39'.5	11'.3	01'.6
240° 50'.7	18'.3	357° 09'.8	11'.4	16° 52'.6 S
255° 50'.7	18'.8	11° 40'.2	11'.5	43'.5
270° 50'.6	19'.3	26° 10'.7	11'.6	34'.3
285° 50'.6	19'.8	40° 41'.3	11'.6	25'.0
300° 50'.5	20'.3	55° 11'.9	11'.8	15'.7
315° 50'.5	20'.8	69° 42'.7	11'.9	06'.3
330° 50'.5	21'.3	84° 13'.6	11'.9	15° 56'.9 S
345° 50'.4	21'.8	98° 44'.5	12'.0	47'.3
0° 50'.4	20° 22'.3 N	113° 15'.5	12'.2	15° 37'.8 S
15° 50'.3	22'.8	127° 46'.7	12'.2	28'.1
30° 50'.3	23'.3	142° 17'.9	12'.3	18'.4
45° 50'.2	23'.8	156° 49'.2	12'.3	08'.6
60° 50'.2	24'.3	171° 20'.5	12'.5	14° 58'.8 S
75° 50'.1	24'.8	185° 52'.0	12'.5	48'.9
90° 50'.1	25'.2	200° 23'.5	12'.7	39'.0
105° 50'.0	25'.7	214° 55'.2	12'.7	29'.0
120° 50'.0	26'.2	229° 26'.9	12'.7	18'.9
135° 49'.9	26'.7	243° 58'.6	12'.9	08'.8
150° 49'.9	27'.2	258° 30'.5	13'.0	13° 58'.6 S
165° 49'.9	27'.7	273° 02'.5	13'.0	48'.4
180° 49'.8	20° 28'.2 N	287° 34'.5	13'.1	13° 38'.1 S
195° 49'.8	28'.7	302° 06'.6	13'.2	27'.8
210° 49'.7	29'.1	316° 38'.8	13'.2	17'.5
225° 49'.7	29'.6	331° 11'.0	13'.4	07'.0
240° 49'.6	30'.1	345° 43'.4	13'.4	12° 56'.6 S
255° 49'.6	30'.6	0° 15'.8	13'.5	46'.1
270° 49'.5	31'.1	14° 48'.3	13'.5	35'.5
285° 49'.5	31'.6	29° 20'.8	13'.6	24'.9
300° 49'.4	32'.0	43° 53'.4	13'.7	14'.3
315° 49'.4	32'.5	58° 26'.1	13'.8	03'.6
330° 49'.3	33'.0	72° 58'.9	13'.8	11° 52'.9 S
345° 49'.3	33'.5	87° 31'.7	13'.9	42'.1
0° 49'.2	20° 34'.0 N	102° 04'.6	14'.0	11° 31'.3 S
15° 49'.2	34'.4	116° 37'.6	14'.1	20'.4
30° 49'.1	34'.9	131° 10'.7	14'.1	09'.6
45° 49'.0	35'.4	145° 43'.8	14'.1	10° 58'.6 S
60° 49'.0	35'.9	160° 16'.9	14'.3	47'.7
75° 48'.9	36'.4	174° 50'.2	14'.3	36'.7
90° 48'.9	36'.8	189° 23'.5	14'.3	25'.7
105° 48'.8	37'.3	203° 56'.8	14'.4	14'.6
120° 48'.8	37'.8	218° 30'.2	14'.5	03'.5
135° 48'.7	38'.3	233° 03'.7	14'.6	9° 52'.4 S
150° 48'.7	38'.7	247° 37'.3	14'.6	41'.2
165° 48'.6	39'.2	262° 10'.9	14'.6	30'.0
180° 48'.6	20° 39'.7 N	276° 44'.5	14'.7	9° 18'.8 S
195° 48'.5	40'.1	291° 18'.2	14'.8	07'.6
210° 48'.5	40'.6	305° 52'.0	14'.8	8° 56'.3 S
225° 48'.4	41'.1	320° 25'.8	14'.9	45'.0
240° 48'.4	41'.5	334° 59'.7	14'.9	33'.7
255° 48'.3	42'.0	349° 33'.6	15'.0	22'.3
270° 48'.2	42'.5	4° 07'.6	15'.0	11'.0
285° 48'.2	43'.0	18° 41'.6	15'.1	7° 59'.6 S
300° 48'.1	43'.4	33° 15'.7	15'.1	48'.1
315° 48'.1	43'.9	47° 49'.8	15'.2	36'.7
330° 48'.0	44'.4	62° 24'.0	15'.2	25'.2
345° 48'.0	44'.8	76° 58'.2	15'.3	13'.7
0° 47'.9	20° 45'.3 N	91° 32'.5	15'.3	7° 02'.2 S
15° 47'.8	45'.7	106° 06'.8	15'.3	6° 50'.7 S
30° 47'.8	46'.2	120° 41'.1	15'.4	39'.2
45° 47'.7	46'.7	135° 15'.5	15'.5	27'.6
60° 47'.7	47'.1	149° 50'.0	15'.4	16'.0
75° 47'.6	47'.6	164° 24'.4	15'.6	04'.4
90° 47'.6	48'.1	178° 59'.0	15'.5	5° 52'.8 S
105° 47'.5	48'.5	193° 33'.5	15'.6	41'.2
120° 47'.4	49'.0	208° 08'.1	15'.6	29'.5
135° 47'.4	49'.4	222° 42'.7	15'.7	17'.9
150° 47'.3	49'.9	237° 17'.4	15'.7	06'.2
165° 47'.3	50'.3	251° 52'.1	15'.7	4° 54'.5 S
SD 15'.8	d 0'.5	SD	15'.3	15'.1

MOON					
GHA	v	Dec	d	HP	
299° 09'.1	11'.0	17° 28'.3 S	8'.8	56'.5	
313° 39'.1	11'.2	19'.5	8'.9		
328° 09'.3	11'.2	10'.6	9'.0	56'.4	
342° 39'.5	11'.3	01'.6	9'.0		
357° 09'.8	11'.4	16° 52'.6 S	9'.1		
11° 40'.2	11'.5	43'.5	9'.2	56'.3	
26° 10'.7	11'.6	34'.3	9'.3		
40° 41'.3	11'.6	25'.0	9'.3		
55° 11'.9	11'.8	15'.7	9'.4	56'.2	
69° 42'.7	11'.9	06'.3	9'.4		
84° 13'.6	11'.9	15° 56'.9 S	9'.6		
98° 44'.5	12'.0	47'.3	9'.5	56'.1	
113° 15'.5	12'.2	15° 37'.8 S	9'.7	56'.1	
127° 46'.7	12'.2	28'.1	9'.7		
142° 17'.9	12'.3	18'.4	9'.8		
156° 49'.2	12'.3	08'.6	9'.8	56'.0	
171° 20'.5	12'.5	14° 58'.8 S	9'.9		
185° 52'.0	12'.5	48'.9	9'.9		
200° 23'.5	12'.7	39'.0	10'.0	55'.9	
214° 55'.2	12'.7	29'.0	10'.1		
229° 26'.9	12'.7	18'.9	10'.1		
243° 58'.6	12'.9	08'.8	10'.2	55'.8	
258° 30'.5	13'.0	13° 58'.6 S	10'.2		
273° 02'.5	13'.0	48'.4	10'.3		
287° 34'.5	13'.1	13° 38'.1 S	10'.3	55'.7	
302° 06'.6	13'.2	27'.8	10'.3		
316° 38'.8	13'.2	17'.5	10'.5		
331° 11'.0	13'.4	07'.0	10'.4		
345° 43'.4	13'.4	12° 56'.6 S	10'.5	55'.6	
0° 15'.8	13'.5	46'.1	10'.6		
14° 48'.3	13'.5	35'.5	10'.6		
29° 20'.8	13'.6	24'.9	10'.6	55'.5	
43° 53'.4	13'.7	14'.3	10'.7		
58° 26'.1	13'.8	03'.6	10'.7		
72° 58'.9	13'.8	11° 52'.9 S	10'.8		
87° 31'.7	13'.9	42'.1	10'.8	55'.4	
102° 04'.6	14'.0	11° 31'.3 S	10'.9	55'.4	
116° 37'.6	14'.1	20'.4	10'.8		
131° 10'.7	14'.1	09'.6	11'.0		
145° 43'.8	14'.1	10° 58'.6 S	10'.9	55'.3	
160° 16'.9	14'.3	47'.7	11'.0		
174° 50'.2	14'.3	36'.7	11'.0		
189° 23'.5	14'.3	25'.7	11'.1		
203° 56'.8	14'.4	14'.6	11'.1	55'.2	
218° 30'.2	14'.5	03'.5	11'.1		
233° 03'.7	14'.6	9° 52'.4 S	11'.2		
247° 37'.3	14'.6	41'.2	11'.2		
262° 10'.9	14'.6	30'.0	11'.2	55'.1	
276° 44'.5	14'.7	9° 18'.8 S	11'.2	55'.1	
291° 18'.2	14'.8	07'.6	11'.3		
305° 52'.0	14'.8	8° 56'.3 S	11'.3		
320° 25'.8	14'.9	45'.0	11'.3	55'.0	
334° 59'.7	14'.9	33'.7	11'.4		
349° 33'.6	15'.0	22'.3	11'.3		
4° 07'.6	15'.0	11'.0	11'.4		
18° 41'.6	15'.1	7° 59'.6 S	11'.5	54'.9	
33° 15'.7	15'.1	48'.1	11'.4		
47° 49'.8	15'.2	36'.7	11'.5		
62° 24'.0	15'.2	25'.2	11'.5		
76° 58'.2	15'.3	13'.7	11'.5		
91° 32'.5	15'.3	7° 02'.2 S	11'.5	54'.8	
106° 06'.8	15'.3	6° 50'.7 S	11'.5		
120° 41'.1	15'.4	39'.2	11'.6		
135° 15'.5	15'.5	27'.6	11'.6		
149° 50'.0	15'.4	16'.0	11'.6		
164° 24'.4	15'.6	04'.4	11'.6	54'.7	
178° 59'.0	15'.5	5° 52'.8 S	11'.6		
193° 33'.5	15'.6	41'.2	11'.7		
208° 08'.1	15'.6	29'.5	11'.6		
222° 42'.7	15'.7	17'.9	11'.7		
237° 17'.4	15'.7	06'.2	11'.7		
251° 52'.1	15'.7	4° 54'.5 S	11'.7	54'.6	
SD	15'.3	15'.1	14'.9		

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 22	Moonrise 23	Moonrise 24
N 72°	-	-	-	02:56	02:02	01:34
N 70°	-	-	-	02:03	01:37	01:21
68°	-	-	00:57	01:29	01:18	01:10
66°	-	-	01:51	01:05	01:03	01:00
64°	-	-	02:24	00:46	00:50	00:53
62°	-	01:16	02:47	00:30	00:40	00:46
60°	-	01:55	03:06	00:17	00:30	00:40
N 58°	-	02:21	03:21	00:06	00:22	00:35
56°	01:09	02:41	03:34	-	00:15	00:30
54°	01:44	02:58	03:46	-	00:09	00:26
52°	02:09	03:12	03:56	-	00:03	00:22
50°	02:28	03:24	04:05	23:58	-	00:19
45°	03:03	03:48	04:23	23:46	-	00:12
N 40°	03:28	04:07	04:39	23:37	-	00:05
35°	03:48	04:23	04:51	23:29	24:00	24:28
30°	04:04	04:36	05:03	23:22	23:55	24:26
20°	04:29	04:58	05:22	23:09	23:47	24:22
N 10°	04:49	05:15	05:38	22:58	23:40	24:18
0°	05:05	05:31	05:53	22:48	23:33	24:15
S 10°	05:20	05:46	06:08	22:38	23:26	24:12
20°	05:34	06:01	06:24	22:27	23:18	24:08
30°	05:47	06:17	06:42	22:14	23:10	24:04
35°	05:55	06:26	06:53	22:07	23:05	24:01
40°	06:02	06:35	07:05	21:58	23:00	23:59
45°	06:11	06:47	07:19	21:48	22:53	23:56
S 50°	06:20	07:00	07:37	21:37	22:45	23:52
52°	06:24	07:06	07:45	21:31	22:42	23:50
54°	06:28	07:13	07:54	21:25	22:38	23:48
56°	06:33	07:20	08:04	21:18	22:33	23:46
58°	06:38	07:28	08:16	21:10	22:28	23:44
S 60°	06:44	07:37	08:29	21:02	22:23	23:41
S 62°	06:50	07:48	08:45	20:52	22:16	23:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 22	Moonset 23	Moonset 24
N 72°	-	-	-	05:44	08:16	10:16
N 70°	-	-	-	06:37	08:39	10:27
68°	23:05	-	-	07:09	08:57	10:36
66°	22:06	-	-	07:32	09:11	10:44
64°	21:32	-	-	07:50	09:23	10:50
62°	21:08	22:42	-	08:05	09:32	10:56
60°	20:49	22:01	-	08:18	09:41	11:01
N 58°	20:34	21:35	-	08:28	09:48	11:05
56°	20:20	21:14	22:49	08:38	09:54

2011 May 25, 26, 27 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
25 00	242° 14'.2	203° 10'.1	13° 43'.9 N	204° 14'.8	14° 25'.0 N	216° 03'.5	9° 38'.6 N	51° 19'.2	1° 49'.6 S
01	257° 16'.6	218° 09'.7	44'.9	219° 15'.5	25'.6	231° 05'.4	38'.7	66° 21'.8	49'.5
02	272° 19'.1	233° 09'.2	45'.8	234° 16'.1	26'.2	246° 07'.4	38'.9	81° 24'.3	49'.5
03	287° 21'.6	248° 08'.7	46'.8	249° 16'.8	26'.8	261° 09'.3	39'.1	96° 26'.9	49'.5
04	302° 24'.0	263° 08'.2	47'.8	264° 17'.4	27'.4	276° 11'.3	39'.3	111° 29'.4	49'.5
05	317° 26'.5	278° 07'.7	48'.8	279° 18'.1	28'.0	291° 13'.2	39'.5	126° 31'.9	49'.5
06	332° 29'.0	293° 07'.2	49'.8	294° 18'.7	28'.6	306° 15'.2	39'.7	141° 34'.5	49'.4
07	347° 31'.4	308° 06'.7	50'.8	309° 19'.4	29'.2	321° 17'.1	39'.9	156° 37'.0	49'.4
08	2° 33'.9	323° 06'.2	51'.8	324° 20'.0	29'.8	336° 19'.1	40'.1	171° 39'.6	49'.4
09	17° 36'.4	338° 05'.7	52'.7	339° 20'.7	30'.4	351° 21'.0	40'.3	186° 42'.1	49'.4
10	32° 38'.8	353° 05'.2	53'.7	354° 21'.3	31'.0	6° 23'.0	40'.5	201° 44'.6	49'.3
11	47° 41'.3	8° 04'.7	54'.7	9° 22'.0	31'.6	21° 24'.9	40'.7	216° 47'.2	49'.3
12	62° 43'.7	23° 04'.2	13° 55'.7 N	24° 22'.7	14° 32'.2 N	36° 26'.9	9° 40'.8 N	231° 49'.7	1° 49'.3 S
13	77° 46'.2	38° 03'.7	56'.7	39° 23'.3	32'.8	51° 28'.8	41'.0	246° 52'.3	49'.3
14	92° 48'.7	53° 03'.2	57'.6	54° 24'.0	33'.4	66° 30'.8	41'.2	261° 54'.8	49'.3
15	107° 51'.1	68° 02'.7	58'.6	69° 24'.6	34'.0	81° 32'.7	41'.4	276° 57'.3	49'.2
16	122° 53'.6	83° 02'.2	59'.6	84° 25'.3	34'.6	96° 34'.7	41'.6	291° 59'.9	49'.2
17	137° 56'.1	98° 01'.7	14° 00'.6 N	99° 25'.9	35'.2	111° 36'.6	41'.8	307° 02'.4	49'.2
18	152° 58'.5	113° 01'.2	01'.6	114° 26'.6	35'.8	126° 38'.6	42'.0	322° 04'.9	49'.2
19	168° 01'.0	128° 00'.7	02'.5	129° 27'.2	36'.4	141° 40'.5	42'.2	337° 07'.5	49'.1
20	183° 03'.5	143° 00'.2	03'.5	144° 27'.9	37'.0	156° 42'.5	42'.4	352° 10'.0	49'.1
21	198° 05'.9	157° 59'.7	04'.5	159° 28'.5	37'.6	171° 44'.4	42'.6	7° 12'.6	49'.1
22	213° 08'.4	172° 59'.2	05'.5	174° 29'.2	38'.2	186° 46'.4	42'.7	22° 15'.1	49'.1
23	228° 10'.9	187° 58'.7	06'.4	189° 29'.8	38'.8	201° 48'.3	42'.9	37° 17'.6	49'.1
26 00	243° 13'.3	202° 58'.2	14° 07'.4 N	204° 30'.5	14° 39'.4 N	216° 50'.3	9° 43'.1 N	52° 20'.2	1° 49'.0 S
01	258° 15'.8	217° 57'.7	08'.4	219° 31'.2	40'.0	231° 52'.2	43'.3	67° 22'.7	49'.0
02	273° 18'.2	232° 57'.2	09'.4	234° 31'.8	40'.6	246° 54'.2	43'.5	82° 25'.2	49'.0
03	288° 20'.7	247° 56'.7	10'.3	249° 32'.5	41'.2	261° 56'.1	43'.7	97° 27'.8	49'.0
04	303° 23'.2	262° 56'.2	11'.3	264° 33'.1	41'.8	276° 58'.1	43'.9	112° 30'.3	49'.0
05	318° 25'.6	277° 55'.7	12'.3	279° 33'.8	42'.4	292° 00'.0	44'.1	127° 32'.8	48'.9
06	333° 28'.1	292° 55'.2	13'.3	294° 34'.4	43'.0	307° 02'.0	44'.3	142° 35'.4	48'.9
07	348° 30'.6	307° 54'.7	14'.2	309° 35'.1	43'.6	322° 03'.9	44'.4	157° 37'.9	48'.9
08	3° 33'.0	322° 54'.1	15'.2	324° 35'.7	44'.2	337° 05'.9	44'.6	172° 40'.4	48'.9
09	18° 35'.5	337° 53'.6	16'.2	339° 36'.4	44'.8	352° 07'.8	44'.8	187° 43'.0	48'.9
10	33° 38'.0	352° 53'.1	17'.1	354° 37'.0	45'.4	7° 09'.8	45'.0	202° 45'.5	48'.8
11	48° 40'.4	7° 52'.6	18'.1	9° 37'.7	46'.0	22° 11'.7	45'.2	217° 48'.1	48'.8
12	63° 42'.9	22° 52'.1	14° 19'.1 N	24° 38'.3	14° 46'.6 N	37° 13'.7	9° 45'.4 N	232° 50'.6	1° 48'.8 S
13	78° 45'.3	37° 51'.6	20'.0	39° 39'.0	47'.2	52° 15'.6	45'.6	247° 53'.1	48'.8
14	93° 47'.8	52° 51'.1	21'.0	54° 39'.6	47'.8	67° 17'.6	45'.8	262° 55'.7	48'.8
15	108° 50'.3	67° 50'.6	22'.0	69° 40'.3	48'.4	82° 19'.5	46'.0	277° 58'.2	48'.7
16	123° 52'.7	82° 50'.1	22'.9	84° 40'.9	49'.0	97° 21'.5	46'.1	293° 00'.7	48'.7
17	138° 55'.2	97° 49'.6	23'.9	99° 41'.6	49'.6	112° 23'.4	46'.3	308° 03'.3	48'.7
18	153° 57'.7	112° 49'.1	24'.9	114° 42'.2	50'.2	127° 25'.4	46'.5	323° 05'.8	48'.7
19	169° 00'.1	127° 48'.5	25'.8	129° 42'.9	50'.8	142° 27'.3	46'.7	338° 08'.3	48'.7
20	184° 02'.6	142° 48'.0	26'.8	144° 43'.6	51'.4	157° 29'.3	46'.9	353° 10'.9	48'.6
21	199° 05'.1	157° 47'.5	27'.8	159° 44'.2	52'.0	172° 31'.2	47'.1	8° 13'.4	48'.6
22	214° 07'.5	172° 47'.0	28'.7	174° 44'.9	52'.6	187° 33'.2	47'.3	23° 15'.9	48'.6
23	229° 10'.0	187° 46'.5	29'.7	189° 45'.5	53'.1	202° 35'.1	47'.5	38° 18'.5	48'.6
27 00	244° 12'.5	202° 46'.0	14° 30'.6 N	204° 46'.2	14° 53'.7 N	217° 37'.1	9° 47'.7 N	53° 21'.0	1° 48'.6 S
01	259° 14'.9	217° 45'.5	31'.6	219° 46'.8	54'.3	232° 39'.0	47'.8	68° 23'.5	48'.5
02	274° 17'.4	232° 45'.0	32'.6	234° 47'.5	54'.9	247° 41'.0	48'.0	83° 26'.1	48'.5
03	289° 19'.8	247° 44'.4	33'.5	249° 48'.1	55'.5	262° 42'.9	48'.2	98° 28'.6	48'.5
04	304° 22'.3	262° 43'.9	34'.5	264° 48'.8	56'.1	277° 44'.9	48'.4	113° 31'.1	48'.5
05	319° 24'.8	277° 43'.4	35'.4	279° 49'.4	56'.7	292° 46'.8	48'.6	128° 33'.7	48'.5
06	334° 27'.2	292° 42'.9	36'.4	294° 50'.1	57'.3	307° 48'.8	48'.8	143° 36'.2	48'.4
07	349° 29'.7	307° 42'.4	37'.4	309° 50'.7	57'.9	322° 50'.8	49'.0	158° 38'.7	48'.4
08	4° 32'.2	322° 41'.9	38'.3	324° 51'.4	58'.5	337° 52'.7	49'.2	173° 41'.3	48'.4
09	19° 34'.6	337° 41'.3	39'.3	339° 52'.0	59'.1	352° 54'.7	49'.3	188° 43'.8	48'.4
10	34° 37'.1	352° 40'.8	40'.2	354° 52'.7	59'.7	7° 56'.6	49'.5	203° 46'.3	48'.4
11	49° 39'.6	7° 40'.3	41'.2	9° 53'.3	15° 00'.2 N	22° 58'.6	49'.7	218° 48'.8	48'.4
12	64° 42'.0	22° 39'.8	14° 42'.1 N	24° 54'.0	15° 00'.8 N	38° 00'.5	9° 49'.9 N	233° 51'.4	1° 48'.3 S
13	79° 44'.5	37° 39'.3	43'.1	39° 54'.6	01'.4	53° 02'.5	50'.1	248° 53'.9	48'.3
14	94° 47'.0	52° 38'.7	44'.0	54° 55'.3	02'.0	68° 04'.4	50'.3	263° 56'.4	48'.3
15	109° 49'.4	67° 38'.2	45'.0	69° 55'.9	02'.6	83° 06'.4	50'.5	278° 59'.0	48'.3
16	124° 51'.9	82° 37'.7	45'.9	84° 56'.6	03'.2	98° 08'.3	50'.7	294° 01'.5	48'.3
17	139° 54'.3	97° 37'.2	46'.9	99° 57'.2	03'.8	113° 10'.3	50'.8	309° 04'.0	48'.2
18	154° 56'.8	112° 36'.7	47'.8	114° 57'.9	04'.4	128° 12'.2	51'.0	324° 06'.6	48'.2
19	169° 59'.3	127° 36'.1	48'.8	129° 58'.5	04'.9	143° 14'.2	51'.2	339° 09'.1	48'.2
20	185° 01'.7	142° 35'.6	49'.7	144° 59'.2	05'.5	158° 16'.1	51'.4	354° 11'.6	48'.2
21	200° 04'.2	157° 35'.1	50'.7	159° 59'.8	06'.1	173° 18'.1	51'.6	9° 14'.2	48'.2
22	215° 06'.7	172° 34'.6	51'.6	175° 00'.5	06'.7	188° 20'.1	51'.8	24° 16'.7	48'.2
23	230° 09'.1	187° 34'.0	52'.6	190° 01'.1	07'.3	203° 22'.0	52'.0	39° 19'.2	48'.1
	M.P. 07:42	v -0'.5	d 1'.0	v 0'.7	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.5 S
Achernar	335° 28'.2	57° 10'.5 S
Acrux	173° 10'.7	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.5	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.5	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.5 N
Alpheratz	357° 45'.2	29° 09'.1 N
Altair	62° 09'.5	8° 53'.9 N
Ankaa	353° 17'.3	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.3	69° 02'.8 S
Avior	234° 19'.0	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.3	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.5	17° 55'.3 S
Dubhe	193° 53'.3	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.3	51° 29'.2 N
Enif	33° 48'.5	9° 55'.6 N
Fomalhaut	15° 25'.6	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.7	23° 30'.9 N
Kaus Aust.	83° 45'.4	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.6 N
Markab	13° 39'.9	15° 16'.0 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.4	69° 46'.3 S
Mirfak	308° 43'.0	49° 54'.0 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.6 S
Polaris	318° 55'.4	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.6	56° 35'.8 N
Shaula	96° 23'.5	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.7	43° 29'.1 S
Vega	80° 39'.6	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	319° 44'.9	10:28
Mars	321° 17'.2	10:22
Jupiter	333° 36'.9	09:31
Saturn	169° 06'.8	20:27

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 47'.2	20° 50'.8 N	266° 26'.8	15'.8	4° 42'.8 S	11'.7	54'.6
195° 47'.1	51'.3	281° 01'.6	15'.8	31'.1	11'.7	
210° 47'.1	51'.7	295° 36'.4	15'.8	19'.4	11'.7	
225° 47'.0	52'.2	310° 11'.2	15'.9	07'.7	11'.8	
240° 47'.0	52'.6	324° 46'.1	15'.8	3° 55'.9 S	11'.7	
255° 46'.9	53'.1	339° 20'.9	15'.9	44'.2	11'.8	54'.5
270° 46'.8	53'.5	353° 55'.8	16'.0	32'.4	11'.7	
285° 46'.8	54'.0	8° 30'.8	15'.9	20'.7	11'.8	
300° 46'.7	54'.4	23° 05'.7	16'.0	08'.9	11'.8	
315° 46'.7	54'.9	37° 40'.7	16'.0	2° 57'.1 S	11'.7	
330° 46'.6	55'.3	52° 15'.7	16'.1	45'.4	11'.8	
345° 46'.5	55'.8	66° 50'.8	16'.0	33'.6	11'.8	
0° 46'.5	20° 56'.2 N	81° 25'.8	16'.1	2° 21'.8 S	11'.8	54'.4
15° 46'.4	56'.7	96° 00'.9	16'.1	10'.0	11'.8	
30° 46'.3	57'.1	110° 36'.0	16'.1	1° 58'.2 S	11'.8	
45° 46'.3	57'.6	125° 11'.1	16'.1	46'.4	11'.8	
60° 46'.2	58'.0	139° 46'.2	16'.2	34'.6	11'.8	
75° 46'.2	58'.5	154° 21'.4	16'.1	22'.8	11'.8	
90° 46'.1	58'.9	168° 56'.5	16'.2	11'.0	11'.8	
105° 46'.0	59'.4	183° 31'.7	16'.2	0° 59'.2 S	11'.8	
120° 46'.0	59'.8	198° 06'.9	16'.2	47'.4	11'.8	54'.3
135° 45'.9	21° 00'.3 N	212° 42'.1	16'.2	35'.6	11'.8	
150° 45'.8	00'.7	227° 17'.3	16'.2	23'.8	11'.8	
165° 45'.8	01'.1	241° 52'.5	16'.3	12'.0	11'.8	
180° 45'.7	21° 01'.6 N	256° 27'.8	16'.2	0° 00'.2 S	11'.7	54'.3
195° 45'.6	02'.0	271° 03'.0	16'.3	0° 11'.5 N	11'.8	
210° 45'.6	02'.5	285° 38'.3	16'.2	23'.3	11'.8	
225° 45'.5	02'.9	300° 13'.5	16'.3	35'.1	11'.8	
240° 45'.4	03'.3	314° 48'.8	16'.3	46'.9	11'.7	
255° 45'.4	03'.8	329° 24'.1	16'.2	58'.6	11'.8	
270° 45'.3	04'.2	343° 59'.3	16'.3	1° 10'.4 N	11'.7	
285° 45'.2	04'.7	358° 34'.6	16'.3	22'.1	11'.8	54'.2
300° 45'.2	05'.1	13° 09'.9	16'.3	33'.9	11'.7	
315° 45'.1	05'.5	27° 45'.2	16'.2	45'.6	11'.7	
330° 45'.0	06'.0	42° 20'.4	16'.3	57'.3	11'.8	
345° 45'.0	06'.4	56° 55'.7	16'.3	2° 09'.1 N	11'.7	
0° 44'.9	21° 06'.8 N	71° 31'.0	16'.2	2° 20'.8 N	11'.7	54'.2
15° 44'.8	07'.3	86° 06'.2	16'.3	32'.5	11'.6	
30° 44'.8	07'.7	100° 41'.5	16'.3	44'.1	11'.7	
45° 44'.7	08'.1	115° 16'.8	16'.2	55'.8	11'.7	
60° 44'.6	08'.6	129° 52'.0	16'.3	3° 07'.5 N	11'.6	
75° 44'.6	09'.0	144° 27'.3	16'.2	19'.1	11'.6	
90° 44'.5	09'.4	159° 02'.5	16'.3	30'.7	11'.7	
105° 44'.4	09'.9	173° 37'.8	16'.2	42'.4	11'.6	
120° 44'.4	10'.3	188° 13'.0	16'.2	54'.0	11'.5	
135° 44'.3	10'.7	202° 48'.2	16'.2	4° 05'.5 N	11'.6	
150° 44'.2	11'.2	217° 23'.4	16'.2	17'.1	11'.6	
165° 44'.2	11'.6	231° 58'.6	16'.2	28'.7	11'.5	
180° 44'.1	21° 12'.0 N	246° 33'.8	16'.1	4° 40'.2 N	11'.5	54'.2
195° 44'.0	12'.4	261° 08'.9	16'.2	51'.7	11'.5	
210° 43'.9	12'.9	275° 44'.1	16'.1	5° 03'.2 N	11'.5	54'.1
225° 43'.9	13'.3	290° 19'.2	16'.1	14'.7	11'.4	
240° 43'.8	13'.7	304° 54'.3	16'.1	26'.1	11'.5	
255° 43'.7	14'.1	319° 29'.4	16'.1	37'.6	11'.4	
270° 43'.7	14'.6	334° 04'.5	16'.1	49'.0	11'.4	
285° 43'.6	15'.0	348° 39'.6	16'.0	6° 00'.4 N	11'.4	
300° 43'.5	15'.4	3° 14'.6	16'.0	11'.8	11'.3	
315° 43'.4	15'.8	17° 49'.6	16'.0	23'.1	11'.3	
330° 43'.4	16'.2	32° 24'.6	16'.0	34'.4	11'.3	
345° 43'.3	16'.7	46° 59'.6	16'.0	45'.7	11'.3	
0° 43'.2	21° 17'.1 N	61° 34'.6	15'.9	6° 57'.0 N	11'.3	54'.1
15° 43'.2	17'.5	76° 09'.5	15'.9	7° 08'.3 N	11'.2	
30° 43'.1	17'.9	90° 44'.4	15'.9	19'.5	11'.2	
45° 43'.0	18'.3	105° 19'.3	15'.8	30'.7	11'.2	
60° 42'.9	18'.7	119° 54'.1	15'.8	41'.9	11'.1	
75° 42'.9	19'.2	134° 28'.9	15'.8	53'.0	11'.1	
90° 42'.8	19'.6	149° 03'.7	15'.8	8° 04'.1 N	11'.1	
105° 42'.7	20'.0	163° 38'.5	15'.7	15'.2	11'.1	54'.2
120° 42'.6	20'.4	178° 13'.2	15'.7	26'.3	11'.0	
135° 42'.6	20'.8	192° 47'.9	15'.7	37'.3	11'.0	
150° 42'.5	21'.2	207° 22'.6	15'.6	48'.3	11'.0	
165° 42'.4	21'.6	221° 57'.2	15'.6	59'.3	10'.9	
SD 15'.8	d 0'.4	SD	14'.8	14'.8	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27
N 72°	-	-	-	01:13	00:55	00:36
N 70°	-	-	-	01:07	00:55	00:43
68°	-	-	00:24	01:02	00:55	00:48
66°	-	-	01:39	00:58	00:55	00:52
64°	-	-	02:15	00:54	00:55	00:56
62°	-	01:01	02:40	00:51	00:55	00:59
60°	-	01:45	03:00	00:48	00:55	01:02
N 58°	-	02:14	03:16	00:46	00:55	01:05
56°	00:55	02:35	03:30	00:43	00:55	01:07
54°	01:36	02:53	03:42	00:41	00:55	01:09
52°	02:02	03:07	03:52	00:40	00:55	01:11
50°	02:22	03:20	04:01	00:38	00:55	01:13
45°	02:59	03:45	04:21	00:34	00:55	01:17
N 40°	03:26	04:05	04:37	00:31	00:56	01:20
35°	03:46	04:21	04:50	00:28	00:56	01:23
30°	04:02	04:35	05:01	00:26	00:56	01:25
20°	04:28	04:57	05:21	00:22	00:56	01:29
N 10°	04:49	05:15	05:38	00:18	00:56	01:33
0°	05:05	05:31	05:53	00:15	00:56	01:37
S 10°	05:21	05:46	06:09	00:12	00:56	01:40
20°	05:35	06:02	06:25	00:08	00:56	01:44
30°	05:49	06:18	06:44	00:04	00:57	01:49
35°	05:56	06:28	06:55	00:01	00:57	01:51
40°	06:04	06:38	07:08	-	00:57	01:54
45°	06:13	06:49	07:22	-	00:57	01:58
S 50°	06:23	07:03	07:40	-	00:57	02:02
52°	06:27	07:10	07:49	-	00:57	02:04
54°	06:32	07:16	07:58	-	00:57	02:06
56°	06:37	07:24	08:09	-	00:57	02:08
58°	06:42	07:33	08:21	-	00:58	02:11
S 60°	06:48	07:42	08:35	-	00:58	02:14
S 62°	06:55	07:53	08:52	-	00:58	02:17

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 25	Moonset 26	Moonset 27
N 72°	-	-	-	12:04	13:49	15:36
N 70°	-	-	-	12:08	13:45	15:24
68°	-	-	-	12:10	13:42	15:15
66°	22:19	-	-	12:13	13:40	15:07
64°	21:42	-	-	12:15	13:38	15:01
62°	21:16	22:59	-	12:17	13:36	14:55
60°	20:55	22:11	-	12:18	13:34	14:50
N 58°	20:39	21:42	-	12:19	13:33	14:46
56°	20:25	21:20	23:04	12:21	13:31	14:42
54°	20:13	21:03	22:21	12:22	13:30	14:39
52°	20:03	20:48	21:54	12:23	13:29	14:36
50°	19:53	20:35	21:33	12:23	13:28	14:33
45°	19:34	20:09	20:56	12:25	13:26	14:27
N 40°	19:18	19:50	20:29	12:27	13:25	14:22
35°	19:05	19:33	20:09	12:28	13:23	14:18
30°	18:53	19:20	19:52	12:29	13:22	14:14
20°	18:33	18:57	19:26	12:31	13:20	14:08
N 10°	18:16	18:39	19:06	12:33	13:18	14:02
0°	18:01	18:23	18:49	12:35	13:16	13:57
S 10°	17:45	18:07	18:33	12:36	13:14	13:51
20°	17:28	17:52	18:19	12:38	13:12	13:46
30°	17:10	17:35	18:05	12:40	13:09	13:39
35°	16:59	17:26	17:57	12:41	13:08	13:35
40°	16:46	17:16	17:49	12:42	13:07	13:31
45°	16:31	17:04	17:41	12:44	13:05	13:26
S 50°	16:13	16:50	17:31	12:46	13:03	13:21
52°	16:05	16:44	17:26	12:46	13:02	13:18
54°	15:55	16:37	17:22	12:47	13:01	13:15
56°	15:45	16:29	17:17	12:48	13:00	13:12
58°	15:33	16:21	17:11	12:49	12:59	13:08
S 60°	15:18	16:11	17:05	12:50	12:57	13:05
S 62°	15:01	16:00	16:58	12:51	12:56	13:00

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
25	3 09	3 06	11:57	06:25	18:45	22d 43%
26	3 03	3 00	11:57	07:06	19:26	23d 34%
27	2 56	2 53	11:57	07:47	20:07	24d 25%

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2011 May 28, 29, 30 (Sat, Sun, Mon)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
28 00	245° 11'.6	202° 33'.5	14° 53'.5 N	205° 01'.8	15° 07'.9 N	218° 24'.0	9° 52'.2 N	54° 21'.7	1° 48'.1 S
01	260° 14'.1	217° 33'.0	54'.5	220° 02'.4	08'.5	233° 25'.9	52'.3	69° 24'.3	48'.1
02	275° 16'.5	232° 32'.5	55'.4	235° 03'.1	09'.1	248° 27'.9	52'.5	84° 26'.8	48'.1
03	290° 19'.0	247° 31'.9	56'.4	250° 03'.7	09'.6	263° 29'.8	52'.7	99° 29'.3	48'.1
04	305° 21'.4	262° 31'.4	57'.3	265° 04'.4	10'.2	278° 31'.8	52'.9	114° 31'.9	48'.0
05	320° 23'.9	277° 30'.9	58'.2	280° 05'.0	10'.8	293° 33'.7	53'.1	129° 34'.4	48'.0
06	335° 26'.4	292° 30'.4	59'.2	295° 05'.7	11'.4	308° 35'.7	53'.3	144° 36'.9	48'.0
07	350° 28'.8	307° 29'.8	15° 00'.1 N	310° 06'.3	12'.0	323° 37'.6	53'.5	159° 39'.4	48'.0
08	5° 31'.3	322° 29'.3	01'.1	325° 07'.0	12'.6	338° 39'.6	53'.6	174° 42'.0	48'.0
09	20° 33'.8	337° 28'.8	02'.0	340° 07'.6	13'.1	353° 41'.6	53'.8	189° 44'.5	48'.0
10	35° 36'.2	352° 28'.3	03'.0	355° 08'.3	13'.7	8° 43'.5	54'.0	204° 47'.0	47'.9
11	50° 38'.7	7° 27'.7	03'.9	10° 08'.9	14'.3	23° 45'.5	54'.2	219° 49'.6	47'.9
12	65° 41'.2	22° 27'.2	15° 04'.8 N	25° 09'.6	15° 14'.9 N	38° 47'.4	9° 54'.4 N	234° 52'.1	1° 47'.9 S
13	80° 43'.6	37° 26'.7	05'.8	40° 10'.2	15'.5	53° 49'.4	54'.6	249° 54'.6	47'.9
14	95° 46'.1	52° 26'.1	06'.7	55° 10'.9	16'.1	68° 51'.3	54'.8	264° 57'.1	47'.9
15	110° 48'.6	67° 25'.6	07'.6	70° 11'.5	16'.6	83° 53'.3	55'.0	279° 59'.7	47'.9
16	125° 51'.0	82° 25'.1	08'.6	85° 12'.2	17'.2	98° 55'.2	55'.1	295° 02'.2	47'.8
17	140° 53'.5	97° 24'.5	09'.5	100° 12'.8	17'.8	113° 57'.2	55'.3	310° 04'.7	47'.8
18	155° 55'.9	112° 24'.0	10'.5	115° 13'.5	18'.4	128° 59'.2	55'.5	325° 07'.2	47'.8
19	170° 58'.4	127° 23'.5	11'.4	130° 14'.1	19'.0	144° 01'.1	55'.7	340° 09'.8	47'.8
20	186° 00'.9	142° 22'.9	12'.3	145° 14'.8	19'.5	159° 03'.1	55'.9	355° 12'.3	47'.8
21	201° 03'.3	157° 22'.4	13'.3	160° 15'.4	20'.1	174° 05'.0	56'.1	10° 14'.8	47'.8
22	216° 05'.8	172° 21'.9	14'.2	175° 16'.1	20'.7	189° 07'.0	56'.3	25° 17'.4	47'.7
23	231° 08'.3	187° 21'.3	15'.1	190° 16'.7	21'.3	204° 08'.9	56'.4	40° 19'.9	47'.7
29 00	246° 10'.7	202° 20'.8	15° 16'.1 N	205° 17'.3	15° 21'.9 N	219° 10'.9	9° 56'.6 N	55° 22'.4	1° 47'.7 S
01	261° 13'.2	217° 20'.3	17'.0	220° 18'.0	22'.4	234° 12'.9	56'.8	70° 24'.9	47'.7
02	276° 15'.7	232° 19'.7	17'.9	235° 18'.6	23'.0	249° 14'.8	57'.0	85° 27'.5	47'.7
03	291° 18'.1	247° 19'.2	18'.8	250° 19'.3	23'.6	264° 16'.8	57'.2	100° 30'.0	47'.7
04	306° 20'.6	262° 18'.7	19'.8	265° 19'.9	24'.2	279° 18'.7	57'.4	115° 32'.5	47'.6
05	321° 23'.1	277° 18'.1	20'.7	280° 20'.6	24'.8	294° 20'.7	57'.5	130° 35'.0	47'.6
06	336° 25'.5	292° 17'.6	21'.6	295° 21'.2	25'.3	309° 22'.6	57'.7	145° 37'.6	47'.6
07	351° 28'.0	307° 17'.0	22'.6	310° 21'.9	25'.9	324° 24'.6	57'.9	160° 40'.1	47'.6
08	6° 30'.4	322° 16'.5	23'.5	325° 22'.5	26'.5	339° 26'.6	58'.1	175° 42'.6	47'.6
09	21° 32'.9	337° 16'.0	24'.4	340° 23'.2	27'.1	354° 28'.5	58'.3	190° 45'.1	47'.6
10	36° 35'.4	352° 15'.4	25'.3	355° 23'.8	27'.6	9° 30'.5	58'.5	205° 47'.7	47'.6
11	51° 37'.8	7° 14'.9	26'.3	10° 24'.5	28'.2	24° 32'.4	58'.7	220° 50'.2	47'.5
12	66° 40'.3	22° 14'.3	15° 27'.2 N	25° 25'.1	15° 28'.8 N	39° 34'.4	9° 58'.8 N	235° 52'.7	1° 47'.5 S
13	81° 42'.8	37° 13'.8	28'.1	40° 25'.8	29'.4	54° 36'.3	59'.0	250° 55'.2	47'.5
14	96° 45'.2	52° 13'.3	29'.0	55° 26'.4	29'.9	69° 38'.3	59'.2	265° 57'.7	47'.5
15	111° 47'.7	67° 12'.7	29'.9	70° 27'.1	30'.5	84° 40'.3	59'.4	281° 00'.3	47'.5
16	126° 50'.2	82° 12'.2	30'.9	85° 27'.7	31'.1	99° 42'.2	59'.6	296° 02'.8	47'.5
17	141° 52'.6	97° 11'.6	31'.8	100° 28'.3	31'.7	114° 44'.2	59'.8	311° 05'.3	47'.4
18	156° 55'.1	112° 11'.1	32'.7	115° 29'.0	32'.2	129° 46'.1	59'.9	326° 07'.8	47'.4
19	171° 57'.5	127° 10'.5	33'.6	130° 29'.6	32'.8	144° 48'.1	10° 00'.1 N	341° 10'.4	47'.4
20	187° 00'.0	142° 10'.0	34'.5	145° 30'.3	33'.4	159° 50'.0	00'.3	356° 12'.9	47'.4
21	202° 02'.5	157° 09'.5	35'.5	160° 30'.9	34'.0	174° 52'.0	00'.5	11° 15'.4	47'.4
22	217° 04'.9	172° 08'.9	36'.4	175° 31'.6	34'.5	189° 54'.0	00'.7	26° 17'.9	47'.4
23	232° 07'.4	187° 08'.4	37'.3	190° 32'.2	35'.1	204° 55'.9	00'.9	41° 20'.5	47'.4
30 00	247° 09'.9	202° 07'.8	15° 38'.2 N	205° 32'.9	15° 35'.7 N	219° 57'.9	10° 01'.1 N	56° 23'.0	1° 47'.3 S
01	262° 12'.3	217° 07'.3	39'.1	220° 33'.5	36'.3	234° 59'.8	01'.2	71° 25'.5	47'.3
02	277° 14'.8	232° 06'.7	40'.0	235° 34'.2	36'.8	250° 01'.8	01'.4	86° 28'.0	47'.3
03	292° 17'.3	247° 06'.2	41'.0	250° 34'.8	37'.4	265° 03'.8	01'.6	101° 30'.5	47'.3
04	307° 19'.7	262° 05'.6	41'.9	265° 35'.5	38'.0	280° 05'.7	01'.8	116° 33'.1	47'.3
05	322° 22'.2	277° 05'.1	42'.8	280° 36'.1	38'.5	295° 07'.7	02'.0	131° 35'.6	47'.3
06	337° 24'.7	292° 04'.5	43'.7	295° 36'.7	39'.1	310° 09'.6	02'.2	146° 38'.1	47'.3
07	352° 27'.1	307° 04'.0	44'.6	310° 37'.4	39'.7	325° 11'.6	02'.3	161° 40'.6	47'.2
08	7° 29'.6	322° 03'.4	45'.5	325° 38'.0	40'.3	340° 13'.6	02'.5	176° 43'.1	47'.2
09	22° 32'.0	337° 02'.9	46'.4	340° 38'.7	40'.8	355° 15'.5	02'.7	191° 45'.7	47'.2
10	37° 34'.5	352° 02'.3	47'.3	355° 39'.3	41'.4	10° 17'.5	02'.9	206° 48'.2	47'.2
11	52° 37'.0	7° 01'.8	48'.3	10° 40'.0	42'.0	25° 19'.4	03'.1	221° 50'.7	47'.2
12	67° 39'.4	22° 01'.2	15° 49'.2 N	25° 40'.6	15° 42'.5 N	40° 21'.4	10° 03'.3 N	236° 53'.2	1° 47'.2 S
13	82° 41'.9	37° 00'.7	50'.1	40° 41'.3	43'.1	55° 23'.4	03'.4	251° 55'.7	47'.2
14	97° 44'.4	52° 00'.1	51'.0	55° 41'.9	43'.7	70° 25'.3	03'.6	266° 58'.3	47'.2
15	112° 46'.8	66° 59'.6	51'.9	70° 42'.6	44'.2	85° 27'.3	03'.8	282° 00'.8	47'.1
16	127° 49'.3	81° 59'.0	52'.8	85° 43'.2	44'.8	100° 29'.2	04'.0	297° 03'.3	47'.1
17	142° 51'.8	96° 58'.5	53'.7	100° 43'.8	45'.4	115° 31'.2	04'.2	312° 05'.8	47'.1
18	157° 54'.2	111° 57'.9	54'.6	115° 44'.5	46'.0	130° 33'.2	04'.4	327° 08'.3	47'.1
19	172° 56'.7	126° 57'.3	55'.5	130° 45'.1	46'.5	145° 35'.1	04'.5	342° 10'.9	47'.1
20	187° 59'.2	141° 56'.8	56'.4	145° 45'.8	47'.1	160° 37'.1	04'.7	357° 13'.4	47'.1
21	203° 01'.6	156° 56'.2	57'.3	160° 46'.4	47'.7	175° 39'.0	04'.9	12° 15'.9	47'.1
22	218° 04'.1	171° 55'.7	58'.2	175° 47'.1	48'.2	190° 41'.0	05'.1	27° 18'.4	47'.0
23	233° 06'.5	186° 55'.1	59'.1	190° 47'.7	48'.8	205° 43'.0	05'.3	42° 20'.9	47'.0
	M.P. 07:30	v -0'.5	d 0'.9	v 0'.6	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.5 S
Achernar	335° 28'.2	57° 10'.5 S
Acrux	173° 10'.7	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.6	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.4 N
Alnair	27° 45'.5	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.2	29° 09'.1 N
Altair	62° 09'.5	8° 53'.9 N
Ankaa	353° 17'.3	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.3 N
Atria	107° 30'.3	69° 02'.8 S
Avior	234° 19'.0	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.3	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.5	17° 55'.3 S
Dubhe	193° 53'.3	61° 41'.5 N
Elnath	278° 14'.9	28° 37'.0 N
Eltanin	90° 46'.3	51° 29'.2 N
Enif	33° 48'.5	9° 55'.7 N
Fomalhaut	15° 25'.6	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.7	23° 30'.9 N
Kaus Aust.	83° 45'.4	34° 22'.6 S
Kochab	137° 18'.7	74° 06'.6 N
Markab	13° 39'.9	15° 16'.0 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.4	69° 46'.3 S
Mirfak	308° 43'.0	49° 54'.0 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.6 S
Polaris	318° 54'.6	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.6	56° 35'.8 N
Shaula	96° 23'.5	37° 06'.6 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.7	43° 29'.1 S
Vega	80° 39'.6	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	316° 10'.1	10:31
Mars	319° 06'.6	10:18
Jupiter	333° 00'.2	09:22
Saturn	169° 11'.7	20:15

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 42'.3	21° 22'.1 N	236° 31'.8	15'.6	9° 10'.2 N	10'.9	54'.2
195° 42'.3	22'.5	251° 06'.4	15'.5	21'.1	10'.8	
210° 42'.2	22'.9	265° 40'.9	15'.5	31'.9	10'.9	
225° 42'.1	23'.3	280° 15'.4	15'.5	42'.8	10'.8	
240° 42'.0	23'.7	294° 49'.9	15'.4	53'.6	10'.7	
255° 42'.0	24'.1	309° 24'.3	15'.4	10° 04'.3 N	10'.7	
270° 41'.9	24'.5	323° 58'.7	15'.3	15'.0	10'.7	
285° 41'.8	24'.9	338° 33'.0	15'.3	25'.7	10'.7	
300° 41'.7	25'.3	353° 07'.3	15'.3	36'.4	10'.6	
315° 41'.7	25'.7	7° 41'.6	15'.2	47'.0	10'.5	
330° 41'.6	26'.1	22° 15'.8	15'.2	57'.5	10'.6	
345° 41'.5	26'.5	36° 50'.0	15'.1	11° 08'.1 N	10'.4	
0° 41'.4	21° 26'.9 N	51° 24'.1	15'.1	11° 18'.5 N	10'.5	54'.2
15° 41'.3	27'.3	65° 58'.2	15'.0	29'.0	10'.4	
30° 41'.3	27'.7	80° 32'.2	15'.0	39'.4	10'.3	
45° 41'.2	28'.2	95° 06'.2	15'.0	49'.7	10'.4	
60° 41'.1	28'.6	109° 40'.2	14'.9	12° 00'.1 N	10'.2	54'.3
75° 41'.0	29'.0	124° 14'.1	14'.8	10'.3	10'.2	
90° 41'.0	29'.4	138° 47'.9	14'.9	20'.5	10'.2	
105° 40'.9	29'.8	153° 21'.8	14'.7	30'.7	10'.2	
120° 40'.8	30'.2	167° 55'.5	14'.7	40'.9	10'.0	
135° 40'.7	30'.5	182° 29'.2	14'.7	50'.9	10'.1	
150° 40'.6	30'.9	197° 02'.9	14'.6	13° 01'.0 N	10'.0	
165° 40'.6	31'.3	211° 36'.5	14'.6	11'.0	9'.9	
180° 40'.5	21° 31'.7 N	226° 10'.1	14'.5	13° 20'.9 N	9'.9	54'.3
195° 40'.4	32'.1	240° 43'.6	14'.4	30'.8	9'.8	
210° 40'.3	32'.5	255° 17'.0	14'.4	40'.6	9'.8	
225° 40'.2	32'.9	269° 50'.4	14'.4	50'.4	9'.7	54'.4
240° 40'.2	33'.3	284° 23'.8	14'.3	14° 00'.1 N	9'.7	
255° 40'.1	33'.7	298° 57'.1	14'.2	09'.8	9'.6	
270° 40'.0	34'.1	313° 30'.3	14'.2	19'.4	9'.6	
285° 39'.9	34'.5	328° 03'.5	14'.1	29'.0	9'.5	
300° 39'.8	34'.9	342° 36'.6	14'.1	38'.5	9'.5	
315° 39'.7	35'.3	357° 09'.7	14'.0	48'.0	9'.4	
330° 39'.7	35'.7	11° 42'.7	14'.0	57'.4	9'.3	
345° 39'.6	36'.1	26° 15'.7	13'.9	15° 06'.7 N	9'.3	
0° 39'.5	21° 36'.4 N	40° 48'.6	13'.8	15° 16'.0 N	9'.2	54'.5
15° 39'.4	36'.8	55° 21'.4	13'.8	25'.2	9'.1	
30° 39'.3	37'.2	69° 54'.2	13'.7	34'.3	9'.1	
45° 39'.3	37'.6	84° 26'.9	13'.7	43'.4	9'.1	
60° 39'.2	38'.0	98° 59'.6	13'.6	52'.5	8'.9	
75° 39'.1	38'.4	113° 32'.2	13'.5	16° 01'.4 N	9'.0	
90° 39'.0	38'.8	128° 04'.7	13'.5	10'.4	8'.8	
105° 38'.9	39'.1	142° 37'.2	13'.4	19'.2	8'.8	
120° 38'.8	39'.5	157° 09'.6	13'.4	28'.0	8'.7	54'.6
135° 38'.7	39'.9	171° 42'.0	13'.2	36'.7	8'.6	
150° 38'.7	40'.3	186° 14'.2	13'.3	45'.3	8'.6	
165° 38'.6	40'.7	200° 46'.5	13'.1	53'.9	8'.5	
180° 38'.5	21° 41'.0 N	215° 18'.6	13'.1	17° 02'.4 N	8'.4	54'.6
195° 38'.4	41'.4	229° 50'.7	13'.1	10'.8	8'.4	
210° 38'.3	41'.8	244° 22'.8	12'.9	19'.2	8'.3	
225° 38'.2	42'.2	258° 54'.7	13'.0	27'.5	8'.2	
240° 38'.2	42'.6	273° 26'.7	12'.8	35'.7	8'.1	54'.7
255° 38'.1	42'.9	287° 58'.5	12'.8	43'.8	8'.1	
270° 38'.0	43'.3	302° 30'.3	12'.7	51'.9	8'.0	
285° 37'.9	43'.7	317° 02'.0	12'.6	59'.9	7'.9	
300° 37'.8	44'.1	331° 33'.6	12'.6	18° 07'.8 N	7'.9	
315° 37'.7	44'.4	346° 05'.2	12'.5	15'.7	7'.7	
330° 37'.6	44'.8	0° 36'.7	12'.5	23'.4	7'.7	54'.8
345° 37'.6	45'.2	15° 08'.2	12'.4	31'.1	7'.6	
0° 37'.5	21° 45'.6 N	29° 39'.6	12'.3	18° 38'.7 N	7'.5	54'.8
15° 37'.4	45'.9	44° 10'.9	12'.2	46'.2	7'.5	
30° 37'.3	46'.3	58° 42'.1	12'.2	53'.7	7'.3	
45° 37'.2	46'.7	73° 13'.3	12'.1	19° 01'.0 N	7'.3	
60° 37'.1	47'.0	87° 44'.4	12'.1	08'.3	7'.2	
75° 37'.0	47'.4	102° 15'.5	12'.0	15'.5	7'.1	54'.9
90° 36'.9	47'.8	116° 46'.5	11'.9	22'.6	7'.0	
105° 36'.8	48'.1	131° 17'.4	11'.8	29'.6	7'.0	
120° 36'.8	48'.5	145° 48'.2	11'.8	36'.6	6'.8	
135° 36'.7	48'.9	160° 19'.0	11'.7	43'.4	6'.8	
150° 36'.6	49'.2	174° 49'.7	11'.7	50'.2	6'.7	55'.0
165° 36'.5	49'.6	189° 20'.4	11'.6	56'.9	6'.5	
SD 15'.8	d 0'.4	SD	14'.8	14'.8	14'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 28	Moonrise 29	Moonrise 30
N 72°	-	-	-	00:16 23:58	23:03	-
N 70°	-	-	-	00:29	00:14 23:52	22:53
68°	-	-	-	00:41	00:33	00:23
66°	-	-	01:27	00:50	00:48	00:46
64°	-	-	02:07	00:58	01:00	01:04
62°	-	00:41	02:34	01:04	01:11	01:20
60°	-	01:36	02:55	01:10	01:20	01:32
N 58°	-	02:07	03:12	01:15	01:28	01:43
56°	00:37	02:30	03:26	01:20	01:35	01:53
54°	01:28	02:48	03:38	01:24	01:41	02:02
52°	01:56	03:03	03:49	01:28	01:47	02:09
50°	02:18	03:17	03:59	01:31	01:52	02:16
45°	02:56	03:43	04:19	01:39	02:03	02:31
N 40°	03:23	04:03	04:35	01:45	02:12	02:43
35°	03:44	04:20	04:49	01:51	02:21	02:54
30°	04:01	04:33	05:00	01:55	02:28	03:03
20°	04:28	04:56	05:20	02:04	02:40	03:19
N 10°	04:48	05:15	05:38	02:11	02:51	03:33
0°	05:06	05:32	05:54	02:18	03:01	03:46
S 10°	05:21	05:47	06:10	02:25	03:11	03:59
20°	05:36	06:03	06:27	02:33	03:22	04:14
30°	05:50	06:20	06:46	02:41	03:35	04:30
35°	05:58	06:29	06:57	02:46	03:42	04:40
40°	06:06	06:40	07:10	02:52	03:51	04:51
45°	06:15	06:52	07:25	02:59	04:01	05:03
S 50°	06:26	07:06	07:44	03:07	04:13	05:19
52°	06:30	07:13	07:52	03:11	04:18	05:27
54°	06:35	07:20	08:02	03:15	04:25	05:35
56°	06:40	07:28	08:13	03:19	04:31	05:44
58°	06:46	07:37	08:26	03:24	04:39	05:55
S 60°	06:52	07:47	08:41	03:30	04:48	06:07
S 62°	06:59	07:59	08:59	03:37	04:58	06:22

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 28	Moonset 29	Moonset 30
N 72°	-	-	-	17:30	19:49	-
N 70°	-	-	-	17:08	19:02	21:38
68°	-	-	-	16:50	18:32	20:24
66°	22:32	-	-	16:37	18:10	19:47
64°	21:50	-	-	16:25	17:52	19:21
62°	21:23	23:21	-	16:16	17:38	19:01
60°	21:01	22:21	-	16:07	17:26	18:44
N 58°	20:44	21:49	-	16:00	17:15	18:30
56°	20:30	21:26	23:24	15:54	17:06	18:19
54°	20:17	21:08	22:30	15:48	16:58	18:08
52°	20:06	20:52	22:00	15:43	16:51	17:59
50°	19:57	20:39	21:38	15:38	16:45	17:51
45°	19:37	20:13	21:00	15:29	16:31	17:34
N 40°	19:20	19:52	20:32	15:20	16:19	17:19
35°	19:07	19:36	20:11	15:13	16:10	17:07
30°	18:55	19:22	19:54	15:07	16:01	16:57
20°	18:34	18:59	19:27	14:57	15:47	16:39
N 10°	18:17	18:40	19:07	14:47	15:34	16:23
0°	18:01	18:23	18:49	14:39	15:22	16:09
S 10°	17:45	18:08	18:34	14:30	15:11	15:54
20°	17:28	17:52	18:19	14:21	14:58	15:39
30°	17:09	17:35	18:04	14:10	14:44	15:21
35°	16:57	17:25	17:56	14:04	14:36	15:11
40°	16:45	17:14	17:48	13:57	14:26	14:59
45°	16:29	17:02	17:39	13:50	14:15	14:46
S 50°	16:11	16:48	17:29	13:40	14:02	14:29
52°	16:02	16:42	17:24	13:36	13:56	14:21
54°	15:52	16:34	17:19	13:31	13:49	14:12
56°	15:41	16:26	17:14	13:26	13:42	14:02
58°	15:28	16:17	17:08	13:20	13:33	13:51
S 60°	15:14	16:07	17:02	13:13	13:24	13:38
S 62°	14:56	15:56	16:55	13:05	13:13	13:23

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
28	2 50	2 46	11:57	08:28	20:50	25d 18%
29	2 42	2 38	11:57	09:12	21:34	26d 11%
30	2 34	2 30	11:57	09:57	22:21	27d 6%

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2011 May 31, Jun. 1, 2 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
31 Tuesday 00	248° 09'.0	201° 54'.6	16° 00'.0 N	205° 48'.4	15° 49'.4 N	220° 44'.9	10° 05'.5 N	57° 23'.5	1° 47'.0 S
01	263° 11'.5	216° 54'.0	00'.9	220° 49'.0	49'.9	235° 46'.9	05'.6	72° 26'.0	47'.0
02	278° 13'.9	231° 53'.5	01'.8	235° 49'.6	50'.5	250° 48'.8	05'.8	87° 28'.5	47'.0
03	293° 16'.4	246° 52'.9	02'.7	250° 50'.3	51'.0	265° 50'.8	06'.0	102° 31'.0	47'.0
04	308° 18'.9	261° 52'.3	03'.6	265° 50'.9	51'.6	280° 52'.8	06'.2	117° 33'.5	47'.0
05	323° 21'.3	276° 51'.8	04'.5	280° 51'.6	52'.2	295° 54'.7	06'.4	132° 36'.0	47'.0
06	338° 23'.8	291° 51'.2	05'.4	295° 52'.2	52'.7	310° 56'.7	06'.6	147° 38'.6	46'.9
07	353° 26'.3	306° 50'.7	06'.3	310° 52'.9	53'.3	325° 58'.7	06'.7	162° 41'.1	46'.9
08	8° 28'.7	321° 50'.1	07'.2	325° 53'.5	53'.9	341° 00'.6	06'.9	177° 43'.6	46'.9
09	23° 31'.2	336° 49'.5	08'.1	340° 54'.2	54'.4	356° 02'.6	07'.1	192° 46'.1	46'.9
10	38° 33'.6	351° 49'.0	09'.0	355° 54'.8	55'.0	11° 04'.5	07'.3	207° 48'.6	46'.9
11	53° 36'.1	6° 48'.4	09'.9	10° 55'.4	55'.6	26° 06'.5	07'.5	222° 51'.2	46'.9
12	68° 38'.6	21° 47'.8	16° 10'.8 N	25° 56'.1	15° 56'.1 N	41° 08'.5	10° 07'.6 N	237° 53'.7	1° 46'.9 S
13	83° 41'.0	36° 47'.3	11'.7	40° 56'.7	56'.7	56° 10'.4	07'.8	252° 56'.2	46'.9
14	98° 43'.5	51° 46'.7	12'.5	55° 57'.4	57'.2	71° 12'.4	08'.0	267° 58'.7	46'.9
15	113° 46'.0	66° 46'.1	13'.4	70° 58'.0	57'.8	86° 14'.4	08'.2	283° 01'.2	46'.8
16	128° 48'.4	81° 45'.6	14'.3	85° 58'.7	58'.4	101° 16'.3	08'.4	298° 03'.7	46'.8
17	143° 50'.9	96° 45'.0	15'.2	100° 59'.3	58'.9	116° 18'.3	08'.6	313° 06'.2	46'.8
18	158° 53'.4	111° 44'.5	16'.1	115° 59'.9	59'.5	131° 20'.2	08'.7	328° 08'.8	46'.8
19	173° 55'.8	126° 43'.9	17'.0	131° 00'.6	16° 00'.1 N	146° 22'.2	08'.9	343° 11'.3	46'.8
20	188° 58'.3	141° 43'.3	17'.9	146° 01'.2	00'.6	161° 24'.2	09'.1	358° 13'.8	46'.8
21	204° 00'.8	156° 42'.8	18'.8	161° 01'.9	01'.2	176° 26'.1	09'.3	13° 16'.3	46'.8
22	219° 03'.2	171° 42'.2	19'.6	176° 02'.5	01'.7	191° 28'.1	09'.5	28° 18'.8	46'.8
23	234° 05'.7	186° 41'.6	20'.5	191° 03'.2	02'.3	206° 30'.1	09'.6	43° 21'.3	46'.7
1 Wednesday 00	249° 08'.1	201° 41'.0	16° 21'.4 N	206° 03'.8	16° 02'.9 N	221° 32'.0	10° 09'.8 N	58° 23'.9	1° 46'.7 S
01	264° 10'.6	216° 40'.5	22'.3	221° 04'.4	03'.4	236° 34'.0	10'.0	73° 26'.4	46'.7
02	279° 13'.1	231° 39'.9	23'.2	236° 05'.1	04'.0	251° 36'.0	10'.2	88° 28'.9	46'.7
03	294° 15'.5	246° 39'.3	24'.1	251° 05'.7	04'.5	266° 37'.9	10'.4	103° 31'.4	46'.7
04	309° 18'.0	261° 38'.8	24'.9	266° 06'.4	05'.1	281° 39'.9	10'.5	118° 33'.9	46'.7
05	324° 20'.5	276° 38'.2	25'.8	281° 07'.0	05'.6	296° 41'.8	10'.7	133° 36'.4	46'.7
06	339° 22'.9	291° 37'.6	26'.7	296° 07'.7	06'.2	311° 43'.8	10'.9	148° 38'.9	46'.7
07	354° 25'.4	306° 37'.1	27'.6	311° 08'.3	06'.8	326° 45'.8	11'.1	163° 41'.5	46'.7
08	9° 27'.9	321° 36'.5	28'.5	326° 08'.9	07'.3	341° 47'.7	11'.3	178° 44'.0	46'.7
09	24° 30'.3	336° 35'.9	29'.3	341° 09'.6	07'.9	356° 49'.7	11'.5	193° 46'.5	46'.6
10	39° 32'.8	351° 35'.3	30'.2	356° 10'.2	08'.4	11° 51'.7	11'.6	208° 49'.0	46'.6
11	54° 35'.3	6° 34'.8	31'.1	11° 10'.9	09'.0	26° 53'.6	11'.8	223° 51'.5	46'.6
12	69° 37'.7	21° 34'.2	16° 32'.0 N	26° 11'.5	16° 09'.5 N	41° 55'.6	10° 12'.0 N	238° 54'.0	1° 46'.6 S
13	84° 40'.2	36° 33'.6	32'.8	41° 12'.1	10'.1	56° 57'.6	12'.2	253° 56'.5	46'.6
14	99° 42'.6	51° 33'.0	33'.7	56° 12'.8	10'.7	71° 59'.5	12'.4	268° 59'.0	46'.6
15	114° 45'.1	66° 32'.5	34'.6	71° 13'.4	11'.2	87° 01'.5	12'.5	284° 01'.6	46'.6
16	129° 47'.6	81° 31'.9	35'.5	86° 14'.1	11'.8	102° 03'.5	12'.7	299° 04'.1	46'.6
17	144° 50'.0	96° 31'.3	36'.3	101° 14'.7	12'.3	117° 05'.4	12'.9	314° 06'.6	46'.6
18	159° 52'.5	111° 30'.7	37'.2	116° 15'.3	12'.9	132° 07'.4	13'.1	329° 09'.1	46'.6
19	174° 55'.0	126° 30'.2	38'.1	131° 16'.0	13'.4	147° 09'.4	13'.3	344° 11'.6	46'.5
20	189° 57'.4	141° 29'.6	38'.9	146° 16'.6	14'.0	162° 11'.3	13'.4	359° 14'.1	46'.5
21	204° 59'.9	156° 29'.0	39'.8	161° 17'.3	14'.5	177° 13'.3	13'.6	14° 16'.6	46'.5
22	220° 02'.4	171° 28'.4	40'.7	176° 17'.9	15'.1	192° 15'.3	13'.8	29° 19'.1	46'.5
23	235° 04'.8	186° 27'.8	41'.5	191° 18'.6	15'.6	207° 17'.2	14'.0	44° 21'.6	46'.5
2 Thursday 00	250° 07'.3	201° 27'.3	16° 42'.4 N	206° 19'.2	16° 16'.2 N	222° 19'.2	10° 14'.2 N	59° 24'.2	1° 46'.5 S
01	265° 09'.8	216° 26'.7	43'.3	221° 19'.8	16'.7	237° 21'.2	14'.3	74° 26'.7	46'.5
02	280° 12'.2	231° 26'.1	44'.1	236° 20'.5	17'.3	252° 23'.1	14'.5	89° 29'.2	46'.5
03	295° 14'.7	246° 25'.5	45'.0	251° 21'.1	17'.8	267° 25'.1	14'.7	104° 31'.7	46'.5
04	310° 17'.1	261° 24'.9	45'.9	266° 21'.8	18'.4	282° 27'.1	14'.9	119° 34'.2	46'.5
05	325° 19'.6	276° 24'.4	46'.7	281° 22'.4	18'.9	297° 29'.0	15'.1	134° 36'.7	46'.4
06	340° 22'.1	291° 23'.8	47'.6	296° 23'.0	19'.5	312° 31'.0	15'.2	149° 39'.2	46'.4
07	355° 24'.5	306° 23'.2	48'.5	311° 23'.7	20'.0	327° 33'.0	15'.4	164° 41'.7	46'.4
08	10° 27'.0	321° 22'.6	49'.3	326° 24'.3	20'.6	342° 34'.9	15'.6	179° 44'.2	46'.4
09	25° 29'.5	336° 22'.0	50'.2	341° 25'.0	21'.1	357° 36'.9	15'.8	194° 46'.8	46'.4
10	40° 31'.9	351° 21'.4	51'.0	356° 25'.6	21'.7	12° 38'.9	15'.9	209° 49'.3	46'.4
11	55° 34'.4	6° 20'.9	51'.9	11° 26'.2	22'.2	27° 40'.8	16'.1	224° 51'.8	46'.4
12	70° 36'.9	21° 20'.3	16° 52'.8 N	26° 26'.9	16° 22'.8 N	42° 42'.8	10° 16'.3 N	239° 54'.3	1° 46'.4 S
13	85° 39'.3	36° 19'.7	53'.6	41° 27'.5	23'.3	57° 44'.8	16'.5	254° 56'.8	46'.4
14	100° 41'.8	51° 19'.1	54'.5	56° 28'.2	23'.9	72° 46'.7	16'.7	269° 59'.3	46'.4
15	115° 44'.3	66° 18'.5	55'.3	71° 28'.8	24'.4	87° 48'.7	16'.8	285° 01'.8	46'.4
16	130° 46'.7	81° 17'.9	56'.2	86° 29'.4	25'.0	102° 50'.7	17'.0	300° 04'.3	46'.4
17	145° 49'.2	96° 17'.3	57'.0	101° 30'.1	25'.5	117° 52'.6	17'.2	315° 06'.8	46'.3
18	160° 51'.6	111° 16'.7	57'.9	116° 30'.7	26'.1	132° 54'.6	17'.4	330° 09'.3	46'.3
19	175° 54'.1	126° 16'.2	58'.8	131° 31'.4	26'.6	147° 56'.6	17'.6	345° 11'.8	46'.3
20	190° 56'.6	141° 15'.6	59'.6	146° 32'.0	27'.2	162° 58'.5	17'.7	0° 14'.3	46'.3
21	205° 59'.0	156° 15'.0	17° 00'.5 N	161° 32'.6	27'.7	178° 00'.5	17'.9	15° 16'.9	46'.3
22	221° 01'.5	171° 14'.4	01'.3	176° 33'.3	28'.3	193° 02'.5	18'.1	30° 19'.4	46'.3
23	236° 04'.0	186° 13'.8	02'.2	191° 33'.9	28'.8	208° 04'.4	18'.3	45° 21'.9	46'.3
	M.P. 07:18	v -0'.6	d 0'.9	v 0'.6	d 0'.6	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.4 S
Achernar	335° 28'.2	57° 10'.5 S
Acrux	173° 10'.8	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.6	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.5 N
Alnair	27° 45'.4	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.6	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.2	29° 09'.1 N
Altair	62° 09'.4	8° 53'.9 N
Ankaa	353° 17'.3	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.3	69° 02'.9 S
Avior	234° 19'.1	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.4 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.3	45° 19'.1 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.5	17° 55'.3 S
Dubhe	193° 53'.3	61° 41'.5 N
Elnath	278° 14'.9	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.2 N
Enif	33° 48'.5	9° 55'.7 N
Fomalhaut	15° 25'.6	29° 33'.5 S
Gacrux	172° 02'.3	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 25'.9 S
Hamal	328° 02'.7	23° 30'.9 N
Kaus Aust.	83° 45'.4	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.6 N
Markab	13° 39'.8	15° 16'.0 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.5	69° 46'.3 S
Mirfak	308° 43'.0	49° 54'.0 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.6 S
Polaris	318° 53'.7	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.6	56° 35'.8 N
Shaula	96° 23'.5	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.1 S
Vega	80° 39'.6	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	312° 32'.9	10:34
Mars	316° 55'.6	10:15
Jupiter	332° 23'.9	09:13
Saturn	169° 15'.7	20:03

SUN

GHA	Dec
180° 36'.4	21° 50'.0 N
195° 36'.3	50'.3
210° 36'.2	50'.7
225° 36'.1	51'.1
240° 36'.0	51'.4
255° 36'.0	51'.8
270° 35'.9	52'.2
285° 35'.8	52'.5
300° 35'.7	52'.9
315° 35'.6	53'.2
330° 35'.5	53'.6
345° 35'.4	53'.9
0° 35'.3	21° 54'.3 N
15° 35'.2	54'.7
30° 35'.1	55'.0
45° 35'.0	55'.4
60° 34'.9	55'.7
75° 34'.9	56'.1
90° 34'.8	56'.4
105° 34'.7	56'.8
120° 34'.6	57'.1
135° 34'.5	57'.5
150° 34'.4	57'.8
165° 34'.3	58'.2
180° 34'.2	21° 58'.5 N
195° 34'.1	58'.9
210° 34'.0	59'.2
225° 33'.9	59'.6
240° 33'.8	59'.9
255° 33'.7	22° 00'.3 N
270° 33'.6	00'.6
285° 33'.5	01'.0
300° 33'.4	01'.3
315° 33'.4	01'.6
330° 33'.3	02'.0
345° 33'.2	02'.3
0° 33'.1	22° 02'.7 N
15° 33'.0	03'.0
30° 32'.9	03'.3
45° 32'.8	03'.7
60° 32'.7	04'.0
75° 32'.6	04'.4
90° 32'.5	04'.7
105° 32'.4	05'.0
120° 32'.3	05'.4
135° 32'.2	05'.7
150° 32'.1	06'.0
165° 32'.0	06'.4
180° 31'.9	22° 06'.7 N
195° 31'.8	07'.0
210° 31'.7	07'.4
225° 31'.6	07'.7
240° 31'.5	08'.0
255° 31'.4	08'.4
270° 31'.3	08'.7
285° 31'.2	09'.0
300° 31'.1	09'.3
315° 31'.0	09'.7
330° 30'.9	10'.0
345° 30'.8	10'.3
0° 30'.7	22° 10'.6 N
15° 30'.6	11'.0
30° 30'.5	11'.3
45° 30'.4	11'.6
60° 30'.3	11'.9
75° 30'.2	12'.3
90° 30'.1	12'.6
105° 30'.0	12'.9
120° 29'.9	13'.2
135° 29'.8	13'.5
150° 29'.7	13'.8
165° 29'.6	14'.2

SD 15'.8 d 0'.3

MOON

GHA	v	Dec	d	HP
203° 51'.0	11'.5	20° 03'.4 N	6'.5	55'.0
218° 21'.5	11'.4	09'.9	6'.4	
232° 51'.9	11'.4	16'.3	6'.3	
247° 22'.3	11'.3	22'.6	6'.2	
261° 52'.6	11'.3	28'.8	6'.2	55'.1
276° 22'.9	11'.2	35'.0	6'.0	
290° 53'.1	11'.1	41'.0	5'.9	
305° 23'.2	11'.1	46'.9	5'.8	
319° 53'.3	11'.0	52'.7	5'.8	
334° 23'.3	10'.9	58'.5	5'.6	
348° 53'.2	10'.9	21° 04'.1 N	5'.5	55'.2
3° 23'.1	10'.8	09'.6	5'.5	
17° 52'.9	10'.7	21° 15'.1 N	5'.3	55'.2
32° 22'.6	10'.7	20'.4	5'.2	
46° 52'.3	10'.6	25'.6	5'.1	
61° 21'.9	10'.5	30'.7	5'.1	55'.3
75° 51'.4	10'.5	35'.8	4'.9	
90° 20'.9	10'.4	40'.7	4'.8	
104° 50'.3	10'.4	45'.5	4'.7	
119° 19'.7	10'.3	50'.2	4'.6	
133° 49'.0	10'.2	54'.8	4'.5	55'.4
148° 18'.2	10'.2	59'.3	4'.4	
162° 47'.4	10'.2	22° 03'.7 N	4'.2	
177° 16'.6	10'.0	07'.9	4'.2	
191° 45'.6	10'.0	22° 12'.1 N	4'.1	55'.4
206° 14'.6	10'.0	16'.2	3'.9	55'.5
220° 43'.6	9'.9	20'.1	3'.8	
235° 12'.5	9'.8	23'.9	3'.7	
249° 41'.3	9'.8	27'.6	3'.6	
264° 10'.1	9'.8	31'.2	3'.5	
278° 38'.9	9'.6	34'.7	3'.4	55'.6
293° 07'.5	9'.7	38'.1	3'.3	
307° 36'.2	9'.5	41'.4	3'.1	
322° 04'.7	9'.6	44'.5	3'.0	
336° 33'.3	9'.4	47'.5	2'.9	
351° 01'.7	9'.5	50'.4	2'.8	55'.7
5° 30'.2	9'.3	22° 53'.2 N	2'.7	55'.7
19° 58'.5	9'.4	55'.9	2'.5	
34° 26'.9	9'.3	58'.4	2'.5	
48° 55'.2	9'.2	23° 00'.9 N	2'.3	
63° 23'.4	9'.2	03'.2	2'.2	55'.8
77° 51'.6	9'.1	05'.4	2'.0	
92° 19'.7	9'.1	07'.4	2'.0	
106° 47'.8	9'.1	09'.4	1'.8	
121° 15'.9	9'.0	11'.2	1'.7	
135° 43'.9	9'.0	12'.9	1'.6	55'.9
150° 11'.9	9'.0	14'.5	1'.4	
164° 39'.9	8'.9	15'.9	1'.3	
179° 07'.8	8'.8	23° 17'.2 N	1'.2	55'.9
193° 35'.6	8'.9	18'.4	1'.1	
208° 03'.5	8'.8	19'.5	0'.9	56'.0
222° 31'.3	8'.7	20'.4	0'.9	
236° 59'.0	8'.8	21'.3	0'.7	
251° 26'.8	8'.7	22'.0	0'.5	
265° 54'.5	8'.6	22'.5	0'.4	56'.1
280° 22'.1	8'.7	22'.9	0'.4	
294° 49'.8	8'.6	23'.3	0'.1	
309° 17'.4	8'.6	23'.4	0'.1	
323° 45'.0	8'.5	23'.5	0'.1	
338° 12'.5	8'.6	23'.4	0'.2	56'.2
352° 40'.1	8'.5	23° 23'.2 N	0'.3	56'.2
7° 07'.6	8'.5	22'.9	0'.5	
21° 35'.1	8'.5	22'.4	0'.6	
36° 02'.6	8'.4	21'.8	0'.7	
50° 30'.0	8'.4	21'.1	0'.9	56'.3
64° 57'.4	8'.5	20'.2	1'.0	
79° 24'.9	8'.4	19'.2	1'.1	
93° 52'.3	8'.3	18'.1	1'.3	
108° 19'.6	8'.4	16'.8	1'.3	56'.4
122° 47'.0	8'.4	15'.5	1'.6	
137° 14'.4	8'.3	13'.9	1'.6	
151° 41'.7	8'.3	12'.3	1'.8	

SD 15'.0 15'.2 15'.3

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 31	Moonrise 1	Moonrise 2
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	-	00:09	-	-
66°	-	-	01:14	00:46	00:50	01:09
64°	-	-	01:59	01:13	01:29	02:02
62°	-	00:08	02:28	01:33	01:56	02:34
60°	-	01:27	02:50	01:50	02:17	02:58
N 58°	-	02:01	03:08	02:05	02:35	03:17
56°	00:07	02:25	03:22	02:17	02:49	03:33
54°	01:19	02:44	03:35	02:28	03:02	03:47
52°	01:51	03:00	03:46	02:37	03:13	03:59
50°	02:13	03:14	03:56	02:46	03:23	04:09
45°	02:53	03:41	04:17	03:04	03:44	04:32
N 40°	03:21	04:01	04:33	03:19	04:01	04:50
35°	03:42	04:18	04:47	03:32	04:15	05:05
30°	04:00	04:32	04:59	03:43	04:27	05:18
20°	04:27	04:56	05:20	04:02	04:49	05:40
N 10°	04:48	05:15	05:38	04:18	05:07	05:59
0°	05:06	05:32	05:54	04:34	05:25	06:17
S 10°	05:22	05:48	06:10	04:50	05:42	06:36
20°	05:37	06:04	06:28	05:07	06:01	06:55
30°	05:52	06:21	06:47	05:26	06:22	07:18
35°	06:00	06:31	06:59	05:37	06:35	07:31
40°	06:08	06:42	07:12	05:51	06:50	07:46
45°	06:18	06:54	07:28	06:06	07:07	08:04
S 50°	06:28	07:09	07:47	06:25	07:29	08:27
52°	06:33	07:16	07:56	06:34	07:39	08:37
54°	06:38	07:23	08:06	06:45	07:51	08:50
56°	06:44	07:32	08:17	06:56	08:04	09:04
58°	06:50	07:41	08:30	07:10	08:20	09:20
S 60°	06:56	07:51	08:46	07:25	08:38	09:40
S 62°	07:03	08:03	09:04	07:44	09:02	10:05

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 31	Moonset 1	Moonset 2
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	-	-	-	-
66°	22:46	-	-	21:26	22:57	23:47
64°	21:59	-	-	20:48	22:04	22:57
62°	21:29	-	-	20:21	21:32	22:25
60°	21:07	22:31	-	20:00	21:08	22:02
N 58°	20:49	21:56	-	19:43	20:49	21:43
56°	20:34	21:32	-	19:29	20:33	21:27
54°	20:21	21:12	22:39	19:16	20:19	21:13
52°	20:10	20:56	22:06	19:05	20:07	21:01
50°	20:00	20:43	21:43	18:56	19:57	20:51
45°	19:39	20:16	21:03	18:35	19:35	20:29
N 40°	19:22	19:55	20:35	18:19	19:17	20:11
35°	19:08	19:38	20:14	18:05	19:02	19:56
30°	18:56	19:23	19:56	17:53	18:49	19:43
20°	18:36	19:00	19:29	17:33	18:27	19:21
N 10°	18:18	18:41	19:08	17:15	18:08	19:01
0°	18:01	18:24	18:50	16:58	17:50	18:43
S 10°	17:45	18:08	18:34	16:41	17:32	18:25
20°	17:28	17:52	18:19	16:24	17:13	18:06
30°	17:08	17:34	18:04	16:03	16:51	17:43
35°	16:56	17:24	17:56	15:51	16:38	17:30
40°	16:43	17:13	17:47	15:38	16:23	17:15
45°	16:28	17:01	17:38	15:22	16:05	16:57
S 50°	16:09	16:46	17:27	15:02	15:43	16:35
52°	16:00	16:39	17:22	14:52	15:33	16:24
54°	15:49	16:32	17:17	14:42	15:21	16:12
56°	15:38	16:24	17:12	14:30	15:07	15:58
58°	15:25	16:14	17:06	14:16	14:52	15:41
S 60°	15:09	16:04	16:59	14:00	14:33	15:21
S 62°	14:51	15:52	16:52	13:41	14:09	14:57

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
31	2 26	2 21	11:58	10:46	23:11	28d 2%
1	2 17	2 12	11:58	11:37	24:04	29d 0%
2	2 08	2 03	11:58	12:30	00:04	1d 0%

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2011 June 3, 4, 5 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.6	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
3 Friday 00	251° 06'.4	201° 13'.2	17° 03'.0 N	206° 34'.6	16° 29'.4 N	223° 06'.4	10° 18'.5 N	60° 24'.4	1° 46'.3 S
01	266° 08'.9	216° 12'.6	03'.9	221° 35'.2	29'.9	238° 08'.4	18'.6	75° 26'.9	46'.3
02	281° 11'.4	231° 12'.0	04'.7	236° 35'.8	30'.4	253° 10'.3	18'.8	90° 29'.4	46'.3
03	296° 13'.8	246° 11'.4	05'.6	251° 36'.5	31'.0	268° 12'.3	19'.0	105° 31'.9	46'.3
04	311° 16'.3	261° 10'.8	06'.4	266° 37'.1	31'.5	283° 14'.3	19'.2	120° 34'.4	46'.3
05	326° 18'.7	276° 10'.2	07'.2	281° 37'.7	32'.1	298° 16'.3	19'.3	135° 36'.9	46'.3
06	341° 21'.2	291° 09'.6	08'.1	296° 38'.4	32'.6	313° 18'.2	19'.5	150° 39'.4	46'.2
07	356° 23'.7	306° 09'.0	08'.9	311° 39'.0	33'.2	328° 20'.2	19'.7	165° 41'.9	46'.2
08	11° 26'.1	321° 08'.5	09'.8	326° 39'.7	33'.7	343° 22'.2	19'.9	180° 44'.4	46'.2
09	26° 28'.6	336° 07'.9	10'.6	341° 40'.3	34'.3	358° 24'.1	20'.1	195° 46'.9	46'.2
10	41° 31'.1	351° 07'.3	11'.5	356° 40'.9	34'.8	13° 26'.1	20'.2	210° 49'.4	46'.2
11	56° 33'.5	6° 06'.7	12'.3	11° 41'.6	35'.3	28° 28'.1	20'.4	225° 51'.9	46'.2
12	71° 36'.0	21° 06'.1	17° 13'.1 N	26° 42'.2	16° 35'.9 N	43° 30'.0	10° 20'.6 N	240° 54'.5	1° 46'.2 S
13	86° 38'.5	36° 05'.5	14'.0	41° 42'.9	36'.4	58° 32'.0	20'.8	255° 57'.0	46'.2
14	101° 40'.9	51° 04'.9	14'.8	56° 43'.5	37'.0	73° 34'.0	20'.9	270° 59'.5	46'.2
15	116° 43'.4	66° 04'.3	15'.7	71° 44'.1	37'.5	88° 36'.0	21'.1	286° 02'.0	46'.2
16	131° 45'.9	81° 03'.7	16'.5	86° 44'.8	38'.0	103° 37'.9	21'.3	301° 04'.5	46'.2
17	146° 48'.3	96° 03'.1	17'.3	101° 45'.4	38'.6	118° 39'.9	21'.5	316° 07'.0	46'.2
18	161° 50'.8	111° 02'.5	18'.2	116° 46'.0	39'.1	133° 41'.9	21'.7	331° 09'.5	46'.2
19	176° 53'.2	126° 01'.9	19'.0	131° 46'.7	39'.7	148° 43'.8	21'.8	346° 12'.0	46'.2
20	191° 55'.7	141° 01'.3	19'.8	146° 47'.3	40'.2	163° 45'.8	22'.0	1° 14'.5	46'.2
21	206° 58'.2	156° 00'.7	20'.7	161° 48'.0	40'.7	178° 47'.8	22'.2	16° 17'.0	46'.1
22	222° 00'.6	171° 00'.1	21'.5	176° 48'.6	41'.3	193° 49'.7	22'.4	31° 19'.5	46'.1
23	237° 03'.1	185° 59'.5	22'.3	191° 49'.2	41'.8	208° 51'.7	22'.5	46° 22'.0	46'.1
4 Saturday 00	252° 05'.6	200° 58'.9	17° 23'.2 N	206° 49'.9	16° 42'.4 N	223° 53'.7	10° 22'.7 N	61° 24'.5	1° 46'.1 S
01	267° 08'.0	215° 58'.3	24'.0	221° 50'.5	42'.9	238° 55'.7	22'.9	76° 27'.0	46'.1
02	282° 10'.5	230° 57'.7	24'.8	236° 51'.1	43'.4	253° 57'.6	23'.1	91° 29'.5	46'.1
03	297° 13'.0	245° 57'.1	25'.7	251° 51'.8	44'.0	268° 59'.6	23'.2	106° 32'.0	46'.1
04	312° 15'.4	260° 56'.5	26'.5	266° 52'.4	44'.5	284° 01'.6	23'.4	121° 34'.5	46'.1
05	327° 17'.9	275° 55'.8	27'.3	281° 53'.0	45'.0	299° 03'.6	23'.6	136° 37'.0	46'.1
06	342° 20'.4	290° 55'.2	28'.2	296° 53'.7	45'.6	314° 05'.5	23'.8	151° 39'.5	46'.1
07	357° 22'.8	305° 54'.6	29'.0	311° 54'.3	46'.1	329° 07'.5	23'.9	166° 42'.0	46'.1
08	12° 25'.3	320° 54'.0	29'.8	326° 55'.0	46'.7	344° 09'.5	24'.1	181° 44'.5	46'.1
09	27° 27'.7	335° 53'.4	30'.6	341° 55'.6	47'.2	359° 11'.4	24'.3	196° 47'.0	46'.1
10	42° 30'.2	350° 52'.8	31'.5	356° 56'.2	47'.7	14° 13'.4	24'.5	211° 49'.5	46'.1
11	57° 32'.7	5° 52'.2	32'.3	11° 56'.9	48'.3	29° 15'.4	24'.7	226° 52'.0	46'.1
12	72° 35'.1	20° 51'.6	17° 33'.1 N	26° 57'.5	16° 48'.8 N	44° 17'.4	10° 24'.8 N	241° 54'.5	1° 46'.1 S
13	87° 37'.6	35° 51'.0	33'.9	41° 58'.1	49'.3	59° 19'.3	25'.0	256° 57'.0	46'.1
14	102° 40'.1	50° 50'.4	34'.7	56° 58'.8	49'.9	74° 21'.3	25'.2	271° 59'.5	46'.1
15	117° 42'.5	65° 49'.8	35'.6	71° 59'.4	50'.4	89° 23'.3	25'.4	287° 02'.0	46'.0
16	132° 45'.0	80° 49'.2	36'.4	87° 00'.1	50'.9	104° 25'.3	25'.5	302° 04'.5	46'.0
17	147° 47'.5	95° 48'.6	37'.2	102° 00'.7	51'.5	119° 27'.2	25'.7	317° 07'.0	46'.0
18	162° 49'.9	110° 47'.9	38'.0	117° 01'.3	52'.0	134° 29'.2	25'.9	332° 09'.5	46'.0
19	177° 52'.4	125° 47'.3	38'.8	132° 02'.0	52'.5	149° 31'.2	26'.1	347° 12'.0	46'.0
20	192° 54'.9	140° 46'.7	39'.7	147° 02'.6	53'.1	164° 33'.1	26'.2	2° 14'.5	46'.0
21	207° 57'.3	155° 46'.1	40'.5	162° 03'.2	53'.6	179° 35'.1	26'.4	17° 17'.0	46'.0
22	222° 59'.8	170° 45'.5	41'.3	177° 03'.9	54'.1	194° 37'.1	26'.6	32° 19'.5	46'.0
23	238° 02'.2	185° 44'.9	42'.1	192° 04'.5	54'.7	209° 39'.1	26'.8	47° 22'.0	46'.0
5 Sunday 00	253° 04'.7	200° 44'.3	17° 42'.9 N	207° 05'.1	16° 55'.2 N	224° 41'.0	10° 26'.9 N	62° 24'.5	1° 46'.0 S
01	268° 07'.2	215° 43'.6	43'.7	222° 05'.8	55'.7	239° 43'.0	27'.1	77° 27'.0	46'.0
02	283° 09'.6	230° 43'.0	44'.5	237° 06'.4	56'.3	254° 45'.0	27'.3	92° 29'.5	46'.0
03	298° 12'.1	245° 42'.4	45'.3	252° 07'.0	56'.8	269° 47'.0	27'.5	107° 32'.0	46'.0
04	313° 14'.6	260° 41'.8	46'.2	267° 07'.7	57'.3	284° 48'.9	27'.6	122° 34'.5	46'.0
05	328° 17'.0	275° 41'.2	47'.0	282° 08'.3	57'.8	299° 50'.9	27'.8	137° 37'.0	46'.0
06	343° 19'.5	290° 40'.6	47'.8	297° 08'.9	58'.4	314° 52'.9	28'.0	152° 39'.5	46'.0
07	358° 22'.0	305° 39'.9	48'.6	312° 09'.6	58'.9	329° 54'.9	28'.2	167° 42'.0	46'.0
08	13° 24'.4	320° 39'.3	49'.4	327° 10'.2	59'.4	344° 56'.8	28'.3	182° 44'.5	46'.0
09	28° 26'.9	335° 38'.7	50'.2	342° 10'.9	17° 00'.0 N	359° 58'.8	28'.5	197° 47'.0	46'.0
10	43° 29'.4	350° 38'.1	51'.0	357° 11'.5	00'.5	15° 00'.8	28'.7	212° 49'.5	46'.0
11	58° 31'.8	5° 37'.5	51'.8	12° 12'.1	01'.0	30° 02'.8	28'.9	227° 52'.0	46'.0
12	73° 34'.3	20° 36'.9	17° 52'.6 N	27° 12'.8	17° 01'.5 N	45° 04'.7	10° 29'.0 N	242° 54'.5	1° 46'.0 S
13	88° 36'.7	35° 36'.2	53'.4	42° 13'.4	02'.1	60° 06'.7	29'.2	257° 57'.0	46'.0
14	103° 39'.2	50° 35'.6	54'.2	57° 14'.0	02'.6	75° 08'.7	29'.4	272° 59'.5	46'.0
15	118° 41'.7	65° 35'.0	55'.0	72° 14'.7	03'.1	90° 10'.7	29'.6	288° 02'.0	45'.9
16	133° 44'.1	80° 34'.4	55'.8	87° 15'.3	03'.6	105° 12'.6	29'.7	303° 04'.5	45'.9
17	148° 46'.6	95° 33'.7	56'.6	102° 15'.9	04'.2	120° 14'.6	29'.9	318° 07'.0	45'.9
18	163° 49'.1	110° 33'.1	57'.4	117° 16'.6	04'.7	135° 16'.6	30'.1	333° 09'.5	45'.9
19	178° 51'.5	125° 32'.5	58'.2	132° 17'.2	05'.2	150° 18'.6	30'.3	348° 12'.0	45'.9
20	193° 54'.0	140° 31'.9	59'.0	147° 17'.8	05'.8	165° 20'.6	30'.4	3° 14'.5	45'.9
21	208° 56'.5	155° 31'.3	59'.8	162° 18'.5	06'.3	180° 22'.5	30'.6	18° 17'.0	45'.9
22	223° 58'.9	170° 30'.6	18° 00'.6 N	177° 19'.1	06'.8	195° 24'.5	30'.8	33° 19'.5	45'.9
23	239° 01'.4	185° 30'.0	01'.4	192° 19'.7	07'.3	210° 26'.5	31'.0	48° 22'.0	45'.9
	M.P. 07:07	v -0'.6	d 0'.8	v 0'.6	d 0'.5	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.4 S
Achernar	335° 28'.2	57° 10'.5 S
Acrux	173° 10'.8	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.5 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.6	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.5 N
Alnair	27° 45'.4	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.1	29° 09'.1 N
Altair	62° 09'.4	8° 53'.9 N
Ankaa	353° 17'.3	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.3	69° 02'.9 S
Avior	234° 19'.1	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.2	45° 19'.2 N
Denebola	182° 35'.0	14° 30'.4 N
Diphda	348° 57'.5	17° 55'.3 S
Dubhe	193° 53'.4	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.2 N
Enif	33° 48'.4	9° 55'.7 N
Fomalhaut	15° 25'.6	29° 33'.4 S
Gacrux	172° 02'.4	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 26'.0 S
Hamal	328° 02'.7	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.6 N
Markab	13° 39'.8	15° 16'.0 N
Menkar	314° 16'.9	4° 08'.0 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.5	69° 46'.3 S
Mirfak	308° 42'.9	49° 54'.0 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.6 S
Polaris	318° 52'.7	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.5	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 42'.5	56° 35'.8 N
Shaula	96° 23'.5	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.1 S
Vega	80° 39'.6	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	308° 53'.3	10:37
Mars	314° 44'.3	10:12
Jupiter	331° 48'.1	09:03
Saturn	169° 18'.9	19:51

SUN									
GHA	Dec	GHA	v	Dec	d	HP
180° 29'.5	22° 14'.5 N	166° 09'.0	8'.4	23° 10'.5 N	1'.9	56'.4
195° 29'.4	14'.8	180° 36'.4	8'.3	08'.6	2'.0	56'.5
210° 29'.3	15'.1	195° 03'.7	8'.3	06'.6	2'.2	
225° 29'.2	15'.4	209° 31'.0	8'.3	04'.4	2'.3	
240° 29'.1	15'.7	223° 58'.3	8'.3	02'.1	2'.4	
255° 29'.0	16'.1	238° 25'.6	8'.3	22° 59'.7 N	2'.6	
270° 28'.9	16'.4	252° 52'.9	8'.3	57'.1	2'.7	56'.6
285° 28'.8	16'.7	267° 20'.2	8'.3	54'.4	2'.8	
300° 28'.7	17'.0	281° 47'.5	8'.3	51'.6	3'.0	
315° 28'.6	17'.3	296° 14'.8	8'.3	48'.6	3'.1	
330° 28'.5	17'.6	310° 42'.1	8'.2	45'.5	3'.2	56'.7
345° 28'.4	17'.9	325° 09'.3	8'.3	42'.3	3'.3	
0° 28'.3	22° 18'.2 N	339° 36'.6	8'.3	22° 39'.0 N	3'.5	56'.7
15° 28'.2	18'.5	354° 03'.9	8'.4	35'.5	3'.6	
30° 28'.1	18'.8	8° 31'.3	8'.3	31'.9	3'.8	
45° 28'.0	19'.1	22° 58'.6	8'.3	28'.1	3'.8	56'.8
60° 27'.9	19'.5	37° 25'.9	8'.3	24'.3	4'.0	
75° 27'.7	19'.8	51° 53'.2	8'.4	20'.3	4'.2	
90° 27'.6	20'.1	66° 20'.6	8'.3	16'.1	4'.2	
105° 27'.5	20'.4	80° 47'.9	8'.4	11'.9	4'.4	
120° 27'.4	20'.7	95° 15'.3	8'.4	07'.5	4'.5	56'.9
135° 27'.3	21'.0	109° 42'.7	8'.3	03'.0	4'.7	
150° 27'.2	21'.3	124° 10'.0	8'.4	21° 58'.3 N	4'.7	
165° 27'.1	21'.6	138° 37'.4	8'.5	53'.6	4'.9	
180° 27'.0	22° 21'.9 N	153° 04'.9	8'.4	21° 48'.7 N	5'.0	56'.9
195° 26'.9	22'.2	167° 32'.3	8'.5	43'.7	5'.2	57'.0
210° 26'.8	22'.5	181° 59'.8	8'.4	38'.5	5'.3	
225° 26'.7	22'.8	196° 27'.2	8'.5	33'.2	5'.4	
240° 26'.6	23'.1	210° 54'.7	8'.5	27'.8	5'.5	
255° 26'.5	23'.4	225° 22'.2	8'.6	22'.3	5'.6	57'.1
270° 26'.4	23'.7	239° 49'.8	8'.5	16'.7	5'.8	
285° 26'.3	24'.0	254° 17'.3	8'.6	10'.9	5'.9	
300° 26'.2	24'.3	268° 44'.9	8'.6	05'.0	6'.0	
315° 26'.1	24'.5	283° 12'.5	8'.6	20° 59'.0 N	6'.2	
330° 25'.9	24'.8	297° 40'.1	8'.7	52'.8	6'.2	57'.2
345° 25'.8	25'.1	312° 07'.8	8'.7	46'.6	6'.4	
0° 25'.7	22° 25'.4 N	326° 35'.5	8'.7	20° 40'.2 N	6'.5	57'.2
15° 25'.6	25'.7	341° 03'.2	8'.7	33'.7	6'.6	
30° 25'.5	26'.0	355° 30'.9	8'.7	27'.1	6'.8	
45° 25'.4	26'.3	9° 58'.6	8'.8	20'.3	6'.8	57'.3
60° 25'.3	26'.6	24° 26'.4	8'.8	13'.5	7'.0	
75° 25'.2	26'.9	38° 54'.2	8'.9	06'.5	7'.1	
90° 25'.1	27'.2	53° 22'.1	8'.9	19° 59'.4 N	7'.2	
105° 25'.0	27'.5	67° 50'.0	8'.9	52'.2	7'.4	
120° 24'.9	27'.7	82° 17'.9	8'.9	44'.8	7'.4	57'.4
135° 24'.8	28'.0	96° 45'.8	9'.0	37'.4	7'.6	
150° 24'.7	28'.3	111° 13'.8	9'.0	29'.8	7'.6	
165° 24'.5	28'.6	125° 41'.8	9'.0	22'.2	7'.8	
180° 24'.4	22° 28'.9 N	140° 09'.8	9'.1	19° 14'.4 N	7'.9	57'.4
195° 24'.3	29'.2	154° 37'.9	9'.1	06'.5	8'.0	57'.5
210° 24'.2	29'.4	169° 06'.0	9'.1	18° 58'.5 N	8'.1	
225° 24'.1	29'.7	183° 34'.1	9'.2	50'.4	8'.3	
240° 24'.0	30'.0	198° 02'.3	9'.2	42'.1	8'.3	
255° 23'.9	30'.3	212° 30'.5	9'.2	33'.8	8'.5	
270° 23'.8	30'.6	226° 58'.7	9'.3	25'.3	8'.5	57'.6
285° 23'.7	30'.8	241° 27'.0	9'.3	16'.8	8'.7	
300° 23'.6	31'.1	255° 55'.3	9'.3	08'.1	8'.7	
315° 23'.4	31'.4	270° 23'.6	9'.4	17° 59'.4 N	8'.9	
330° 23'.3	31'.7	284° 52'.0	9'.4	50'.5	9'.0	
345° 23'.2	32'.0	299° 20'.4	9'.5	41'.5	9'.1	57'.7
0° 23'.1	22° 32'.2 N	313° 48'.9	9'.5	17° 32'.4 N	9'.2	57'.7
15° 23'.0	32'.5	328° 17'.4	9'.5	23'.2	9'.2	
30° 22'.9	32'.8	342° 45'.9	9'.6	14'.0	9'.4	
45° 22'.8	33'.1	357° 14'.5	9'.5	04'.6	9'.5	
60° 22'.7	33'.3	11° 43'.0	9'.7	16° 55'.1 N	9'.6	57'.8
75° 22'.6	33'.6	26° 11'.7	9'.7	45'.5	9'.7	
90° 22'.4	33'.9	40° 40'.4	9'.7	35'.8	9'.7	
105° 22'.3	34'.1	55° 09'.1	9'.7	26'.1	9'.9	
120° 22'.2	34'.4	69° 37'.8	9'.8	16'.2	10'.0	
135° 22'.1	34'.7	84° 06'.6	9'.8	06'.2	10'.0	57'.9
150° 22'.0	35'.0	98° 35'.4	9'.9	15° 56'.2 N	10'.2	
165° 21'.9	35'.2	113° 04'.3	9'.8	46'.0	10'.2	
SD 15'.8	d 0'.3	SD	15'.4		15'.6	15'.7

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 3	Moonrise 4	Moonrise 5
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	04:21
68°	-	-	-	-	02:48	05:08
66°	-	-	01:01	02:11	03:50	05:39
64°	-	-	01:52	03:01	04:25	06:02
62°	-	-	02:23	03:32	04:50	06:20
60°	-	01:19	02:46	03:56	05:10	06:34
N 58°	-	01:55	03:04	04:15	05:26	06:47
56°	-	02:21	03:19	04:30	05:40	06:58
54°	01:12	02:41	03:33	04:44	05:52	07:07
52°	01:46	02:57	03:44	04:56	06:02	07:16
50°	02:09	03:11	03:54	05:06	06:12	07:24
45°	02:51	03:39	04:15	05:28	06:31	07:40
N 40°	03:19	04:00	04:32	05:45	06:47	07:53
35°	03:41	04:17	04:47	06:00	07:01	08:04
30°	03:59	04:32	04:59	06:13	07:12	08:14
20°	04:27	04:56	05:20	06:35	07:32	08:31
N 10°	04:48	05:15	05:38	06:54	07:50	08:45
0°	05:06	05:32	05:55	07:12	08:06	08:59
S 10°	05:22	05:49	06:11	07:29	08:22	09:13
20°	05:38	06:05	06:29	07:48	08:39	09:27
30°	05:53	06:23	06:49	08:10	08:59	09:44
35°	06:01	06:33	07:01	08:23	09:10	09:53
40°	06:10	06:44	07:14	08:38	09:24	10:04
45°	06:20	06:57	07:30	08:55	09:39	10:17
S 50°	06:31	07:12	07:50	09:17	09:58	10:32
52°	06:36	07:19	07:59	09:27	10:07	10:40
54°	06:41	07:26	08:09	09:39	10:17	10:48
56°	06:46	07:35	08:21	09:52	10:29	10:57
58°	06:53	07:44	08:35	10:07	10:42	11:07
S 60°	07:00	07:55	08:50	10:26	10:57	11:18
S 62°	07:07	08:08	09:10	10:49	11:15	11:32

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 3	Moonset 4	Moonset 5
N 72°	-	-	-	-	-	25:20
N 70°	-	-	-	-	-	01:24
68°	-	-	-	-	01:04	00:35
66°	23:00	-	-	-	00:01	00:04
64°	22:07	-	-	23:26	23:40	23:48
62°	21:35	-	-	23:00	23:21	23:35
60°	21:12	22:40	-	22:40	23:06	23:24
N 58°	20:53	22:03	-	22:23	22:53	23:14
56°	20:38	21:37	-	22:09	22:41	23:06
54°	20:25	21:17	22:47	21:57	22:31	22:58
52°	20:13	21:00	22:12	21:46	22:22	22:51
50°	20:03	20:46	21:48	21:37	22:14	22:45
45°	19:42	20:18	21:06	21:16	21:57	22:32
N 40°	19:25	19:57	20:38	21:00	21:43	22:21
35°	19:10	19:40	20:16	20:46	21:31	22:11
30°	18:58	19:25	19:58	20:34	21:20	22:03
20°	18:37	19:01	19:30	20:13	21:02	21:49
N 10°	18:19	18:42	19:08	19:55	20:46	21:36
0°	18:02	18:24	18:50	19:38	20:31	21:24
S 10°	17:45	18:08	18:34	19:21	20:16	21:12
20°	17:28	17:51	18:19	19:02	20:00	20:59
30°	17:07	17:34	18:03	18:41	19:42	20:44
35°	16:56	17:24	17:55	18:28	19:31	20:35
40°	16:42	17:12	17:46	18:14	19:18	20:25
45°	16:26	17:00	17:37	17:57	19:03	20:13
S 50°	16:07	16:45	17:26	17:36	18:45	19:59
52°	15:57	16:38	17:21	17:26	18:36	19:52
54°	15:47	16:30	17:15	17:14	18:27	19:45
56°	15:35	16:21	17:10	17:01	18:16	19:37
58°	15:22	16:12	17:04	16:46	18:03	19:27
S 60°	15:06	16:01	16:57	16:28	17:48	19:16
S 62°	14:46	15:49	16:49	16:05	17:31	19:03

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
3	1 58	1 53	11:58	13:25	00:57	2d 3%
4	1 48	1 43	11:58	14:19	01:52	3d 7%
5	1 38	1 33	11:58	15:11	02:45	4d 14%

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2011 June 6, 7, 8 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.1		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
6 Monday 00	254° 03'.9	200° 29'.4	18° 02'.2 N	207° 20'.4	17° 07'.8 N	225° 28'.5	10° 31'.1 N	63° 24'.5	1° 45'.9 S
01	269° 06'.3	215° 28'.8	03'.0	222° 21'.0	08'.4	240° 30'.4	31'.3	78° 27'.0	45'.9
02	284° 08'.8	230° 28'.1	03'.8	237° 21'.6	08'.9	255° 32'.4	31'.5	93° 29'.5	45'.9
03	299° 11'.2	245° 27'.5	04'.6	252° 22'.3	09'.4	270° 34'.4	31'.6	108° 32'.0	45'.9
04	314° 13'.7	260° 26'.9	05'.4	267° 22'.9	09'.9	285° 36'.4	31'.8	123° 34'.5	45'.9
05	329° 16'.2	275° 26'.2	06'.2	282° 23'.5	10'.5	300° 38'.3	32'.0	138° 37'.0	45'.9
06	344° 18'.6	290° 25'.6	07'.0	297° 24'.2	11'.0	315° 40'.3	32'.2	153° 39'.4	45'.9
07	359° 21'.1	305° 25'.0	07'.7	312° 24'.8	11'.5	330° 42'.3	32'.3	168° 41'.9	45'.9
08	14° 23'.6	320° 24'.4	08'.5	327° 25'.4	12'.0	345° 44'.3	32'.5	183° 44'.4	45'.9
09	29° 26'.0	335° 23'.7	09'.3	342° 26'.1	12'.5	0° 46'.3	32'.7	198° 46'.9	45'.9
10	44° 28'.5	350° 23'.1	10'.1	357° 26'.7	13'.1	15° 48'.2	32'.9	213° 49'.4	45'.9
11	59° 31'.0	5° 22'.5	10'.9	12° 27'.3	13'.6	30° 50'.2	33'.0	228° 51'.9	45'.9
12	74° 33'.4	20° 21'.8	18° 11'.7 N	27° 28'.0	17° 14'.1 N	45° 52'.2	10° 33'.2 N	243° 54'.4	1° 45'.9 S
13	89° 35'.9	35° 21'.2	12'.5	42° 28'.6	14'.6	60° 54'.2	33'.4	258° 56'.9	45'.9
14	104° 38'.3	50° 20'.6	13'.2	57° 29'.2	15'.2	75° 56'.1	33'.6	273° 59'.4	45'.9
15	119° 40'.8	65° 19'.9	14'.0	72° 29'.9	15'.7	90° 58'.1	33'.7	289° 01'.9	45'.9
16	134° 43'.3	80° 19'.3	14'.8	87° 30'.5	16'.2	106° 00'.1	33'.9	304° 04'.4	45'.9
17	149° 45'.7	95° 18'.7	15'.6	102° 31'.1	16'.7	121° 02'.1	34'.1	319° 06'.9	45'.9
18	164° 48'.2	110° 18'.0	16'.4	117° 31'.8	17'.2	136° 04'.1	34'.2	334° 09'.4	45'.9
19	179° 50'.7	125° 17'.4	17'.2	132° 32'.4	17'.7	151° 06'.0	34'.4	349° 11'.9	45'.9
20	194° 53'.1	140° 16'.8	17'.9	147° 33'.0	18'.3	166° 08'.0	34'.6	4° 14'.4	45'.9
21	209° 55'.6	155° 16'.1	18'.7	162° 33'.7	18'.8	181° 10'.0	34'.8	19° 16'.9	45'.9
22	224° 58'.1	170° 15'.5	19'.5	177° 34'.3	19'.3	196° 12'.0	34'.9	34° 19'.3	45'.9
23	240° 00'.5	185° 14'.9	20'.3	192° 34'.9	19'.8	211° 14'.0	35'.1	49° 21'.8	45'.9
7 Tuesday 00	255° 03'.0	200° 14'.2	18° 21'.0 N	207° 35'.6	17° 20'.3 N	226° 15'.9	10° 35'.3 N	64° 24'.3	1° 45'.9 S
01	270° 05'.5	215° 13'.6	21'.8	222° 36'.2	20'.8	241° 17'.9	35'.5	79° 26'.8	45'.9
02	285° 07'.9	230° 12'.9	22'.6	237° 36'.8	21'.4	256° 19'.9	35'.6	94° 29'.3	45'.9
03	300° 10'.4	245° 12'.3	23'.4	252° 37'.5	21'.9	271° 21'.9	35'.8	109° 31'.8	45'.9
04	315° 12'.8	260° 11'.7	24'.1	267° 38'.1	22'.4	286° 23'.9	36'.0	124° 34'.3	45'.9
05	330° 15'.3	275° 11'.0	24'.9	282° 38'.7	22'.9	301° 25'.8	36'.1	139° 36'.8	45'.9
06	345° 17'.8	290° 10'.4	25'.7	297° 39'.4	23'.4	316° 27'.8	36'.3	154° 39'.3	45'.9
07	0° 20'.2	305° 09'.8	26'.4	312° 40'.0	23'.9	331° 29'.8	36'.5	169° 41'.8	45'.9
08	15° 22'.7	320° 09'.1	27'.2	327° 40'.6	24'.5	346° 31'.8	36'.7	184° 44'.3	45'.9
09	30° 25'.2	335° 08'.5	28'.0	342° 41'.3	25'.0	1° 33'.8	36'.8	199° 46'.7	45'.9
10	45° 27'.6	350° 07'.8	28'.7	357° 41'.9	25'.5	16° 35'.7	37'.0	214° 49'.2	45'.9
11	60° 30'.1	5° 07'.2	29'.5	12° 42'.5	26'.0	31° 37'.7	37'.2	229° 51'.7	45'.9
12	75° 32'.6	20° 06'.5	18° 30'.3 N	27° 43'.1	17° 26'.5 N	46° 39'.7	10° 37'.3 N	244° 54'.2	1° 45'.9 S
13	90° 35'.0	35° 05'.9	31'.0	42° 43'.8	27'.0	61° 41'.7	37'.5	259° 56'.7	45'.9
14	105° 37'.5	50° 05'.3	31'.8	57° 44'.4	27'.5	76° 43'.7	37'.7	274° 59'.2	45'.9
15	120° 40'.0	65° 04'.6	32'.6	72° 45'.0	28'.0	91° 45'.7	37'.9	290° 01'.7	45'.9
16	135° 42'.4	80° 04'.0	33'.3	87° 45'.7	28'.6	106° 47'.6	38'.0	305° 04'.2	45'.9
17	150° 44'.9	95° 03'.3	34'.1	102° 46'.3	29'.1	121° 49'.6	38'.2	320° 06'.7	45'.9
18	165° 47'.3	110° 02'.7	34'.9	117° 46'.9	29'.6	136° 51'.6	38'.4	335° 09'.2	45'.9
19	180° 49'.8	125° 02'.0	35'.6	132° 47'.6	30'.1	151° 53'.6	38'.5	350° 11'.6	45'.9
20	195° 52'.3	140° 01'.4	36'.4	147° 48'.2	30'.6	166° 55'.6	38'.7	5° 14'.1	45'.9
21	210° 54'.7	155° 00'.7	37'.1	162° 48'.8	31'.1	181° 57'.5	38'.9	20° 16'.6	45'.9
22	225° 57'.2	170° 00'.1	37'.9	177° 49'.5	31'.6	196° 59'.5	39'.1	35° 19'.1	45'.9
23	240° 59'.7	184° 59'.4	38'.6	192° 50'.1	32'.1	212° 01'.5	39'.2	50° 21'.6	45'.9
8 Wednesday 00	256° 02'.1	199° 58'.8	18° 39'.4 N	207° 50'.7	17° 32'.6 N	227° 03'.5	10° 39'.4 N	65° 24'.1	1° 45'.9 S
01	271° 04'.6	214° 58'.1	40'.2	222° 51'.3	33'.1	242° 05'.5	39'.6	80° 26'.6	45'.9
02	286° 07'.1	229° 57'.5	40'.9	237° 52'.0	33'.7	257° 07'.5	39'.7	95° 29'.1	45'.9
03	301° 09'.5	244° 56'.8	41'.7	252° 52'.6	34'.2	272° 09'.4	39'.9	110° 31'.5	45'.9
04	316° 12'.0	259° 56'.2	42'.4	267° 53'.2	34'.7	287° 11'.4	40'.1	125° 34'.0	45'.9
05	331° 14'.4	274° 55'.5	43'.2	282° 53'.9	35'.2	302° 13'.4	40'.2	140° 36'.5	45'.9
06	346° 16'.9	289° 54'.9	43'.9	297° 54'.5	35'.7	317° 15'.4	40'.4	155° 39'.0	45'.9
07	1° 19'.4	304° 54'.2	44'.7	312° 55'.1	36'.2	332° 17'.4	40'.6	170° 41'.5	45'.9
08	16° 21'.8	319° 53'.6	45'.4	327° 55'.8	36'.7	347° 19'.4	40'.8	185° 44'.0	45'.9
09	31° 24'.3	334° 52'.9	46'.2	342° 56'.4	37'.2	2° 21'.3	40'.9	200° 46'.5	45'.9
10	46° 26'.8	349° 52'.3	46'.9	357° 57'.0	37'.7	17° 23'.3	41'.1	215° 49'.0	45'.9
11	61° 29'.2	4° 51'.6	47'.7	12° 57'.7	38'.2	32° 25'.3	41'.3	230° 51'.4	45'.9
12	76° 31'.7	19° 51'.0	18° 48'.4 N	27° 58'.3	17° 38'.7 N	47° 27'.3	10° 41'.4 N	245° 53'.9	1° 45'.9 S
13	91° 34'.2	34° 50'.3	49'.1	42° 58'.9	39'.2	62° 29'.3	41'.6	260° 56'.4	45'.9
14	106° 36'.6	49° 49'.7	49'.9	57° 59'.5	39'.7	77° 31'.3	41'.8	275° 58'.9	45'.9
15	121° 39'.1	64° 49'.0	50'.6	73° 00'.2	40'.2	92° 33'.2	41'.9	291° 01'.4	45'.9
16	136° 41'.6	79° 48'.4	51'.4	88° 00'.8	40'.7	107° 35'.2	42'.1	306° 03'.9	45'.9
17	151° 44'.0	94° 47'.7	52'.1	103° 01'.4	41'.2	122° 37'.2	42'.3	321° 06'.4	45'.9
18	166° 46'.5	109° 47'.0	52'.9	118° 02'.1	41'.7	137° 39'.2	42'.5	336° 08'.8	45'.9
19	181° 48'.9	124° 46'.4	53'.6	133° 02'.7	42'.3	152° 41'.2	42'.6	351° 11'.3	45'.9
20	196° 51'.4	139° 45'.7	54'.3	148° 03'.3	42'.8	167° 43'.2	42'.8	6° 13'.8	45'.9
21	211° 53'.9	154° 45'.1	55'.1	163° 03'.9	43'.3	182° 45'.2	43'.0	21° 16'.3	45'.9
22	226° 56'.3	169° 44'.4	55'.8	178° 04'.6	43'.8	197° 47'.1	43'.1	36° 18'.8	45'.9
23	241° 58'.8	184° 43'.8	56'.5	193° 05'.2	44'.3	212° 49'.1	43'.3	51° 21'.3	45'.9
	M.P. 06:55	v -0'.6	d 0'.8	v 0'.6	d 0'.5	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.4 S
Achernar	335° 28'.1	57° 10'.4 S
Acrux	173° 10'.8	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.6	55° 54'.0 N
Alkaid	152° 59'.6	49° 15'.5 N
Alnair	27° 45'.4	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.1	29° 09'.1 N
Altair	62° 09'.4	8° 54'.0 N
Ankaa	353° 17'.2	42° 14'.4 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 02'.9 S
Avior	234° 19'.1	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.2	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.5	17° 55'.3 S
Dubhe	193° 53'.4	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.2 N
Enif	33° 48'.4	9° 55'.7 N
Fomalhaut	15° 25'.5	29° 33'.4 S
Gacrux	172° 02'.4	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.5	60° 26'.0 S
Hamal	328° 02'.7	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.6 N
Markab	13° 39'.8	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.1 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.6	69° 46'.2 S
Mirfak	308° 42'.9	49° 54'.0 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.6 S
Polaris	318° 51'.8	89° 18'.7 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.5	56° 35'.8 N
Shaula	96° 23'.5	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.1 S
Vega	80° 39'.5	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	305° 11'.2	10:40
Mars	312° 32'.6	10:09
Jupiter	331° 13'.0	08:54
Saturn	169° 21'.3	19:39

SUN				
GHA	Dec	GHA	v	Dec	d	HP
180° 21'.8	22° 35'.5 N	127° 33'.1	10'.0	15° 35'.8 N	10'.4	57'.9
195° 21'.7	35'.8	142° 02'.1	9'.9	25'.4	10'.4	
210° 21'.5	36'.0	156° 31'.0	10'.0	15'.0	10'.5	58'.0
225° 21'.4	36'.3	171° 00'.0	10'.1	04'.5	10'.6	
240° 21'.3	36'.6	185° 29'.1	10'.0	14° 53'.9 N	10'.7	
255° 21'.2	36'.8	199° 58'.1	10'.1	43'.2	10'.8	
270° 21'.1	37'.1	214° 27'.2	10'.2	32'.4	10'.8	
285° 21'.0	37'.3	228° 56'.4	10'.2	21'.6	11'.0	58'.1
300° 20'.9	37'.6	243° 25'.6	10'.2	10'.6	11'.0	
315° 20'.8	37'.9	257° 54'.8	10'.2	13° 59'.6 N	11'.1	
330° 20'.6	38'.1	272° 24'.0	10'.3	48'.5	11'.2	
345° 20'.5	38'.4	286° 53'.3	10'.3	37'.3	11'.3	
0° 20'.4	22° 38'.6 N	301° 22'.6	10'.3	13° 26'.0 N	11'.3	58'.1
15° 20'.3	38'.9	315° 51'.9	10'.4	14'.7	11'.4	58'.2
30° 20'.2	39'.2	330° 21'.3	10'.4	03'.3	11'.5	
45° 20'.1	39'.4	344° 50'.7	10'.5	12° 51'.8 N	11'.6	
60° 20'.0	39'.7	359° 20'.2	10'.4	40'.2	11'.7	
75° 19'.8	39'.9	13° 49'.6	10'.5	28'.5	11'.7	
90° 19'.7	40'.2	28° 19'.1	10'.6	16'.8	11'.8	58'.3
105° 19'.6	40'.4	42° 48'.7	10'.5	05'.0	11'.9	
120° 19'.5	40'.7	57° 18'.2	10'.6	11° 53'.1 N	11'.9	
135° 19'.4	40'.9	71° 47'.8	10'.7	41'.2	12'.0	
150° 19'.3	41'.2	86° 17'.5	10'.6	29'.2	12'.1	
165° 19'.2	41'.5	100° 47'.1	10'.7	17'.1	12'.1	
180° 19'.0	22° 41'.7 N	115° 16'.8	10'.7	11° 05'.0 N	12'.2	58'.4
195° 18'.9	42'.0	129° 46'.5	10'.7	10° 52'.8 N	12'.3	
210° 18'.8	42'.2	144° 16'.2	10'.8	40'.5	12'.3	
225° 18'.7	42'.5	158° 46'.0	10'.8	28'.2	12'.4	
240° 18'.6	42'.7	173° 15'.8	10'.8	15'.8	12'.5	
255° 18'.5	42'.9	187° 45'.6	10'.8	03'.3	12'.5	58'.5
270° 18'.3	43'.2	202° 15'.4	10'.9	9° 50'.8 N	12'.6	
285° 18'.2	43'.4	216° 45'.3	10'.9	38'.2	12'.6	
300° 18'.1	43'.7	231° 15'.2	10'.9	25'.6	12'.7	
315° 18'.0	43'.9	245° 45'.1	10'.9	12'.9	12'.8	
330° 17'.9	44'.2	260° 15'.0	10'.9	00'.1	12'.8	
345° 17'.8	44'.4	274° 44'.9	11'.0	8° 47'.3 N	12'.8	58'.6
0° 17'.6	22° 44'.7 N	289° 14'.9	11'.0	8° 34'.5 N	12'.9	58'.6
15° 17'.5	44'.9	303° 44'.9	11'.0	21'.6	13'.0	
30° 17'.4	45'.1	318° 14'.9	11'.0	08'.6	13'.0	
45° 17'.3	45'.4	332° 44'.9	11'.1	7° 55'.6 N	13'.1	
60° 17'.2	45'.6	347° 15'.0	11'.0	42'.5	13'.1	
75° 17'.1	45'.9	1° 45'.0	11'.1	29'.4	13'.1	58'.7
90° 16'.9	46'.1	16° 15'.1	11'.1	16'.3	13'.2	
105° 16'.8	46'.3	30° 45'.2	11'.1	03'.1	13'.3	
120° 16'.7	46'.6	45° 15'.3	11'.1	6° 49'.8 N	13'.2	
135° 16'.6	46'.8	59° 45'.4	11'.1	36'.6	13'.4	
150° 16'.5	47'.0	74° 15'.5	11'.2	23'.2	13'.3	
165° 16'.4	47'.3	88° 45'.7	11'.1	09'.9	13'.4	58'.8
180° 16'.2	22° 47'.5 N	103° 15'.8	11'.2	5° 56'.5 N	13'.5	58'.8
195° 16'.1	47'.8	117° 46'.0	11'.1	43'.0	13'.5	
210° 16'.0	48'.0	132° 16'.1	11'.2	29'.5	13'.5	
225° 15'.9	48'.2	146° 46'.3	11'.2	16'.0	13'.5	
240° 15'.8	48'.4	161° 16'.5	11'.2	02'.5	13'.6	
255° 15'.6	48'.7	175° 46'.7	11'.1	4° 48'.9 N	13'.6	58'.9
270° 15'.5	48'.9	190° 16'.8	11'.2	35'.3	13'.7	
285° 15'.4	49'.1	204° 47'.0	11'.2	21'.6	13'.7	
300° 15'.3	49'.4	219° 17'.2	11'.2	07'.9	13'.7	
315° 15'.2	49'.6	233° 47'.4	11'.2	3° 54'.2 N	13'.7	
330° 15'.1	49'.8	248° 17'.6	11'.2	40'.5	13'.8	
345° 14'.9	50'.0	262° 47'.8	11'.3	26'.7	13'.7	
0° 14'.8	22° 50'.3 N	277° 18'.1	11'.2	3° 13'.0 N	13'.9	59'.0
15° 14'.7	50'.5	291° 48'.3	11'.2	2° 59'.1 N	13'.8	
30° 14'.6	50'.7	306° 18'.5	11'.1	45'.3	13'.8	
45° 14'.5	50'.9	320° 48'.6	11'.2	31'.5	13'.9	
60° 14'.3	51'.2	335° 18'.8	11'.2	17'.6	13'.9	
75° 14'.2	51'.4	349° 49'.0	11'.2	03'.7	13'.9	
90° 14'.1	51'.6	4° 19'.2	11'.2	1° 49'.8 N	13'.9	59'.1
105° 14'.0	51'.8	18° 49'.4	11'.1	35'.9	14'.0	
120° 13'.9	52'.1	33° 19'.5	11'.2	21'.9	13'.9	
135° 13'.7	52'.3	47° 49'.7	11'.1	08'.0	14'.0	
150° 13'.6	52'.5	62° 19'.8	11'.2	0° 54'.0 N	14'.0	
165° 13'.5	52'.7	76° 50'.0	11'.1	40'.0	14'.0	
SD 15'.8	d 0'.2	SD	15'.8	16'.0	16'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 6	Moonrise 7	Moonrise 8
N 72°	-	-	-	06:15	08:37	10:47
N 70°	-	-	-	06:47	08:52	10:52
68°	-	-	-	07:10	09:04	10:56
66°	-	-	00:47	07:27	09:14	10:59
64°	-	-	01:45	07:42	09:22	11:02
62°	-	-	02:18	07:54	09:29	11:04
60°	-	01:11	02:42	08:04	09:35	11:06
N 58°	-	01:51	03:01	08:13	09:40	11:08
56°	-	02:17	03:17	08:21	09:45	11:10
54°	01:04	02:38	03:30	08:27	09:49	11:11
52°	01:41	02:55	03:42	08:34	09:53	11:13
50°	02:06	03:09	03:53	08:39	09:56	11:14
45°	02:49	03:37	04:14	08:51	10:04	11:17
N 40°	03:18	03:59	04:31	09:01	10:10	11:19
35°	03:40	04:17	04:46	09:09	10:15	11:21
30°	03:58	04:31	04:59	09:17	10:19	11:22
20°	04:26	04:55	05:20	09:29	10:27	11:25
N 10°	04:48	05:15	05:38	09:40	10:34	11:28
0°	05:07	05:33	05:55	09:51	10:41	11:30
S 10°	05:23	05:49	06:12	10:01	10:47	11:33
20°	05:39	06:06	06:30	10:12	10:54	11:35
30°	05:55	06:24	06:50	10:24	11:02	11:38
35°	06:03	06:34	07:02	10:32	11:07	11:40
40°	06:12	06:46	07:16	10:40	11:12	11:42
45°	06:22	06:59	07:32	10:49	11:18	11:44
S 50°	06:33	07:14	07:52	11:01	11:25	11:47
52°	06:38	07:21	08:02	11:06	11:28	11:48
54°	06:43	07:29	08:12	11:12	11:32	11:49
56°	06:49	07:38	08:24	11:18	11:35	11:51
58°	06:55	07:47	08:38	11:25	11:40	11:52
S 60°	07:03	07:58	08:55	11:33	11:45	11:54
S 62°	07:10	08:11	09:15	11:43	11:50	11:56

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 6	Moonset 7	Moonset 8
N 72°	-	-	-	01:20	00:44	00:19 / 23:58
N 70°	-	-	-	00:47	00:27	00:11 / 23:58
68°	-	-	-	00:22	00:13	00:05 / 23:57
66°	23:16	-	-	00:03	00:00 / 24:00	23:57
64°	22:14	-	-	23:52	23:55	23:57
62°	21:41	-	-	23:44	23:51	23:57
60°	21:16	22:49	-	23:37	23:47	23:56
N 58°	20:57	22:08	-	23:31	23:44	23:56
56°	20:41	21:41	-	23:25	23:41	23:56
54°	20:28	21:21	22:55	23:20	23:39	23:56
52°	20:16	21:04	22:18	23:15	23:36	23:56
50°	20:06	20:49	21:52	23:11	23:34	23:56
45°	19:44	20:21	21:09	23:02	23:29	23:55
N 40°	19:26	19:59	20:40	22:55	23:26	23:55
35°	19:12	19:41	20:18	22:48	23:22	23:55
30°	18:59	19:27	20:00	22:42	23:19	23:55
20°	18:38	19:02	19:31	22:32	23:14	23:54
N 10°	18:20	18:42	19:09	22:23	23:09	23:54
0°	18:02	18:25	18:51	22:15	23:05	23:54
S 10°	17:46	18:08	18:35	22:06	23:00	23:54
20°	17:28	17:52	18:19	21:57	22:55	23:53
30°	17:07	17:33	18:03	21:47	22:50	23:53
35°	16:55	17:23	17:55	21:41	22:46	23:52
40°	16:41	17:12	17:46	21:34	22:43	23:52
45°	16:25	16:59	17:36	21:25	22:38	23:52
S 50°	16:05	16:43	17:25	21:16	22:33	23:51
52°	15:56	16:36	17:20	21:11	22:31	23:51
54°	15:45	16:28	17:14	21:06	22:28	23:51
56°	15:33	16:20	17:08	21:00	22:25	23:50
58°	15:19	16:10	17:02	20:54	22:22	23:50
S 60°	15:03	15:59	16:55	20:47	22:18	23:50
S 62°	14:43	15:46	16:47	20:39	22:14	23:49

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
6	1 27	1 22	11:59	16:03	03:37	5d 22%
7	1 16	1 11	11:59	16:53	04:28	6d 32%
8	1 05	0 59	11:59	17:42	05:17	7d 43%

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2011 June 9, 10, 11 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
9 Thursday 00	257° 01'.3	199° 43'.1	18° 57'.3 N	208° 05'.8	17° 44'.8 N	227° 51'.1	10° 43'.5 N	66° 23'.8	1° 45'.9 S
01	272° 03'.7	214° 42'.4	58'.0	223° 06'.5	45'.3	242° 53'.1	43'.6	81° 26'.2	45'.9
02	287° 06'.2	229° 41'.8	58'.8	238° 07'.1	45'.8	257° 55'.1	43'.8	96° 28'.7	45'.9
03	302° 08'.7	244° 41'.1	59'.5	253° 07'.7	46'.3	272° 57'.1	44'.0	111° 31'.2	45'.9
04	317° 11'.1	259° 40'.4	19° 00'.2 N	268° 08'.3	46'.8	287° 59'.1	44'.1	126° 33'.7	45'.9
05	332° 13'.6	274° 39'.8	00'.9	283° 09'.0	47'.3	303° 01'.0	44'.3	141° 36'.2	45'.9
06	347° 16'.1	289° 39'.1	01'.7	298° 09'.6	47'.8	318° 03'.0	44'.5	156° 38'.7	45'.9
07	2° 18'.5	304° 38'.5	02'.4	313° 10'.2	48'.3	333° 05'.0	44'.7	171° 41'.1	45'.9
08	17° 21'.0	319° 37'.8	03'.1	328° 10'.9	48'.8	348° 07'.0	44'.8	186° 43'.6	45'.9
09	32° 23'.4	334° 37'.1	03'.9	343° 11'.5	49'.3	3° 09'.0	45'.0	201° 46'.1	45'.9
10	47° 25'.9	349° 36'.5	04'.6	358° 12'.1	49'.8	18° 11'.0	45'.2	216° 48'.6	45'.9
11	62° 28'.4	4° 35'.8	05'.3	13° 12'.7	50'.3	33° 13'.0	45'.3	231° 51'.1	45'.9
12	77° 30'.8	19° 35'.1	19° 06'.0 N	28° 13'.4	17° 50'.8 N	48° 15'.0	10° 45'.5 N	246° 53'.5	1° 46'.0 S
13	92° 33'.3	34° 34'.5	06'.8	43° 14'.0	51'.3	63° 16'.9	45'.7	261° 56'.0	46'.0
14	107° 35'.8	49° 33'.8	07'.5	58° 14'.6	51'.8	78° 18'.9	45'.8	276° 58'.5	46'.0
15	122° 38'.2	64° 33'.1	08'.2	73° 15'.3	52'.3	93° 20'.9	46'.0	292° 01'.0	46'.0
16	137° 40'.7	79° 32'.5	08'.9	88° 15'.9	52'.7	108° 22'.9	46'.2	307° 03'.5	46'.0
17	152° 43'.2	94° 31'.8	09'.7	103° 16'.5	53'.2	123° 24'.9	46'.3	322° 06'.0	46'.0
18	167° 45'.6	109° 31'.1	10'.4	118° 17'.1	53'.7	138° 26'.9	46'.5	337° 08'.4	46'.0
19	182° 48'.1	124° 30'.5	11'.1	133° 17'.8	54'.2	153° 28'.9	46'.7	352° 10'.9	46'.0
20	197° 50'.5	139° 29'.8	11'.8	148° 18'.4	54'.7	168° 30'.9	46'.8	7° 13'.4	46'.0
21	212° 53'.0	154° 29'.1	12'.5	163° 19'.0	55'.2	183° 32'.8	47'.0	22° 15'.9	46'.0
22	227° 55'.5	169° 28'.5	13'.2	178° 19'.7	55'.7	198° 34'.8	47'.2	37° 18'.4	46'.0
23	242° 57'.9	184° 27'.8	14'.0	193° 20'.3	56'.2	213° 36'.8	47'.3	52° 20'.8	46'.0
10 Friday 00	258° 00'.4	199° 27'.1	19° 14'.7 N	208° 20'.9	17° 56'.7 N	228° 38'.8	10° 47'.5 N	67° 23'.3	1° 46'.0 S
01	273° 02'.9	214° 26'.4	15'.4	223° 21'.5	57'.2	243° 40'.8	47'.7	82° 25'.8	46'.0
02	288° 05'.3	229° 25'.8	16'.1	238° 22'.2	57'.7	258° 42'.8	47'.8	97° 28'.3	46'.0
03	303° 07'.8	244° 25'.1	16'.8	253° 22'.8	58'.2	273° 44'.8	48'.0	112° 30'.8	46'.0
04	318° 10'.3	259° 24'.4	17'.5	268° 23'.4	58'.7	288° 46'.8	48'.2	127° 33'.2	46'.0
05	333° 12'.7	274° 23'.8	18'.2	283° 24'.0	59'.2	303° 48'.8	48'.3	142° 35'.7	46'.0
06	348° 15'.2	289° 23'.1	18'.9	298° 24'.7	59'.7	318° 50'.7	48'.5	157° 38'.2	46'.0
07	3° 17'.7	304° 22'.4	19'.7	313° 25'.3	18° 00'.2 N	333° 52'.7	48'.7	172° 40'.7	46'.0
08	18° 20'.1	319° 21'.7	20'.4	328° 25'.9	00'.7	348° 54'.7	48'.8	187° 43'.2	46'.0
09	33° 22'.6	334° 21'.1	21'.1	343° 26'.6	01'.1	3° 56'.7	49'.0	202° 45'.6	46'.0
10	48° 25'.0	349° 20'.4	21'.8	358° 27'.2	01'.6	18° 58'.7	49'.2	217° 48'.1	46'.0
11	63° 27'.5	4° 19'.7	22'.5	13° 27'.8	02'.1	34° 00'.7	49'.4	232° 50'.6	46'.0
12	78° 30'.0	19° 19'.0	19° 23'.2 N	28° 28'.4	18° 02'.6 N	49° 02'.7	10° 49'.5 N	247° 53'.1	1° 46'.0 S
13	93° 32'.4	34° 18'.4	23'.9	43° 29'.1	03'.1	64° 04'.7	49'.7	262° 55'.6	46'.1
14	108° 34'.9	49° 17'.7	24'.6	58° 29'.7	03'.6	79° 06'.7	49'.9	277° 58'.0	46'.1
15	123° 37'.4	64° 17'.0	25'.3	73° 30'.3	04'.1	94° 08'.7	50'.0	293° 00'.5	46'.1
16	138° 39'.8	79° 16'.3	26'.0	88° 30'.9	04'.6	109° 10'.6	50'.2	308° 03'.0	46'.1
17	153° 42'.3	94° 15'.6	26'.7	103° 31'.6	05'.1	124° 12'.6	50'.3	323° 05'.5	46'.1
18	168° 44'.8	109° 15'.0	27'.4	118° 32'.2	05'.6	139° 14'.6	50'.5	338° 07'.9	46'.1
19	183° 47'.2	124° 14'.3	28'.1	133° 32'.8	06'.0	154° 16'.6	50'.7	353° 10'.4	46'.1
20	198° 49'.7	139° 13'.6	28'.8	148° 33'.4	06'.5	169° 18'.6	50'.8	8° 12'.9	46'.1
21	213° 52'.1	154° 12'.9	29'.5	163° 34'.1	07'.0	184° 20'.6	51'.0	23° 15'.4	46'.1
22	228° 54'.6	169° 12'.2	30'.2	178° 34'.7	07'.5	199° 22'.6	51'.2	38° 17'.9	46'.1
23	243° 57'.1	184° 11'.6	30'.9	193° 35'.3	08'.0	214° 24'.6	51'.3	53° 20'.3	46'.1
11 Saturday 00	258° 59'.5	199° 10'.9	19° 31'.6 N	208° 35'.9	18° 08'.5 N	229° 26'.6	10° 51'.5 N	68° 22'.8	1° 46'.1 S
01	274° 02'.0	214° 10'.2	32'.3	223° 36'.6	09'.0	244° 28'.6	51'.7	83° 25'.3	46'.1
02	289° 04'.5	229° 09'.5	33'.0	238° 37'.2	09'.5	259° 30'.6	51'.8	98° 27'.8	46'.1
03	304° 06'.9	244° 08'.8	33'.6	253° 37'.8	09'.9	274° 32'.6	52'.0	113° 30'.2	46'.1
04	319° 09'.4	259° 08'.1	34'.3	268° 38'.5	10'.4	289° 34'.5	52'.2	128° 32'.7	46'.1
05	334° 11'.9	274° 07'.5	35'.0	283° 39'.1	10'.9	304° 36'.5	52'.3	143° 35'.2	46'.1
06	349° 14'.3	289° 06'.8	35'.7	298° 39'.7	11'.4	319° 38'.5	52'.5	158° 37'.7	46'.1
07	4° 16'.8	304° 06'.1	36'.4	313° 40'.3	11'.9	334° 40'.5	52'.7	173° 40'.1	46'.2
08	19° 19'.3	319° 05'.4	37'.1	328° 41'.0	12'.4	349° 42'.5	52'.8	188° 42'.6	46'.2
09	34° 21'.7	334° 04'.7	37'.8	343° 41'.6	12'.8	4° 44'.5	53'.0	203° 45'.1	46'.2
10	49° 24'.2	349° 04'.0	38'.5	358° 42'.2	13'.3	19° 46'.5	53'.2	218° 47'.6	46'.2
11	64° 26'.6	4° 03'.3	39'.1	13° 42'.8	13'.8	34° 48'.5	53'.3	233° 50'.0	46'.2
12	79° 29'.1	19° 02'.6	19° 39'.8 N	28° 43'.5	18° 14'.3 N	49° 50'.5	10° 53'.5 N	248° 52'.5	1° 46'.2 S
13	94° 31'.6	34° 02'.0	40'.5	43° 44'.1	14'.8	64° 52'.5	53'.7	263° 55'.0	46'.2
14	109° 34'.0	49° 01'.3	41'.2	58° 44'.7	15'.3	79° 54'.5	53'.8	278° 57'.5	46'.2
15	124° 36'.5	64° 00'.6	41'.9	73° 45'.3	15'.7	94° 56'.5	54'.0	293° 59'.9	46'.2
16	139° 39'.0	78° 59'.9	42'.6	88° 46'.0	16'.2	109° 58'.5	54'.2	309° 02'.4	46'.2
17	154° 41'.4	93° 59'.2	43'.2	103° 46'.6	16'.7	125° 00'.5	54'.3	324° 04'.9	46'.2
18	169° 43'.9	108° 58'.5	43'.9	118° 47'.2	17'.2	140° 02'.4	54'.5	339° 07'.4	46'.2
19	184° 46'.4	123° 57'.8	44'.6	133° 47'.8	17'.7	155° 04'.4	54'.7	354° 09'.8	46'.2
20	199° 48'.8	138° 57'.1	45'.3	148° 48'.5	18'.1	170° 06'.4	54'.8	9° 12'.3	46'.2
21	214° 51'.3	153° 56'.4	45'.9	163° 49'.1	18'.6	185° 08'.4	55'.0	24° 14'.8	46'.2
22	229° 53'.8	168° 55'.7	46'.6	178° 49'.7	19'.1	200° 10'.4	55'.1	39° 17'.2	46'.3
23	244° 56'.2	183° 55'.1	47'.3	193° 50'.3	19'.6	215° 12'.4	55'.3	54° 19'.7	46'.3
	M.P. 06:43	v -0'.7	d 0'.7	v 0'.6	d 0'.5	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.8	40° 15'.4 S
Achernar	335° 28'.1	57° 10'.4 S
Acrux	173° 10'.8	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.6	55° 54'.0 N
Alkaid	152° 59'.7	49° 15'.5 N
Alnair	27° 45'.3	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.1	29° 09'.1 N
Altair	62° 09'.4	8° 54'.0 N
Ankaa	353° 17'.2	42° 14'.3 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 02'.9 S
Avior	234° 19'.1	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.3 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.2	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.4	17° 55'.3 S
Dubhe	193° 53'.4	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.2 N
Enif	33° 48'.4	9° 55'.7 N
Fomalhaut	15° 25'.5	29° 33'.4 S
Gacrux	172° 02'.4	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.6	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 18'.8	74° 06'.6 N
Markab	13° 39'.8	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.1 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.6	69° 46'.2 S
Mirfak	308° 42'.9	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.6 S
Polaris	318° 50'.9	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.1 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.1 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.4	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.1 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.1 S
Vega	80° 39'.5	38° 47'.6 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	301° 26'.7	10:43
Mars	310° 20'.5	10:06
Jupiter	330° 38'.4	08:44
Saturn	169° 22'.9	19:27

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 13'.4	22° 52'.9 N	91° 20'.1	11'.1	0° 26'.0 N	14'.0	59'.1
195° 13'.3	53'.1	105° 50'.2	11'.1	12'.0	14'.0	59'.2
210° 13'.1	53'.4	120° 20'.3	11'.1	0° 02'.0 S	14'.0	
225° 13'.0	53'.6	134° 50'.4	11'.0	16'.0	14'.0	
240° 12'.9	53'.8	149° 20'.4	11'.1	30'.0	14'.0	
255° 12'.8	54'.0	163° 50'.5	11'.0	44'.0	14'.0	
270° 12'.6	54'.2	178° 20'.5	11'.0	58'.0	14'.1	
285° 12'.5	54'.4	192° 50'.5	11'.0	1° 12'.1 S	14'.0	
300° 12'.4	54'.6	207° 20'.5	11'.0	26'.1	14'.0	
315° 12'.3	54'.9	221° 50'.5	10'.9	40'.1	14'.0	59'.3
330° 12'.2	55'.1	236° 20'.4	11'.0	54'.1	14'.1	
345° 12'.0	55'.3	250° 50'.4	10'.9	2° 08'.2 S	14'.0	
0° 11'.9	22° 55'.5 N	265° 20'.3	10'.8	2° 22'.2 S	14'.0	59'.3
15° 11'.8	55'.7	279° 50'.1	10'.9	36'.2	14'.0	
30° 11'.7	55'.9	294° 20'.0	10'.8	50'.2	13'.9	
45° 11'.6	56'.1	308° 49'.8	10'.8	3° 04'.1 S	14'.0	
60° 11'.4	56'.3	323° 19'.6	10'.8	18'.1	14'.0	
75° 11'.3	56'.5	337° 49'.4	10'.7	32'.1	13'.9	59'.4
90° 11'.2	56'.7	352° 19'.1	10'.7	46'.0	14'.0	
105° 11'.1	56'.9	6° 48'.8	10'.7	00'.0	13'.9	
120° 10'.9	57'.1	21° 18'.5	10'.6	4° 13'.9 S	13'.9	
135° 10'.8	57'.3	35° 48'.1	10'.6	27'.8	13'.9	
150° 10'.7	57'.5	50° 17'.7	10'.6	41'.7	13'.8	
165° 10'.6	57'.7	64° 47'.3	10'.5	55'.5	13'.9	
180° 10'.4	22° 57'.9 N	79° 16'.8	10'.5	5° 09'.4 S	13'.8	59'.4
195° 10'.3	58'.1	93° 46'.3	10'.5	23'.2	13'.8	
210° 10'.2	58'.3	108° 15'.8	10'.4	37'.0	13'.8	59'.5
225° 10'.1	58'.5	122° 45'.2	10'.4	50'.8	13'.7	
240° 10'.0	58'.7	137° 14'.6	10'.3	6° 04'.5 S	13'.7	
255° 09'.8	58'.9	151° 43'.9	10'.3	18'.2	13'.7	
270° 09'.7	59'.1	166° 13'.2	10'.3	31'.9	13'.6	
285° 09'.6	59'.3	180° 42'.5	10'.2	45'.5	13'.7	
300° 09'.5	59'.5	195° 11'.7	10'.2	59'.2	13'.5	
315° 09'.3	59'.7	209° 40'.9	10'.1	7° 12'.7 S	13'.6	
330° 09'.2	59'.9	224° 10'.0	10'.1	26'.3	13'.5	
345° 09'.1	23° 00'.1 N	238° 39'.1	10'.0	39'.8	13'.5	
0° 09'.0	23° 00'.3 N	253° 08'.1	10'.0	7° 53'.3 S	13'.4	59'.5
15° 08'.8	00'.5	267° 37'.1	10'.0	8° 06'.7 S	13'.4	59'.6
30° 08'.7	00'.7	282° 06'.1	9'.9	20'.1	13'.3	
45° 08'.6	00'.9	296° 35'.0	9'.8	33'.4	13'.4	
60° 08'.5	01'.1	311° 03'.8	9'.8	46'.8	13'.2	
75° 08'.3	01'.2	325° 32'.6	9'.7	9° 00'.0 S	13'.2	
90° 08'.2	01'.4	340° 01'.3	9'.7	13'.2	13'.2	
105° 08'.1	01'.6	354° 30'.0	9'.7	26'.4	13'.1	
120° 08'.0	01'.8	8° 58'.7	9'.5	39'.5	13'.1	
135° 07'.8	02'.0	23° 27'.2	9'.6	52'.6	13'.0	
150° 07'.7	02'.2	37° 55'.8	9'.4	10° 05'.6 S	12'.9	
165° 07'.6	02'.4	52° 24'.2	9'.5	18'.5	12'.9	
180° 07'.5	23° 02'.6 N	66° 52'.7	9'.3	10° 31'.4 S	12'.9	59'.6
195° 07'.3	02'.7	81° 21'.0	9'.3	44'.3	12'.8	
210° 07'.2	02'.9	95° 49'.3	9'.3	57'.1	12'.7	
225° 07'.1	03'.1	110° 17'.6	9'.2	11° 09'.8 S	12'.6	59'.7
240° 07'.0	03'.3	124° 45'.8	9'.1	22'.4	12'.6	
255° 06'.8	03'.5	139° 13'.9	9'.1	35'.0	12'.6	
270° 06'.7	03'.6	153° 42'.0	9'.0	47'.6	12'.4	
285° 06'.6	03'.8	168° 10'.0	8'.9	12° 00'.0 S	12'.4	
300° 06'.5	04'.0	182° 37'.9	8'.9	12'.4	12'.4	
315° 06'.3	04'.2	197° 05'.8	8'.8	24'.8	12'.2	
330° 06'.2	04'.4	211° 33'.6	8'.8	37'.0	12'.2	
345° 06'.1	04'.5	226° 01'.4	8'.7	49'.2	12'.1	
0° 06'.0	23° 04'.7 N	240° 29'.1	8'.6	13° 01'.3 S	12'.1	59'.7
15° 05'.8	04'.9	254° 56'.7	8'.6	13'.4	11'.9	
30° 05'.7	05'.1	269° 24'.3	8'.5	25'.3	11'.9	
45° 05'.6	05'.2	283° 51'.8	8'.5	37'.2	11'.8	
60° 05'.5	05'.4	298° 19'.3	8'.4	49'.0	11'.7	
75° 05'.3	05'.6	312° 46'.7	8'.3	14° 00'.7 S	11'.7	
90° 05'.2	05'.7	327° 14'.0	8'.2	12'.4	11'.5	
105° 05'.1	05'.9	341° 41'.2	8'.2	23'.9	11'.5	
120° 05'.0	06'.1	356° 08'.4	8'.2	35'.4	11'.4	
135° 04'.8	06'.2	10° 35'.6	8'.0	46'.8	11'.3	
150° 04'.7	06'.4	25° 02'.6	8'.0	58'.1	11'.2	
165° 04'.6	06'.6	39° 29'.6	7'.9	15° 09'.3 S	11'.1	
SD 15'.8	d 0'.2	SD	16'.2	16'.2	16'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 9	Moonrise 10	Moonrise 11
N 72°	-	-	-	12:54	15:07	17:37
N 70°	-	-	-	12:50	14:53	17:05
68°	-	-	-	12:47	14:42	16:42
66°	-	-	00:31	12:45	14:32	16:25
64°	-	-	01:40	12:42	14:25	16:10
62°	-	-	02:15	12:40	14:18	15:58
60°	-	01:03	02:39	12:39	14:12	15:48
N 58°	-	01:47	02:59	12:37	14:08	15:40
56°	-	02:14	03:15	12:36	14:03	15:32
54°	00:58	02:35	03:29	12:35	13:59	15:25
52°	01:38	02:53	03:41	12:34	13:56	15:19
50°	02:04	03:07	03:51	12:33	13:52	15:13
45°	02:47	03:36	04:13	12:30	13:45	15:02
N 40°	03:17	03:58	04:31	12:29	13:40	14:52
35°	03:40	04:16	04:46	12:27	13:35	14:44
30°	03:58	04:31	04:58	12:26	13:30	14:36
20°	04:26	04:55	05:20	12:24	13:23	14:24
N 10°	04:49	05:16	05:38	12:22	13:17	14:13
0°	05:07	05:33	05:56	12:20	13:11	14:03
S 10°	05:24	05:50	06:13	12:18	13:05	13:53
20°	05:40	06:07	06:31	12:16	12:58	13:43
30°	05:56	06:25	06:52	12:14	12:51	13:31
35°	06:04	06:36	07:04	12:13	12:47	13:24
40°	06:13	06:47	07:18	12:12	12:42	13:16
45°	06:23	07:01	07:34	12:10	12:37	13:07
S 50°	06:35	07:16	07:54	12:08	12:31	12:56
52°	06:40	07:23	08:04	12:08	12:28	12:51
54°	06:45	07:31	08:15	12:07	12:25	12:46
56°	06:51	07:40	08:27	12:06	12:21	12:40
58°	06:58	07:50	08:41	12:05	12:18	12:33
S 60°	07:05	08:01	08:58	12:03	12:13	12:25
S 62°	07:13	08:15	09:19	12:02	12:08	12:17

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 9	Moonset 10	Moonset 11
N 72°	-	-	-	23:37	23:11	22:33
N 70°	-	-	-	23:44	23:28	23:07
68°	-	-	-	23:50	23:41	23:31
66°	23:35	-	-	23:55	23:52	23:50
64°	22:20	-	-	23:59	-	00:01
62°	21:45	-	-	-	00:02	00:09
60°	21:20	22:58	-	-	00:06	00:16
N 58°	21:00	22:13	-	-	00:09	00:22
56°	20:44	21:45	-	-	00:11	00:28
54°	20:30	21:24	23:03	-	00:13	00:33
52°	20:18	21:07	22:22	-	00:16	00:37
50°	20:08	20:52	21:56	-	00:17	00:41
45°	19:46	20:23	21:12	-	00:22	00:50
N 40°	19:28	20:01	20:42	-	00:25	00:57
35°	19:13	19:43	20:19	-	00:28	01:03
30°	19:01	19:28	20:01	-	00:31	01:09
20°	18:39	19:03	19:33	-	00:36	01:19
N 10°	18:20	18:43	19:10	-	00:40	01:27
0°	18:03	18:26	18:52	-	00:44	01:35
S 10°	17:46	18:09	18:35	-	00:48	01:43
20°	17:28	17:52	18:19	-	00:52	01:52
30°	17:07	17:33	18:03	-	00:57	02:02
35°	16:55	17:23	17:54	-	00:59	02:07
40°	16:41	17:11	17:45	-	01:02	02:14
45°	16:24	16:58	17:35	-	01:06	02:21
S 50°	16:04	16:42	17:24	-	01:10	02:31
52°	15:55	16:35	17:19	-	01:12	02:35
54°	15:44	16:27	17:13	-	01:14	02:40
56°	15:32	16:18	17:07	-	01:17	02:45
58°	15:17	16:08	17:01	-	01:20	02:51
S 60°	15:00	15:57	16:53	-	01:23	02:57
S 62°	14:40	15:44	16:45	-	01:26	03:05

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
9	0 54	0 48	11:59	18:32	06:07	8d 55%
10	0 42	0 36	11:59	19:23	06:57	9d 66%
11	0 30	0 24	12:00	20:16	07:49	10d 77%

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2011 June 12, 13, 14 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
12 Sunday 00	259° 58'.7	198° 54'.4	19° 48'.0 N	208° 50'.9	18° 20'.1 N	230° 14'.4	10° 55'.5 N	69° 22'.2	1° 46'.3 S
01	275° 01'.1	213° 53'.7	48'.6	223° 51'.6	20'.5	245° 16'.4	55'.6	84° 24'.7	46'.3
02	290° 03'.6	228° 53'.0	49'.3	238° 52'.2	21'.0	260° 18'.4	55'.8	99° 27'.1	46'.3
03	305° 06'.1	243° 52'.3	50'.0	253° 52'.8	21'.5	275° 20'.4	56'.0	114° 29'.6	46'.3
04	320° 08'.5	258° 51'.6	50'.6	268° 53'.4	22'.0	290° 22'.4	56'.1	129° 32'.1	46'.3
05	335° 11'.0	273° 50'.9	51'.3	283° 54'.1	22'.5	305° 24'.4	56'.3	144° 34'.6	46'.3
06	350° 13'.5	288° 50'.2	52'.0	298° 54'.7	22'.9	320° 26'.4	56'.5	159° 37'.0	46'.3
07	5° 15'.9	303° 49'.5	52'.6	313° 55'.3	23'.4	335° 28'.4	56'.6	174° 39'.5	46'.3
08	20° 18'.4	318° 48'.8	53'.3	328° 55'.9	23'.9	350° 30'.4	56'.8	189° 42'.0	46'.3
09	35° 20'.9	333° 48'.1	54'.0	343° 56'.6	24'.4	5° 32'.4	57'.0	204° 44'.4	46'.3
10	50° 23'.3	348° 47'.4	54'.6	358° 57'.2	24'.8	20° 34'.4	57'.1	219° 46'.9	46'.3
11	65° 25'.8	3° 46'.7	55'.3	13° 57'.8	25'.3	35° 36'.4	57'.3	234° 49'.4	46'.4
12	80° 28'.3	18° 46'.0	19° 55'.9 N	28° 58'.4	18° 25'.8 N	50° 38'.4	10° 57'.4 N	249° 51'.9	1° 46'.4 S
13	95° 30'.7	33° 45'.3	56'.6	43° 59'.1	26'.3	65° 40'.4	57'.6	264° 54'.3	46'.4
14	110° 33'.2	48° 44'.6	57'.3	58° 59'.7	26'.7	80° 42'.4	57'.8	279° 56'.8	46'.4
15	125° 35'.6	63° 43'.9	57'.9	74° 00'.3	27'.2	95° 44'.4	57'.9	294° 59'.3	46'.4
16	140° 38'.1	78° 43'.2	58'.6	89° 00'.9	27'.7	110° 46'.4	58'.1	310° 01'.7	46'.4
17	155° 40'.6	93° 42'.5	59'.2	104° 01'.6	28'.2	125° 48'.3	58'.3	325° 04'.2	46'.4
18	170° 43'.0	108° 41'.8	59'.9	119° 02'.2	28'.6	140° 50'.3	58'.4	340° 06'.7	46'.4
19	185° 45'.5	123° 41'.1	20° 00'.6 N	134° 02'.8	29'.1	155° 52'.3	58'.6	355° 09'.1	46'.4
20	200° 48'.0	138° 40'.4	01'.2	149° 03'.4	29'.6	170° 54'.3	58'.7	10° 11'.6	46'.4
21	215° 50'.4	153° 39'.7	01'.9	164° 04'.0	30'.0	185° 56'.3	58'.9	25° 14'.1	46'.4
22	230° 52'.9	168° 39'.0	02'.5	179° 04'.7	30'.5	200° 58'.3	59'.1	40° 16'.6	46'.5
23	245° 55'.4	183° 38'.3	03'.2	194° 05'.3	31'.0	216° 00'.3	59'.2	55° 19'.0	46'.5
13 Monday 00	260° 57'.8	198° 37'.6	20° 03'.8 N	209° 05'.9	18° 31'.5 N	231° 02'.3	10° 59'.4 N	70° 21'.5	1° 46'.5 S
01	276° 00'.3	213° 36'.9	04'.5	224° 06'.5	31'.9	246° 04'.3	59'.6	85° 24'.0	46'.5
02	291° 02'.7	228° 36'.2	05'.1	239° 07'.2	32'.4	261° 06'.3	59'.7	100° 26'.4	46'.5
03	306° 05'.2	243° 35'.5	05'.8	254° 07'.8	32'.9	276° 08'.3	59'.9	115° 28'.9	46'.5
04	321° 07'.7	258° 34'.8	06'.4	269° 08'.4	33'.3	291° 10'.3	11° 00'.0 N	130° 31'.4	46'.5
05	336° 10'.1	273° 34'.0	07'.1	284° 09'.0	33'.8	306° 12'.3	00'.2	145° 33'.8	46'.5
06	351° 12'.6	288° 33'.3	07'.7	299° 09'.6	34'.3	321° 14'.3	00'.4	160° 36'.3	46'.5
07	6° 15'.1	303° 32'.6	08'.3	314° 10'.3	34'.8	336° 16'.3	00'.5	175° 38'.8	46'.5
08	21° 17'.5	318° 31'.9	09'.0	329° 10'.9	35'.2	351° 18'.3	00'.7	190° 41'.2	46'.5
09	36° 20'.0	333° 31'.2	09'.6	344° 11'.5	35'.7	6° 20'.3	00'.9	205° 43'.7	46'.6
10	51° 22'.5	348° 30'.5	10'.3	359° 12'.1	36'.2	21° 22'.3	01'.0	220° 46'.2	46'.6
11	66° 24'.9	3° 29'.8	10'.9	14° 12'.8	36'.6	36° 24'.3	01'.2	235° 48'.6	46'.6
12	81° 27'.4	18° 29'.1	20° 11'.5 N	29° 13'.4	18° 37'.1 N	51° 26'.3	11° 01'.3 N	250° 51'.1	1° 46'.6 S
13	96° 29'.9	33° 28'.4	12'.2	44° 14'.0	37'.6	66° 28'.3	01'.5	265° 53'.6	46'.6
14	111° 32'.3	48° 27'.7	12'.8	59° 14'.6	38'.0	81° 30'.3	01'.7	280° 56'.0	46'.6
15	126° 34'.8	63° 27'.0	13'.5	74° 15'.2	38'.5	96° 32'.3	01'.8	295° 58'.5	46'.6
16	141° 37'.2	78° 26'.2	14'.1	89° 15'.9	39'.0	111° 34'.3	02'.0	311° 01'.0	46'.6
17	156° 39'.7	93° 25'.5	14'.7	104° 16'.5	39'.4	126° 36'.3	02'.2	326° 03'.4	46'.6
18	171° 42'.2	108° 24'.8	15'.4	119° 17'.1	39'.9	141° 38'.3	02'.3	341° 05'.9	46'.6
19	186° 44'.6	123° 24'.1	16'.0	134° 17'.7	40'.4	156° 40'.3	02'.5	356° 08'.4	46'.7
20	201° 47'.1	138° 23'.4	16'.6	149° 18'.4	40'.8	171° 42'.3	02'.6	11° 10'.8	46'.7
21	216° 49'.6	153° 22'.7	17'.3	164° 19'.0	41'.3	186° 44'.3	02'.8	26° 13'.3	46'.7
22	231° 52'.0	168° 22'.0	17'.9	179° 19'.6	41'.7	201° 46'.3	03'.0	41° 15'.8	46'.7
23	246° 54'.5	183° 21'.2	18'.5	194° 20'.2	42'.2	216° 48'.3	03'.1	56° 18'.2	46'.7
14 Tuesday 00	261° 57'.0	198° 20'.5	20° 19'.1 N	209° 20'.8	18° 42'.7 N	231° 50'.3	11° 03'.3 N	71° 20'.7	1° 46'.7 S
01	276° 59'.4	213° 19'.8	19'.8	224° 21'.5	43'.1	246° 52'.3	03'.4	86° 23'.2	46'.7
02	292° 01'.9	228° 19'.1	20'.4	239° 22'.1	43'.6	261° 54'.3	03'.6	101° 25'.6	46'.7
03	307° 04'.4	243° 18'.4	21'.0	254° 22'.7	44'.1	276° 56'.3	03'.8	116° 28'.1	46'.7
04	322° 06'.8	258° 17'.7	21'.6	269° 23'.3	44'.5	291° 58'.3	03'.9	131° 30'.6	46'.8
05	337° 09'.3	273° 16'.9	22'.3	284° 23'.9	45'.0	307° 00'.3	04'.1	146° 33'.0	46'.8
06	352° 11'.7	288° 16'.2	22'.9	299° 24'.6	45'.4	322° 02'.3	04'.3	161° 35'.5	46'.8
07	7° 14'.2	303° 15'.5	23'.5	314° 25'.2	45'.9	337° 04'.3	04'.4	176° 37'.9	46'.8
08	22° 16'.7	318° 14'.8	24'.1	329° 25'.8	46'.4	352° 06'.3	04'.6	191° 40'.4	46'.8
09	37° 19'.1	333° 14'.1	24'.7	344° 26'.4	46'.8	7° 08'.3	04'.7	206° 42'.9	46'.8
10	52° 21'.6	348° 13'.4	25'.4	359° 27'.0	47'.3	22° 10'.3	04'.9	221° 45'.3	46'.8
11	67° 24'.1	3° 12'.6	26'.0	14° 27'.7	47'.8	37° 12'.3	05'.1	236° 47'.8	46'.8
12	82° 26'.5	18° 11'.9	20° 26'.6 N	29° 28'.3	18° 48'.2 N	52° 14'.3	11° 05'.2 N	251° 50'.3	1° 46'.8 S
13	97° 29'.0	33° 11'.2	27'.2	44° 28'.9	48'.7	67° 16'.4	05'.4	266° 52'.7	46'.9
14	112° 31'.5	48° 10'.5	27'.8	59° 29'.5	49'.1	82° 18'.4	05'.5	281° 55'.2	46'.9
15	127° 33'.9	63° 09'.7	28'.4	74° 30'.1	49'.6	97° 20'.4	05'.7	296° 57'.7	46'.9
16	142° 36'.4	78° 09'.0	29'.1	89° 30'.8	50'.0	112° 22'.4	05'.9	312° 00'.1	46'.9
17	157° 38'.9	93° 08'.3	29'.7	104° 31'.4	50'.5	127° 24'.4	06'.0	327° 02'.6	46'.9
18	172° 41'.3	108° 07'.6	30'.3	119° 32'.0	51'.0	142° 26'.4	06'.2	342° 05'.0	46'.9
19	187° 43'.8	123° 06'.9	30'.9	134° 32'.6	51'.4	157° 28'.4	06'.3	357° 07'.5	46'.9
20	202° 46'.2	138° 06'.1	31'.5	149° 33'.2	51'.9	172° 30'.4	06'.5	12° 10'.0	46'.9
21	217° 48'.7	153° 05'.4	32'.1	164° 33'.9	52'.3	187° 32'.4	06'.7	27° 12'.4	47'.0
22	232° 51'.2	168° 04'.7	32'.7	179° 34'.5	52'.8	202° 34'.4	06'.8	42° 14'.9	47'.0
23	247° 53'.6	183° 04'.0	33'.3	194° 35'.1	53'.2	217° 36'.4	07'.0	57° 17'.3	47'.0
	M.P. 06:31	v -0'.7	d 0'.6	v 0'.6	d 0'.5	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.4 S
Achernar	335° 28'.1	57° 10'.4 S
Acrux	173° 10'.8	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.7	55° 54'.0 N
Alkaid	152° 59'.7	49° 15'.5 N
Alnair	27° 45'.3	46° 54'.0 S
Alnilam	275° 48'.2	1° 11'.8 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.1	29° 09'.1 N
Altair	62° 09'.4	8° 54'.0 N
Ankaa	353° 17'.2	42° 14'.3 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 02'.9 S
Avior	234° 19'.1	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.1	46° 00'.5 N
Deneb	49° 32'.2	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.4	17° 55'.3 S
Dubhe	193° 53'.4	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.3 N
Enif	33° 48'.4	9° 55'.7 N
Fomalhaut	15° 25'.5	29° 33'.4 S
Gacrux	172° 02'.4	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.6	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 18'.9	74° 06'.7 N
Markab	13° 39'.7	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.1 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.6	69° 46'.2 S
Mirfak	308° 42'.9	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.6 S
Polaris	318° 49'.8	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.1 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.4	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.1 S
Vega	80° 39'.5	38° 47'.7 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	297° 39'.8	10:46
Mars	308° 08'.1	10:03
Jupiter	330° 04'.5	08:35
Saturn	169° 23'.7	19:15

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 04'.4	23° 06'.8 N	53° 56'.5	7'.9	15° 20'.4 S	11'.0	59'.7
195° 04'.3	06'.9	68° 23'.4	7'.8	31'.4	11'.0	
210° 04'.2	07'.1	82° 50'.2	7'.7	42'.4	10'.8	
225° 04'.1	07'.2	97° 16'.9	7'.7	53'.2	10'.7	
240° 03'.9	07'.4	111° 43'.6	7'.6	16° 03'.9 S	10'.6	
255° 03'.8	07'.6	126° 10'.2	7'.5	14'.5	10'.6	
270° 03'.7	07'.7	140° 36'.7	7'.5	25'.1	10'.4	
285° 03'.6	07'.9	155° 03'.2	7'.4	35'.5	10'.3	
300° 03'.4	08'.1	169° 29'.6	7'.3	45'.8	10'.3	
315° 03'.3	08'.2	183° 55'.9	7'.3	56'.1	10'.1	
330° 03'.2	08'.4	198° 22'.2	7'.2	17° 06'.2 S	10'.0	
345° 03'.0	08'.5	212° 48'.4	7'.2	16'.2	9'.9	
0° 02'.9	23° 08'.7 N	227° 14'.6	7'.0	17° 26'.1 S	9'.8	59'.7
15° 02'.8	08'.9	241° 40'.6	7'.1	35'.9	9'.7	
30° 02'.7	09'.0	256° 06'.7	6'.9	45'.6	9'.5	
45° 02'.5	09'.2	270° 32'.6	6'.9	55'.1	9'.5	
60° 02'.4	09'.3	284° 58'.5	6'.8	18° 04'.6 S	9'.3	
75° 02'.3	09'.5	299° 24'.3	6'.8	13'.9	9'.3	
90° 02'.1	09'.6	313° 50'.1	6'.7	23'.2	9'.1	
105° 02'.0	09'.8	328° 15'.8	6'.6	32'.3	8'.9	
120° 01'.9	09'.9	342° 41'.4	6'.6	41'.2	8'.9	
135° 01'.8	10'.1	357° 07'.0	6'.5	50'.1	8'.7	
150° 01'.6	10'.2	11° 32'.5	6'.5	58'.8	8'.7	
165° 01'.5	10'.4	25° 58'.0	6'.4	19° 07'.5 S	8'.5	
180° 01'.4	23° 10'.5 N	40° 23'.4	6'.3	19° 16'.0 S	8'.3	59'.6
195° 01'.2	10'.7	54° 48'.7	6'.3	24'.3	8'.3	
210° 01'.1	10'.8	69° 14'.0	6'.2	32'.6	8'.1	
225° 01'.0	11'.0	83° 39'.2	6'.2	40'.7	8'.0	
240° 00'.9	11'.1	98° 04'.4	6'.1	48'.7	7'.8	
255° 00'.7	11'.3	112° 29'.5	6'.0	56'.5	7'.7	
270° 00'.6	11'.4	126° 54'.5	6'.1	20° 04'.2 S	7'.6	
285° 00'.5	11'.6	141° 19'.6	5'.9	11'.8	7'.5	
300° 00'.3	11'.7	155° 44'.5	5'.9	19'.3	7'.3	
315° 00'.2	11'.9	170° 09'.4	5'.9	26'.6	7'.2	
330° 00'.1	12'.0	184° 34'.3	5'.8	33'.8	7'.0	
345° 00'.0	12'.2	198° 59'.1	5'.7	40'.8	6'.9	
359° 59'.8	23° 12'.3 N	213° 23'.8	5'.7	20° 47'.7 S	6'.8	59'.6
14° 59'.7	12'.4	227° 48'.5	5'.7	54'.5	6'.6	59'.5
29° 59'.6	12'.6	242° 13'.2	5'.6	21° 01'.1 S	6'.5	
44° 59'.4	12'.7	256° 37'.8	5'.6	07'.6	6'.3	
59° 59'.3	12'.9	271° 02'.4	5'.5	13'.9	6'.2	
74° 59'.2	13'.0	285° 26'.9	5'.5	20'.1	6'.1	
89° 59'.0	13'.1	299° 51'.4	5'.5	26'.2	5'.9	
104° 58'.9	13'.3	314° 15'.9	5'.4	32'.1	5'.7	
119° 58'.8	13'.4	328° 40'.3	5'.4	37'.8	5'.7	
134° 58'.7	13'.5	343° 04'.7	5'.3	43'.5	5'.4	
149° 58'.5	13'.7	357° 29'.0	5'.3	48'.9	5'.4	59'.4
164° 58'.4	13'.8	11° 53'.3	5'.3	54'.3	5'.1	
179° 58'.3	23° 13'.9 N	26° 17'.6	5'.2	21° 59'.4 S	5'.1	59'.4
194° 58'.1	14'.1	40° 41'.8	5'.3	22° 04'.5 S	4'.8	
209° 58'.0	14'.2	55° 06'.1	5'.1	09'.3	4'.8	
224° 57'.9	14'.3	69° 30'.2	5'.2	14'.1	4'.5	
239° 57'.7	14'.5	83° 54'.4	5'.2	18'.6	4'.5	
254° 57'.6	14'.6	98° 18'.6	5'.1	23'.1	4'.2	59'.3
269° 57'.5	14'.7	112° 42'.7	5'.1	27'.3	4'.1	
284° 57'.3	14'.8	127° 06'.8	5'.0	31'.4	4'.0	
299° 57'.2	15'.0	141° 30'.8	5'.1	35'.4	3'.8	
314° 57'.1	15'.1	155° 54'.9	5'.1	39'.2	3'.7	
329° 57'.0	15'.2	170° 19'.0	5'.0	42'.9	3'.5	
344° 56'.8	15'.4	184° 43'.0	5'.0	46'.4	3'.3	59'.2
359° 56'.7	23° 15'.5 N	199° 07'.0	5'.0	22° 49'.7 S	3'.2	59'.2
14° 56'.6	15'.6	213° 31'.0	5'.0	52'.9	3'.0	
29° 56'.4	15'.7	227° 55'.0	5'.0	55'.9	2'.9	
44° 56'.3	15'.8	242° 19'.0	5'.0	58'.8	2'.7	
59° 56'.2	16'.0	256° 43'.0	5'.0	23° 01'.5 S	2'.6	
74° 56'.0	16'.1	271° 07'.0	5'.0	04'.1	2'.4	59'.1
89° 55'.9	16'.2	285° 31'.0	5'.0	06'.5	2'.2	
104° 55'.8	16'.3	299° 55'.0	4'.9	08'.7	2'.1	
119° 55'.6	16'.4	314° 18'.9	5'.0	10'.8	2'.0	
134° 55'.5	16'.6	328° 42'.9	5'.0	12'.8	1'.7	
149° 55'.4	16'.7	343° 06'.9	5'.0	14'.5	1'.7	59'.0
164° 55'.3	16'.8	357° 30'.9	5'.0	16'.2	1'.4	
SD 15'.7	d 0'.1	SD	16'.3	16'.2	16'.1	

MOON						
GHA	v	Dec	d	HP
53° 56'.5	7'.9	15° 20'.4 S	11'.0	59'.7
68° 23'.4	7'.8	31'.4	11'.0	
82° 50'.2	7'.7	42'.4	10'.8	
97° 16'.9	7'.7	53'.2	10'.7	
111° 43'.6	7'.6	16° 03'.9 S	10'.6	
126° 10'.2	7'.5	14'.5	10'.6	
140° 36'.7	7'.5	25'.1	10'.4	
155° 03'.2	7'.4	35'.5	10'.3	
169° 29'.6	7'.3	45'.8	10'.3	
183° 55'.9	7'.3	56'.1	10'.1	
198° 22'.2	7'.2	17° 06'.2 S	10'.0	
212° 48'.4	7'.2	16'.2	9'.9	
227° 14'.6	7'.0	17° 26'.1 S	9'.8	59'.7
241° 40'.6	7'.1	35'.9	9'.7	
256° 06'.7	6'.9	45'.6	9'.5	
270° 32'.6	6'.9	55'.1	9'.5	
284° 58'.5	6'.8	18° 04'.6 S	9'.3	
299° 24'.3	6'.8	13'.9	9'.3	
313° 50'.1	6'.7	23'.2	9'.1	
328° 15'.8	6'.6	32'.3	8'.9	
342° 41'.4	6'.6	41'.2	8'.9	
357° 07'.0	6'.5	50'.1	8'.7	
11° 32'.5	6'.5	58'.8	8'.7	
25° 58'.0	6'.4	19° 07'.5 S	8'.5	
40° 23'.4	6'.3	19° 16'.0 S	8'.3	59'.6
54° 48'.7	6'.3	24'.3	8'.3	
69° 14'.0	6'.2	32'.6	8'.1	
83° 39'.2	6'.2	40'.7	8'.0	
98° 04'.4	6'.1	48'.7	7'.8	
112° 29'.5	6'.0	56'.5	7'.7	
126° 54'.5	6'.1	20° 04'.2 S	7'.6	
141° 19'.6	5'.9	11'.8	7'.5	
155° 44'.5	5'.9	19'.3	7'.3	
170° 09'.4	5'.9	26'.6	7'.2	
184° 34'.3	5'.8	33'.8	7'.0	
198° 59'.1	5'.7	40'.8	6'.9	
213° 23'.8	5'.7	20° 47'.7 S	6'.8	59'.6
227° 48'.5	5'.7	54'.5	6'.6	59'.5
242° 13'.2	5'.6	21° 01'.1 S	6'.5	
256° 37'.8	5'.6	07'.6	6'.3	
271° 02'.4	5'.5	13'.9	6'.2	
285° 26'.9	5'.5	20'.1	6'.1	
299° 51'.4	5'.5	26'.2	5'.9	
314° 15'.9	5'.4	32'.1	5'.7	
328° 40'.3	5'.4	37'.8	5'.7	
343° 04'.7	5'.3	43'.5	5'.4	
357° 29'.0	5'.3	48'.9	5'.4	59'.4
11° 53'.3	5'.3	54'.3	5'.1	
26° 17'.6	5'.2	21° 59'.4 S	5'.1	59'.4
40° 41'.8	5'.3	22° 04'.5 S	4'.8	
55° 06'.1	5'.1	09'.3	4'.8	
69° 30'.2	5'.2	14'.1	4'.5	
83° 54'.4	5'.2	18'.6	4'.5	
98° 18'.6	5'.1	23'.1	4'.2	59'.3
112° 42'.7	5'.1	27'.3	4'.1	
127° 06'.8	5'.0	31'.4	4'.0	
141° 30'.8	5'.1	35'.4	3'.8	
155° 54'.9	5'.1	39'.2	3'.7	
170° 19'.0	5'.0	42'.9	3'.5	
184° 43'.0	5'.0	46'.4	3'.3	59'.2
199° 07'.0	5'.0	22° 49'.7 S	3'.2	59'.2
213° 31'.0	5'.0	52'.9	3'.0	
227° 55'.0	5'.0	55'.9	2'.9	
242° 19'.0	5'.0	58'.8	2'.7	
256° 43'.0	5'.0	23° 01'.5 S	2'.6	
271° 07'.0	5'.0	04'.1	2'.4	59'.1
285° 31'.0	5'.0	06'.5	2'.2	
299° 55'.0	4'.9	08'.7	2'.1	
314° 18'.9	5'.0	10'.8	2'.0	
328° 42'.9	5'.0	12'.8	1'.7	
343° 06'.9	5'.0	14'.5	1'.7	59'.0
357° 30'.9	5'.0	16'.2	1'.4	
SD	16'.3	16'.2	16'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 12	Moonrise 13	Moonrise 14
N 72°	-	-	-	-	-	-
N 70°	-	-	-	19:46	-	-
68°	-	-	-	18:54	21:56	-
66°	-	-	-	18:22	20:23	22:14
64°	-	-	01:36	17:58	19:44	21:15
62°	-	-	02:12	17:40	19:18	20:42
60°	-	00:57	02:37	17:25	18:57	20:17
N 58°	-	01:43	02:57	17:12	18:40	19:57
56°	-	02:12	03:14	17:01	18:26	19:41
54°	00:52	02:34	03:28	16:51	18:13	19:27
52°	01:35	02:51	03:40	16:42	18:03	19:15
50°	02:02	03:06	03:51	16:35	17:53	19:04
45°	02:46	03:36	04:13	16:18	17:33	18:42
N 40°	03:16	03:58	04:31	16:05	17:16	18:24
35°	03:39	04:16	04:45	15:53	17:03	18:09
30°	03:58	04:31	04:58	15:44	16:51	17:56
20°	04:26	04:56	05:20	15:27	16:30	17:33
N 10°	04:49	05:16	05:39	15:12	16:13	17:14
0°	05:08	05:34	05:56	14:58	15:56	16:56
S 10°	05:24	05:51	06:14	14:45	15:40	16:38
20°	05:40	06:08	06:32	14:31	15:23	16:19
30°	05:57	06:27	06:53	14:14	15:03	15:57
35°	06:05	06:37	07:05	14:05	14:51	15:44
40°	06:15	06:49	07:19	13:54	14:38	15:29
45°	06:25	07:02	07:36	13:41	14:22	15:12
S 50°	06:36	07:18	07:56	13:26	14:03	14:50
52°	06:42	07:25	08:06	13:19	13:54	14:40
54°	06:47	07:33	08:17	13:11	13:44	14:28
56°	06:53	07:42	08:29	13:02	13:33	14:15
58°	07:00	07:52	08:44	12:53

2011 June 15, 16, 17 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
15 00	262° 56'.1	198° 03'.2	20° 33'.9 N	209° 35'.7	18° 53'.7 N	232° 38'.4	11° 07'.1 N	72° 19'.8	1° 47'.0 S
01	277° 58'.6	213° 02'.5	34'.5	224° 36'.3	54'.2	247° 40'.4	07'.3	87° 22'.3	47'.0
02	293° 01'.0	228° 01'.8	35'.1	239° 37'.0	54'.6	262° 42'.4	07'.5	102° 24'.7	47'.0
03	308° 03'.5	243° 01'.0	35'.7	254° 37'.6	55'.1	277° 44'.4	07'.6	117° 27'.2	47'.0
04	323° 06'.0	258° 00'.3	36'.3	269° 38'.2	55'.5	292° 46'.4	07'.8	132° 29'.7	47'.0
05	338° 08'.4	272° 59'.6	36'.9	284° 38'.8	56'.0	307° 48'.4	07'.9	147° 32'.1	47'.1
06	353° 10'.9	287° 58'.9	37'.5	299° 39'.4	56'.4	322° 50'.4	08'.1	162° 34'.6	47'.1
07	8° 13'.4	302° 58'.1	38'.1	314° 40'.1	56'.9	337° 52'.4	08'.2	177° 37'.0	47'.1
08	23° 15'.8	317° 57'.4	38'.7	329° 40'.7	57'.3	352° 54'.4	08'.4	192° 39'.5	47'.1
09	38° 18'.3	332° 56'.7	39'.3	344° 41'.3	57'.8	7° 56'.4	08'.6	207° 42'.0	47'.1
10	53° 20'.7	347° 55'.9	39'.9	359° 41'.9	58'.2	22° 58'.4	08'.7	222° 44'.4	47'.1
11	68° 23'.2	2° 55'.2	40'.5	14° 42'.5	58'.7	38° 00'.5	08'.9	237° 46'.9	47'.1
12	83° 25'.7	17° 54'.5	20° 41'.1 N	29° 43'.2	18° 59'.1 N	53° 02'.5	11° 09'.0 N	252° 49'.3	1° 47'.1 S
13	98° 28'.1	32° 53'.7	41'.7	44° 43'.8	59'.6	68° 04'.5	09'.2	267° 51'.8	47'.2
14	113° 30'.6	47° 53'.0	42'.3	59° 44'.4	19° 00'.0 N	83° 06'.5	09'.4	282° 54'.2	47'.2
15	128° 33'.1	62° 52'.3	42'.9	74° 45'.0	00'.5	98° 08'.5	09'.5	297° 56'.7	47'.2
16	143° 35'.5	77° 51'.5	43'.5	89° 45'.6	01'.0	113° 10'.5	09'.7	312° 59'.2	47'.2
17	158° 38'.0	92° 50'.8	44'.1	104° 46'.2	01'.4	128° 12'.5	09'.8	328° 01'.6	47'.2
18	173° 40'.5	107° 50'.1	44'.7	119° 46'.9	01'.9	143° 14'.5	10'.0	343° 04'.1	47'.2
19	188° 42'.9	122° 49'.3	45'.2	134° 47'.5	02'.3	158° 16'.5	10'.1	358° 06'.5	47'.2
20	203° 45'.4	137° 48'.6	45'.8	149° 48'.1	02'.7	173° 18'.5	10'.3	13° 09'.0	47'.3
21	218° 47'.8	152° 47'.9	46'.4	164° 48'.7	03'.2	188° 20'.5	10'.5	28° 11'.5	47'.3
22	233° 50'.3	167° 47'.1	47'.0	179° 49'.3	03'.6	203° 22'.5	10'.6	43° 13'.9	47'.3
23	248° 52'.8	182° 46'.4	47'.6	194° 50'.0	04'.1	218° 24'.5	10'.8	58° 16'.4	47'.3
16 00	263° 55'.2	197° 45'.7	20° 48'.2 N	209° 50'.6	19° 04'.5 N	233° 26'.5	11° 10'.9 N	73° 18'.8	1° 47'.3 S
01	278° 57'.7	212° 44'.9	48'.7	224° 51'.2	05'.0	248° 28'.5	11'.1	88° 21'.3	47'.3
02	294° 00'.2	227° 44'.2	49'.3	239° 51'.8	05'.4	263° 30'.6	11'.3	103° 23'.7	47'.3
03	309° 02'.6	242° 43'.5	49'.9	254° 52'.4	05'.9	278° 32'.6	11'.4	118° 26'.2	47'.3
04	324° 05'.1	257° 42'.7	50'.5	269° 53'.0	06'.3	293° 34'.6	11'.6	133° 28'.7	47'.4
05	339° 07'.6	272° 42'.0	51'.1	284° 53'.7	06'.8	308° 36'.6	11'.7	148° 31'.1	47'.4
06	354° 10'.0	287° 41'.2	51'.6	299° 54'.3	07'.2	323° 38'.6	11'.9	163° 33'.6	47'.4
07	9° 12'.5	302° 40'.5	52'.2	314° 54'.9	07'.7	338° 40'.6	12'.0	178° 36'.0	47'.4
08	24° 15'.0	317° 39'.8	52'.8	329° 55'.5	08'.1	353° 42'.6	12'.2	193° 38'.5	47'.4
09	39° 17'.4	332° 39'.0	53'.4	344° 56'.1	08'.6	8° 44'.6	12'.4	208° 40'.9	47'.4
10	54° 19'.9	347° 38'.3	53'.9	359° 56'.8	09'.0	23° 46'.6	12'.5	223° 43'.4	47'.5
11	69° 22'.3	2° 37'.5	54'.5	14° 57'.4	09'.4	38° 48'.6	12'.7	238° 45'.8	47'.5
12	84° 24'.8	17° 36'.8	20° 55'.1 N	29° 58'.0	19° 09'.9 N	53° 50'.6	11° 12'.8 N	253° 48'.3	1° 47'.5 S
13	99° 27'.3	32° 36'.0	55'.6	44° 58'.6	10'.3	68° 52'.7	13'.0	268° 50'.8	47'.5
14	114° 29'.7	47° 35'.3	56'.2	59° 59'.2	10'.8	83° 54'.7	13'.1	283° 53'.2	47'.5
15	129° 32'.2	62° 34'.6	56'.8	74° 59'.8	11'.2	98° 56'.7	13'.3	298° 55'.7	47'.5
16	144° 34'.7	77° 33'.8	57'.3	90° 00'.5	11'.7	113° 58'.7	13'.5	313° 58'.1	47'.5
17	159° 37'.1	92° 33'.1	57'.9	105° 01'.1	12'.1	129° 00'.7	13'.6	329° 00'.6	47'.6
18	174° 39'.6	107° 32'.3	58'.5	120° 01'.7	12'.5	144° 02'.7	13'.8	344° 03'.0	47'.6
19	189° 42'.1	122° 31'.6	59'.0	135° 02'.3	13'.0	159° 04'.7	13'.9	359° 05'.5	47'.6
20	204° 44'.5	137° 30'.8	59'.6	150° 02'.9	13'.4	174° 06'.7	14'.1	14° 07'.9	47'.6
21	219° 47'.0	152° 30'.1	21° 00'.2 N	165° 03'.5	13'.9	189° 08'.7	14'.2	29° 10'.4	47'.6
22	234° 49'.5	167° 29'.3	00'.7	180° 04'.2	14'.3	204° 10'.7	14'.4	44° 12'.9	47'.6
23	249° 51'.9	182° 28'.6	01'.3	195° 04'.8	14'.8	219° 12'.8	14'.6	59° 15'.3	47'.6
17 00	264° 54'.4	197° 27'.9	21° 01'.8 N	210° 05'.4	19° 15'.2 N	234° 14'.8	11° 14'.7 N	74° 17'.8	1° 47'.7 S
01	279° 56'.8	212° 27'.1	02'.4	225° 06'.0	15'.6	249° 16'.8	14'.9	89° 20'.2	47'.7
02	294° 59'.3	227° 26'.4	02'.9	240° 06'.6	16'.1	264° 18'.8	15'.0	104° 22'.7	47'.7
03	310° 01'.8	242° 25'.6	03'.5	255° 07'.2	16'.5	279° 20'.8	15'.2	119° 25'.1	47'.7
04	325° 04'.2	257° 24'.9	04'.1	270° 07'.9	16'.9	294° 22'.8	15'.3	134° 27'.6	47'.7
05	340° 06'.7	272° 24'.1	04'.6	285° 08'.5	17'.4	309° 24'.8	15'.5	149° 30'.0	47'.7
06	355° 09'.2	287° 23'.4	05'.2	300° 09'.1	17'.8	324° 26'.8	15'.6	164° 32'.5	47'.8
07	10° 11'.6	302° 22'.6	05'.7	315° 09'.7	18'.3	339° 28'.9	15'.8	179° 34'.9	47'.8
08	25° 14'.1	317° 21'.9	06'.3	330° 10'.3	18'.7	354° 30'.9	16'.0	194° 37'.4	47'.8
09	40° 16'.6	332° 21'.1	06'.8	345° 10'.9	19'.1	9° 32'.9	16'.1	209° 39'.8	47'.8
10	55° 19'.0	347° 20'.4	07'.4	0° 11'.6	19'.6	24° 34'.9	16'.3	224° 42'.3	47'.8
11	70° 21'.5	2° 19'.6	07'.9	15° 12'.2	20'.0	39° 36'.9	16'.4	239° 44'.7	47'.8
12	85° 24'.0	17° 18'.9	21° 08'.5 N	30° 12'.8	19° 20'.4 N	54° 38'.9	11° 16'.6 N	254° 47'.2	1° 47'.9 S
13	100° 26'.4	32° 18'.1	09'.0	45° 13'.4	20'.9	69° 40'.9	16'.7	269° 49'.6	47'.9
14	115° 28'.9	47° 17'.3	09'.5	60° 14'.0	21'.3	84° 42'.9	16'.9	284° 52'.1	47'.9
15	130° 31'.3	62° 16'.6	10'.1	75° 14'.6	21'.8	99° 45'.0	17'.0	299° 54'.5	47'.9
16	145° 33'.8	77° 15'.8	10'.6	90° 15'.2	22'.2	114° 47'.0	17'.2	314° 57'.0	47'.9
17	160° 36'.3	92° 15'.1	11'.2	105° 15'.9	22'.6	129° 49'.0	17'.4	329° 59'.4	47'.9
18	175° 38'.7	107° 14'.3	11'.7	120° 16'.5	23'.1	144° 51'.0	17'.5	345° 01'.9	48'.0
19	190° 41'.2	122° 13'.6	12'.3	135° 17'.1	23'.5	159° 53'.0	17'.7	0° 04'.3	48'.0
20	205° 43'.7	137° 12'.8	12'.8	150° 17'.7	23'.9	174° 55'.0	17'.8	15° 06'.8	48'.0
21	220° 46'.1	152° 12'.1	13'.3	165° 18'.3	24'.4	189° 57'.0	18'.0	30° 09'.2	48'.0
22	235° 48'.6	167° 11'.3	13'.9	180° 18'.9	24'.8	204° 59'.1	18'.1	45° 11'.7	48'.0
23	250° 51'.1	182° 10'.5	14'.4	195° 19'.6	25'.2	220° 01'.1	18'.3	60° 14'.1	48'.0
	M.P. 06:19	v -0'.7	d 0'.6	v 0'.6	d 0'.4	v 2'.0	d 0'.2	v 2'.5	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.4 S
Achernar	335° 28'.1	57° 10'.4 S
Acrux	173° 10'.9	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.4	16° 31'.9 N
Alioth	166° 21'.7	55° 54'.0 N
Alkaid	152° 59'.7	49° 15'.5 N
Alnair	27° 45'.3	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.8 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.0	29° 09'.2 N
Altair	62° 09'.3	8° 54'.0 N
Ankaa	353° 17'.2	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 02'.9 S
Avior	234° 19'.2	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.0	46° 00'.5 N
Deneb	49° 32'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.4	17° 55'.2 S
Dubhe	193° 53'.5	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.3 N
Enif	33° 48'.4	9° 55'.7 N
Fomalhaut	15° 25'.4	29° 33'.4 S
Gacrux	172° 02'.4	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.6	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 18'.9	74° 06'.7 N
Markab	13° 39'.7	15° 16'.0 N
Menkar	314° 16'.8	4° 08'.1 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.7	69° 46'.2 S
Mirfak	308° 42'.9	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.6 S
Polaris	318° 48'.5	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.8	8° 11'.4 S
Rigil Kent	139° 53'.2	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.4	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.0 S
Vega	80° 39'.5	38° 47'.7 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	293° 50'.4	10:49
Mars	305° 55'.3	10:00
Jupiter	329° 31'.3	08:25
Saturn	169° 23'.6	19:04

SUN

GHA	Dec
179° 55'.1	23° 16'.9 N
194° 55'.0	17'.0
209° 54'.9	17'.1
224° 54'.7	17'.3
239° 54'.6	17'.4
254° 54'.5	17'.5
269° 54'.3	17'.6
284° 54'.2	17'.7
299° 54'.1	17'.8
314° 53'.9	17'.9
329° 53'.8	18'.0
344° 53'.7	18'.1
359° 53'.5	23° 18'.2 N
14° 53'.4	18'.4
29° 53'.3	18'.5
44° 53'.1	18'.6
59° 53'.0	18'.7
74° 52'.9	18'.8
89° 52'.7	18'.9
104° 52'.6	19'.0
119° 52'.5	19'.1
134° 52'.3	19'.2
149° 52'.2	19'.3
164° 52'.1	19'.4
179° 51'.9	23° 19'.5 N
194° 51'.8	19'.6
209° 51'.7	19'.7
224° 51'.5	19'.8
239° 51'.4	19'.9
254° 51'.3	20'.0
269° 51'.1	20'.1
284° 51'.0	20'.2
299° 50'.9	20'.2
314° 50'.7	20'.3
329° 50'.6	20'.4
344° 50'.5	20'.5
359° 50'.3	23° 20'.6 N
14° 50'.2	20'.7
29° 50'.1	20'.8
44° 49'.9	20'.9
59° 49'.8	21'.0
74° 49'.7	21'.1
89° 49'.5	21'.1
104° 49'.4	21'.2
119° 49'.3	21'.3
134° 49'.1	21'.4
149° 49'.0	21'.5
164° 48'.9	21'.6
179° 48'.7	23° 21'.6 N
194° 48'.6	21'.7
209° 48'.5	21'.8
224° 48'.3	21'.9
239° 48'.2	22'.0
254° 48'.1	22'.0
269° 47'.9	22'.1
284° 47'.8	22'.2
299° 47'.7	22'.3
314° 47'.5	22'.3
329° 47'.4	22'.4
344° 47'.3	22'.5
359° 47'.1	23° 22'.6 N
14° 47'.0	22'.6
29° 46'.9	22'.7
44° 46'.7	22'.8
59° 46'.6	22'.8
74° 46'.5	22'.9
89° 46'.3	23'.0
104° 46'.2	23'.1
119° 46'.1	23'.1
134° 45'.9	23'.2
149° 45'.8	23'.3
164° 45'.7	23'.3

SD 15'.7 d 0'.1

MOON

GHA	v	Dec	d	HP
11° 54'.9	5'.1	23° 17'.6 S	1'.3	59'.0
26° 19'.0	5'.0	18'.9	1'.2	
40° 43'.0	5'.1	20'.1	1'.0	
55° 07'.1	5'.1	21'.1	0'.8	58'.9
69° 31'.2	5'.0	21'.9	0'.7	
83° 55'.2	5'.2	22'.6	0'.5	
98° 19'.4	5'.1	23'.1	0'.4	
112° 43'.5	5'.2	23'.5	0'.2	
127° 07'.7	5'.2	23'.7	0'.0	58'.8
141° 31'.9	5'.2	23'.7	0'.1	
155° 56'.1	5'.2	23'.6	0'.2	
170° 20'.3	5'.3	23'.4	0'.4	
184° 44'.6	5'.3	23° 23'.0 S	0'.6	58'.7
199° 08'.9	5'.4	22'.4	0'.7	
213° 33'.3	5'.4	21'.7	0'.9	
227° 57'.7	5'.4	20'.8	1'.0	
242° 22'.1	5'.5	19'.8	1'.2	
256° 46'.6	5'.5	18'.6	1'.3	58'.6
271° 11'.1	5'.6	17'.3	1'.5	
285° 35'.7	5'.6	15'.8	1'.6	
300° 00'.3	5'.6	14'.2	1'.8	
314° 24'.9	5'.7	12'.4	1'.9	58'.5
328° 49'.6	5'.8	10'.5	2'.1	
343° 14'.4	5'.8	08'.4	2'.2	
357° 39'.2	5'.9	23° 06'.2 S	2'.3	58'.5
12° 04'.1	5'.9	03'.9	2'.5	58'.4
26° 29'.0	6'.0	01'.4	2'.7	
40° 54'.0	6'.0	22° 58'.7 S	2'.8	
55° 19'.0	6'.1	55'.9	2'.9	58'.3
69° 44'.1	6'.2	53'.0	3'.1	
84° 09'.3	6'.2	49'.9	3'.3	
98° 34'.5	6'.3	46'.6	3'.3	
112° 59'.8	6'.3	43'.3	3'.5	58'.2
127° 25'.1	6'.4	39'.8	3'.7	
141° 50'.5	6'.5	36'.1	3'.8	
156° 16'.0	6'.6	32'.3	3'.9	
170° 41'.6	6'.6	22° 28'.4 S	4'.1	58'.1
185° 07'.2	6'.7	24'.3	4'.1	
199° 32'.9	6'.8	20'.2	4'.4	
213° 58'.7	6'.9	15'.8	4'.4	58'.0
228° 24'.6	6'.9	11'.4	4'.6	
242° 50'.5	7'.0	06'.8	4'.7	
257° 16'.5	7'.1	02'.1	4'.9	
271° 42'.6	7'.2	21° 57'.2 S	5'.0	57'.9
286° 08'.8	7'.2	52'.2	5'.1	
300° 35'.0	7'.3	47'.1	5'.2	
315° 01'.3	7'.4	41'.9	5'.4	57'.8
329° 27'.7	7'.5	36'.5	5'.4	
343° 54'.2	7'.6	21° 31'.1 S	5'.6	57'.8
358° 20'.8	7'.7	25'.5	5'.8	
12° 47'.5	7'.7	19'.7	5'.8	57'.7
27° 14'.2	7'.8	13'.9	6'.0	
41° 41'.0	7'.9	07'.9	6'.0	
56° 07'.9	8'.0	01'.9	6'.2	57'.6
70° 34'.9	8'.1	20° 55'.7 S	6'.3	
85° 02'.0	8'.2	49'.4	6'.5	
99° 29'.2	8'.3	42'.9	6'.5	
113° 56'.5	8'.3	36'.4	6'.6	57'.5
128° 23'.8	8'.5	29'.8	6'.8	
142° 51'.3	8'.5	23'.0	6'.9	
157° 18'.8	8'.6	20° 16'.1 S	6'.9	57'.4
171° 46'.4	8'.8	09'.2	7'.1	
186° 14'.2	8'.8	02'.1	7'.2	
200° 42'.0	8'.9	19° 54'.9 S	7'.3	57'.3
215° 09'.9	8'.9	47'.6	7'.4	
229° 37'.8	9'.1	40'.2	7'.5	
244° 05'.9	9'.2	32'.7	7'.6	57'.2
258° 34'.1	9'.3	25'.1	7'.6	
273° 02'.4	9'.3	17'.5	7'.8	
287° 30'.7	9'.5	09'.7	7'.9	
301° 59'.2	9'.5	01'.8	8'.0	57'.1
316° 27'.7	9'.6	18° 53'.8 S	8'.1	

SD 16'.0 15'.8 15'.6

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 15	Moonrise 16	Moonrise 17
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	24:35
68°	-	-	-	-	-	23:48
66°	-	-	-	23:08	23:17	23:17
64°	-	-	01:33	22:14	22:41	22:54
62°	-	-	02:10	21:41	22:16	22:36
60°	-	00:52	02:36	21:17	21:56	22:20
N 58°	-	01:41	02:56	20:57	21:39	22:07
56°	-	02:11	03:13	20:41	21:25	21:56
54°	00:48	02:33	03:27	20:27	21:13	21:46
52°	01:33	02:51	03:39	20:15	21:02	21:37
50°	02:00	03:06	03:50	20:04	20:52	21:29
45°	02:46	03:35	04:13	19:42	20:32	21:12
N 40°	03:16	03:58	04:31	19:24	20:15	20:58
35°	03:39	04:16	04:46	19:09	20:02	20:47
30°	03:58	04:31	04:59	18:56	19:49	20:36
20°	04:27	04:56	05:21	18:33	19:29	20:18
N 10°	04:49	05:16	05:39	18:14	19:10	20:03
0°	05:08	05:34	05:57	17:56	18:54	19:48
S 10°	05:25	05:52	06:14	17:38	18:37	19:33
20°	05:41	06:09	06:33	17:18	18:18	19:17
30°	05:58	06:28	06:54	16:56	17:57	18:59
35°	06:06	06:38	07:06	16:43	17:45	18:49
40°	06:16	06:50	07:20	16:28	17:31	18:37
45°	06:26	07:03	07:37	16:10	17:14	18:22
S 50°	06:38	07:19	07:58	15:47	16:54	18:05
52°	06:43	07:27	08:08	15:37	16:44	17:56
54°	06:49	07:35	08:19	15:25	16:33	17:47
56°	06:55	07:44	08:31	15:11	16:20	17:36
58°	07:02	07:54	08:46	14:55	16:05	17:24
S 60°	07:09	08:06	09:03	14:35	15:48	17:10
S 62°	07:17	08:19	09:25	14:11	15:26	16:54

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 15	Moonset 16	Moonset 17
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	-	-	-	02:02
66°	-	-	-	00:05	01:15	03:05
64°	22:29	-	-	01:03	02:09	03:40
62°	21:52	-	-	01:37	02:42	04:05
60°	21:26	23:10	-	02:02	03:06	04:25
N 58°	21:05	22:21	-	02:22	03:25	04:41
56°	20:49	21:51	-	02:38	03:41	04:55
54°	20:34	21:29	23:15	02:52	03:55	05:07
52°	20:22	21:11	22:29	03:04	04:07	05:17
50°	20:11	20:56	22:01	03:15	04:17	05:27
45°	19:49	20:26	21:16	03:38	04:39	05:46
N 40°	19:31	20:04	20:45	03:56	04:57	06:02
35°	19:16	19:45	20:22	04:11	05:12	06:15
30°	19:03	19:30	20:04	04:24	05:25	06:27
20°	18:41	19:05	19:35	04:47	05:47	06:47
N 10°	18:22	18:45	19:12	05:06	06:06	07:04
0°	18:04	18:27	18:53	05:25	06:24	07:20
S 10°	17:47	18:10	18:36	05:43	06:41	07:36
20°	17:28	17:52	18:20	06:02	07:00	07:53
30°	17:07	17:34	18:03	06:25	07:22	08:12
35°	16:55	17:23	17:55	06:38	07:35	08:23
40°	16:41	17:11	17:45	06:53	07:49	08:36
45°	16:24	16:58	17:35	07:11	08:06	08:51
S 50°	16:03	16:42	17:23	07:33	08:28	09:10
52°	15:54	16:34	17:18	07:44	08:38	09:19
54°	15:42	16:26	17:12	07:56	08:49	09:28
56°	15:30	16:17	17:06	08:10	09:02	09:39
58°	15:15	16:07	17:00	08:26	09:17	09:52
S 60°	14:58	15:55	16:52	08:46	09:35	10:06
S 62°	14:36	15:42	16:44	09:10	09:57	10:24

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
15	0 19	0 26	12:00	24:10	11:40	14d Full
16	0 32	0 38	12:01	00:10	12:39	15d 99%
17	0 45	0 51	12:01	01:07	13:34	16d 97%

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2011 June 18, 19, 20 (Sat, Sun, Mon)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
18 00	265° 53'.5	197° 09'.8	21° 14'.9 N	210° 20'.2	19° 25'.7 N	235° 03'.1	11° 18'.4 N	75° 16'.6	1° 48'.1 S
01	280° 56'.0	212° 09'.0	15'.5	225° 20'.8	26'.1	250° 05'.1	18'.6	90° 19'.0	48'.1
02	295° 58'.5	227° 08'.3	16'.0	240° 21'.4	26'.5	265° 07'.1	18'.7	105° 21'.5	48'.1
03	311° 00'.9	242° 07'.5	16'.5	255° 22'.0	26'.9	280° 09'.1	18'.9	120° 23'.9	48'.1
04	326° 03'.4	257° 06'.8	17'.1	270° 22'.6	27'.4	295° 11'.1	19'.1	135° 26'.4	48'.1
05	341° 05'.8	272° 06'.0	17'.6	285° 23'.2	27'.8	310° 13'.2	19'.2	150° 28'.8	48'.2
06	356° 08'.3	287° 05'.2	18'.1	300° 23'.9	28'.2	325° 15'.2	19'.4	165° 31'.3	48'.2
07	11° 10'.8	302° 04'.5	18'.6	315° 24'.5	28'.7	340° 17'.2	19'.5	180° 33'.7	48'.2
08	26° 13'.2	317° 03'.7	19'.2	330° 25'.1	29'.1	355° 19'.2	19'.7	195° 36'.2	48'.2
09	41° 15'.7	332° 03'.0	19'.7	345° 25'.7	29'.5	10° 21'.2	19'.8	210° 38'.6	48'.2
10	56° 18'.2	347° 02'.2	20'.2	0° 26'.3	30'.0	25° 23'.2	20'.0	225° 41'.1	48'.2
11	71° 20'.6	2° 01'.4	20'.7	15° 26'.9	30'.4	40° 25'.3	20'.1	240° 43'.5	48'.3
12	86° 23'.1	17° 00'.7	21° 21'.3 N	30° 27'.5	19° 30'.8 N	55° 27'.3	11° 20'.3 N	255° 46'.0	1° 48'.3 S
13	101° 25'.6	31° 59'.9	21'.8	45° 28'.2	31'.2	70° 29'.3	20'.4	270° 48'.4	48'.3
14	116° 28'.0	46° 59'.1	22'.3	60° 28'.8	31'.7	85° 31'.3	20'.6	285° 50'.9	48'.3
15	131° 30'.5	61° 58'.4	22'.8	75° 29'.4	32'.1	100° 33'.3	20'.7	300° 53'.3	48'.3
16	146° 33'.0	76° 57'.6	23'.3	90° 30'.0	32'.5	115° 35'.3	20'.9	315° 55'.8	48'.4
17	161° 35'.4	91° 56'.9	23'.9	105° 30'.6	32'.9	130° 37'.4	21'.0	330° 58'.2	48'.4
18	176° 37'.9	106° 56'.1	24'.4	120° 31'.2	33'.4	145° 39'.4	21'.2	346° 00'.7	48'.4
19	191° 40'.3	121° 55'.3	24'.9	135° 31'.8	33'.8	160° 41'.4	21'.4	1° 03'.1	48'.4
20	206° 42'.8	136° 54'.6	25'.4	150° 32'.5	34'.2	175° 43'.4	21'.5	16° 05'.6	48'.4
21	221° 45'.3	151° 53'.8	25'.9	165° 33'.1	34'.6	190° 45'.4	21'.7	31° 08'.0	48'.4
22	236° 47'.7	166° 53'.0	26'.4	180° 33'.7	35'.1	205° 47'.4	21'.8	46° 10'.4	48'.5
23	251° 50'.2	181° 52'.3	26'.9	195° 34'.3	35'.5	220° 49'.5	22'.0	61° 12'.9	48'.5
19 00	266° 52'.7	196° 51'.5	21° 27'.5 N	210° 34'.9	19° 35'.9 N	235° 51'.5	11° 22'.1 N	76° 15'.3	1° 48'.5 S
01	281° 55'.1	211° 50'.7	28'.0	225° 35'.5	36'.3	250° 53'.5	22'.3	91° 17'.8	48'.5
02	296° 57'.6	226° 50'.0	28'.5	240° 36'.1	36'.8	265° 55'.5	22'.4	106° 20'.2	48'.5
03	312° 00'.1	241° 49'.2	29'.0	255° 36'.8	37'.2	280° 57'.5	22'.6	121° 22'.7	48'.6
04	327° 02'.5	256° 48'.4	29'.5	270° 37'.4	37'.6	295° 59'.6	22'.7	136° 25'.1	48'.6
05	342° 05'.0	271° 47'.6	30'.0	285° 38'.0	38'.0	311° 01'.6	22'.9	151° 27'.6	48'.6
06	357° 07'.4	286° 46'.9	30'.5	300° 38'.6	38'.5	326° 03'.6	23'.0	166° 30'.0	48'.6
07	12° 09'.9	301° 46'.1	31'.0	315° 39'.2	38'.9	341° 05'.6	23'.2	181° 32'.5	48'.6
08	27° 12'.4	316° 45'.3	31'.5	330° 39'.8	39'.3	356° 07'.6	23'.3	196° 34'.9	48'.7
09	42° 14'.8	331° 44'.6	32'.0	345° 40'.4	39'.7	11° 09'.6	23'.5	211° 37'.3	48'.7
10	57° 17'.3	346° 43'.8	32'.5	0° 41'.0	40'.1	26° 11'.7	23'.6	226° 39'.8	48'.7
11	72° 19'.8	1° 43'.0	33'.0	15° 41'.7	40'.6	41° 13'.7	23'.8	241° 42'.2	48'.7
12	87° 22'.2	16° 42'.3	21° 33'.5 N	30° 42'.3	19° 41'.0 N	56° 15'.7	11° 23'.9 N	256° 44'.7	1° 48'.7 S
13	102° 24'.7	31° 41'.5	34'.0	45° 42'.9	41'.4	71° 17'.7	24'.1	271° 47'.1	48'.8
14	117° 27'.2	46° 40'.7	34'.5	60° 43'.5	41'.8	86° 19'.7	24'.3	286° 49'.6	48'.8
15	132° 29'.6	61° 39'.9	35'.0	75° 44'.1	42'.2	101° 21'.8	24'.4	301° 52'.0	48'.8
16	147° 32'.1	76° 39'.2	35'.5	90° 44'.7	42'.7	116° 23'.8	24'.6	316° 54'.5	48'.8
17	162° 34'.6	91° 38'.4	36'.0	105° 45'.3	43'.1	131° 25'.8	24'.7	331° 56'.9	48'.8
18	177° 37'.0	106° 37'.6	36'.5	120° 45'.9	43'.5	146° 27'.8	24'.9	346° 59'.3	48'.9
19	192° 39'.5	121° 36'.8	36'.9	135° 46'.6	43'.9	161° 29'.8	25'.0	2° 01'.8	48'.9
20	207° 41'.9	136° 36'.1	37'.4	150° 47'.2	44'.3	176° 31'.9	25'.2	17° 04'.2	48'.9
21	222° 44'.4	151° 35'.3	37'.9	165° 47'.8	44'.7	191° 33'.9	25'.3	32° 06'.7	48'.9
22	237° 46'.9	166° 34'.5	38'.4	180° 48'.4	45'.2	206° 35'.9	25'.5	47° 09'.1	48'.9
23	252° 49'.3	181° 33'.7	38'.9	195° 49'.0	45'.6	221° 37'.9	25'.6	62° 11'.5	49'.0
20 00	267° 51'.8	196° 33'.0	21° 39'.4 N	210° 49'.6	19° 46'.0 N	236° 40'.0	11° 25'.8 N	77° 14'.0	1° 49'.0 S
01	282° 54'.3	211° 32'.2	39'.9	225° 50'.2	46'.4	251° 42'.0	25'.9	92° 16'.4	49'.0
02	297° 56'.7	226° 31'.4	40'.3	240° 50'.8	46'.8	266° 44'.0	26'.1	107° 18'.9	49'.0
03	312° 59'.2	241° 30'.6	40'.8	255° 51'.5	47'.2	281° 46'.0	26'.2	122° 21'.3	49'.0
04	328° 01'.7	256° 29'.8	41'.3	270° 52'.1	47'.7	296° 48'.0	26'.4	137° 23'.8	49'.1
05	343° 04'.1	271° 29'.1	41'.8	285° 52'.7	48'.1	311° 50'.1	26'.5	152° 26'.2	49'.1
06	358° 06'.6	286° 28'.3	42'.3	300° 53'.3	48'.5	326° 52'.1	26'.7	167° 28'.6	49'.1
07	13° 09'.1	301° 27'.5	42'.7	315° 53'.9	48'.9	341° 54'.1	26'.8	182° 31'.1	49'.1
08	28° 11'.5	316° 26'.7	43'.2	330° 54'.5	49'.3	356° 56'.1	27'.0	197° 33'.5	49'.1
09	43° 14'.0	331° 25'.9	43'.7	345° 55'.1	49'.7	11° 58'.2	27'.1	212° 36'.0	49'.2
10	58° 16'.4	346° 25'.2	44'.2	0° 55'.7	50'.1	27° 00'.2	27'.3	227° 38'.4	49'.2
11	73° 18'.9	1° 24'.4	44'.7	15° 56'.4	50'.5	42° 02'.2	27'.4	242° 40'.8	49'.2
12	88° 21'.4	16° 23'.6	21° 45'.1 N	30° 57'.0	19° 51'.0 N	57° 04'.2	11° 27'.6 N	257° 43'.3	1° 49'.2 S
13	103° 23'.8	31° 22'.8	45'.6	45° 57'.6	51'.4	72° 06'.3	27'.7	272° 45'.7	49'.3
14	118° 26'.3	46° 22'.0	46'.1	60° 58'.2	51'.8	87° 08'.3	27'.9	287° 48'.2	49'.3
15	133° 28'.8	61° 21'.3	46'.5	75° 58'.8	52'.2	102° 10'.3	28'.0	302° 50'.6	49'.3
16	148° 31'.2	76° 20'.5	47'.0	90° 59'.4	52'.6	117° 12'.3	28'.2	317° 53'.0	49'.3
17	163° 33'.7	91° 19'.7	47'.5	106° 00'.0	53'.0	132° 14'.3	28'.3	332° 55'.5	49'.3
18	178° 36'.2	106° 18'.9	47'.9	121° 00'.6	53'.4	147° 16'.4	28'.5	347° 57'.9	49'.4
19	193° 38'.6	121° 18'.1	48'.4	136° 01'.2	53'.8	162° 18'.4	28'.6	3° 00'.4	49'.4
20	208° 41'.1	136° 17'.3	48'.9	151° 01'.9	54'.2	177° 20'.4	28'.8	18° 02'.8	49'.4
21	223° 43'.5	151° 16'.6	49'.3	166° 02'.5	54'.6	192° 22'.4	28'.9	33° 05'.2	49'.4
22	238° 46'.0	166° 15'.8	49'.8	181° 03'.1	55'.1	207° 24'.5	29'.1	48° 07'.7	49'.4
23	253° 48'.5	181° 15'.0	50'.3	196° 03'.7	55'.5	222° 26'.5	29'.2	63° 10'.1	49'.5
	M.P. 06:08	v -0'.8	d 0'.5	v 0'.6	d 0'.4	v 2'.0	d 0'.2	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.3 S
Achernar	335° 28'.0	57° 10'.4 S
Acrux	173° 10'.9	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.7	55° 54'.0 N
Alkaid	152° 59'.7	49° 15'.5 N
Alnair	27° 45'.2	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.0	29° 09'.2 N
Altair	62° 09'.3	8° 54'.0 N
Ankaa	353° 17'.1	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 02'.9 S
Avior	234° 19'.2	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.0	46° 00'.5 N
Deneb	49° 32'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.4	17° 55'.2 S
Dubhe	193° 53'.5	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.3 N
Enif	33° 48'.3	9° 55'.7 N
Fomalhaut	15° 25'.4	29° 33'.4 S
Gacrux	172° 02'.4	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.6 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.6	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 19'.0	74° 06'.7 N
Markab	13° 39'.7	15° 16'.1 N
Menkar	314° 16'.8	4° 08'.1 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.7	69° 46'.2 S
Mirfak	308° 42'.8	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.6 S
Polaris	318° 47'.4	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.2	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.3	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.0 S
Vega	80° 39'.5	38° 47'.7 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	289° 58'.8	10:53
Mars	303° 42'.2	09:57
Jupiter	328° 58'.8	08:15
Saturn	169° 22'.7	18:52

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 45'.5	23° 23'.4 N	330° 56'.3	9'.8	18° 45'.7 S	8'.1	57'.1
194° 45'.4	23'.4	345° 25'.1	9'.8	37'.6	8'.3	57'.0
209° 45'.3	23'.5	359° 53'.9	9'.9	29'.3	8'.3	
224° 45'.1	23'.6	14° 22'.8	10'.0	21'.0	8'.4	
239° 45'.0	23'.6	28° 51'.8	10'.1	12'.6	8'.6	56'.9
254° 44'.9	23'.7	43° 20'.9	10'.2	04'.0	8'.6	
269° 44'.7	23'.8	57° 50'.1	10'.3	17° 55'.4 S	8'.6	
284° 44'.6	23'.8	72° 19'.4	10'.3	46'.8	8'.8	
299° 44'.4	23'.9	86° 48'.7	10'.5	38'.0	8'.9	56'.8
314° 44'.3	23'.9	101° 18'.2	10'.6	29'.1	8'.9	
329° 44'.2	24'.0	115° 47'.8	10'.6	20'.2	9'.0	
344° 44'.0	24'.0	130° 17'.4	10'.7	11'.2	9'.1	56'.7
359° 43'.9	23° 24'.1 N	144° 47'.1	10'.9	17° 02'.1 S	9'.1	56'.7
14° 43'.8	24'.2	159° 17'.0	10'.9	16° 53'.0 S	9'.3	
29° 43'.6	24'.2	173° 46'.9	11'.0	43'.7	9'.3	56'.6
44° 43'.5	24'.3	188° 16'.9	11'.1	34'.4	9'.4	
59° 43'.4	24'.3	202° 47'.0	11'.2	25'.0	9'.4	
74° 43'.2	24'.4	217° 17'.2	11'.3	15'.6	9'.6	56'.5
89° 43'.1	24'.4	231° 47'.5	11'.3	06'.0	9'.6	
104° 43'.0	24'.5	246° 17'.8	11'.5	15° 56'.4 S	9'.6	
119° 42'.8	24'.5	260° 48'.3	11'.5	46'.8	9'.8	
134° 42'.7	24'.6	275° 18'.8	11'.6	37'.0	9'.8	56'.4
149° 42'.6	24'.6	289° 49'.4	11'.7	27'.2	9'.8	
164° 42'.4	24'.7	304° 20'.1	11'.8	17'.4	10'.0	
179° 42'.3	23° 24'.7 N	318° 50'.9	11'.9	15° 07'.4 S	9'.9	56'.3
194° 42'.2	24'.8	333° 21'.8	12'.0	14° 57'.5 S	10'.1	
209° 42'.0	24'.8	347° 52'.8	12'.0	47'.4	10'.1	
224° 41'.9	24'.9	2° 23'.8	12'.2	37'.3	10'.2	
239° 41'.7	24'.9	16° 55'.0	12'.2	27'.1	10'.2	56'.2
254° 41'.6	24'.9	31° 26'.2	12'.3	16'.9	10'.3	
269° 41'.5	25'.0	45° 57'.5	12'.4	06'.6	10'.3	
284° 41'.3	25'.0	60° 28'.9	12'.4	13° 56'.3 S	10'.4	56'.1
299° 41'.2	25'.1	75° 00'.3	12'.6	45'.9	10'.4	
314° 41'.1	25'.1	89° 31'.9	12'.6	35'.5	10'.5	
329° 40'.9	25'.1	104° 03'.5	12'.7	25'.0	10'.6	
344° 40'.8	25'.2	118° 35'.2	12'.7	14'.4	10'.6	56'.0
359° 40'.7	23° 25'.2 N	133° 06'.9	12'.9	13° 03'.8 S	10'.6	56'.0
14° 40'.5	25'.3	147° 38'.8	12'.9	12° 53'.2 S	10'.7	
29° 40'.4	25'.3	162° 10'.7	13'.0	42'.5	10'.7	55'.9
44° 40'.3	25'.3	176° 42'.7	13'.1	31'.8	10'.8	
59° 40'.1	25'.4	191° 14'.8	13'.2	21'.0	10'.8	
74° 40'.0	25'.4	205° 47'.0	13'.2	10'.2	10'.9	
89° 39'.9	25'.4	220° 19'.2	13'.3	11° 59'.3 S	10'.9	55'.8
104° 39'.7	25'.5	234° 51'.5	13'.4	48'.4	11'.0	
119° 39'.6	25'.5	249° 23'.9	13'.4	37'.4	11'.0	
134° 39'.4	25'.5	263° 56'.3	13'.5	26'.4	11'.0	55'.7
149° 39'.3	25'.6	278° 28'.8	13'.6	15'.4	11'.1	
164° 39'.2	25'.6	293° 01'.4	13'.7	04'.3	11'.1	
179° 39'.0	23° 25'.6 N	307° 34'.1	13'.7	10° 53'.2 S	11'.1	55'.7
194° 38'.9	25'.7	322° 06'.8	13'.8	42'.1	11'.2	55'.6
209° 38'.8	25'.7	336° 39'.6	13'.8	30'.9	11'.2	
224° 38'.6	25'.7	351° 12'.4	13'.9	19'.7	11'.3	
239° 38'.5	25'.7	5° 45'.3	14'.0	08'.4	11'.3	
254° 38'.4	25'.8	20° 18'.3	14'.0	9° 57'.1 S	11'.3	55'.5
269° 38'.2	25'.8	34° 51'.3	14'.2	45'.8	11'.3	
284° 38'.1	25'.8	49° 24'.5	14'.1	34'.5	11'.4	
299° 38'.0	25'.8	63° 57'.6	14'.2	23'.1	11'.4	
314° 37'.8	25'.9	78° 30'.8	14'.3	11'.7	11'.4	55'.4
329° 37'.7	25'.9	93° 04'.1	14'.4	00'.3	11'.5	
344° 37'.5	25'.9	107° 37'.5	14'.4	8° 48'.8 S	11'.5	
359° 37'.4	23° 25'.9 N	122° 10'.9	14'.4	8° 37'.3 S	11'.5	55'.4
14° 37'.3	26'.0	136° 44'.3	14'.6	25'.8	11'.5	55'.3
29° 37'.1	26'.0	151° 17'.9	14'.5	14'.3	11'.6	
44° 37'.0	26'.0	165° 51'.4	14'.7	02'.7	11'.6	
59° 36'.9	26'.0	180° 25'.1	14'.6	7° 51'.1 S	11'.6	
74° 36'.7	26'.0	194° 58'.7	14'.8	39'.5	11'.6	55'.2
89° 36'.6	26'.1	209° 32'.5	14'.8	27'.9	11'.6	
104° 36'.5	26'.1	224° 06'.3	14'.8	16'.3	11'.7	
119° 36'.3	26'.1	238° 40'.1	14'.9	04'.6	11'.7	
134° 36'.2	26'.1	253° 14'.0	14'.9	6° 52'.9 S	11'.7	
149° 36'.1	26'.1	267° 47'.9	15'.0	41'.2	11'.7	55'.1
164° 35'.9	26'.1	282° 21'.9	15'.0	29'.5	11'.7	
SD 15'.7	d 0'.0	SD	15'.4	15'.3	15'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 18	Moonrise 19	Moonrise 20
N 72°	-	-	-	-	00:31 23:57	23:33
N 70°	-	-	-	00:35 23:59	23:39	23:24
68°	-	-	-	23:34	23:25	23:17
66°	-	-	-	23:16	23:13	23:11
64°	-	-	01:31	23:00	23:04	23:05
62°	-	-	02:09	22:48	22:55	23:01
60°	-	00:50	02:36	22:37	22:48	22:57
N 58°	-	01:40	02:56	22:27	22:42	22:53
56°	-	02:10	03:13	22:19	22:36	22:50
54°	00:45	02:33	03:27	22:11	22:31	22:47
52°	01:32	02:51	03:39	22:05	22:26	22:45
50°	02:00	03:06	03:50	21:58	22:22	22:42
45°	02:46	03:35	04:13	21:45	22:13	22:37
N 40°	03:16	03:58	04:31	21:34	22:05	22:33
35°	03:39	04:16	04:46	21:25	21:59	22:29
30°	03:58	04:31	04:59	21:17	21:53	22:25
20°	04:27	04:56	05:21	21:03	21:43	22:19
N 10°	04:50	05:17	05:40	20:50	21:34	22:14
0°	05:09	05:35	05:58	20:39	21:25	22:09
S 10°	05:26	05:52	06:15	20:27	21:17	22:05
20°	05:42	06:10	06:34	20:14	21:08	21:59
30°	05:59	06:28	06:55	20:00	20:58	21:54
35°	06:07	06:39	07:07	19:51	20:52	21:50
40°	06:17	06:51	07:21	19:42	20:45	21:46
45°	06:27	07:04	07:38	19:31	20:37	21:42
S 50°	06:39	07:20	07:59	19:17	20:28	21:36
52°	06:44	07:28	08:09	19:10	20:23	21:34
54°	06:50	07:36	08:20	19:03	20:18	21:31
56°	06:56	07:45	08:33	18:55	20:13	21:28
58°	07:03	07:56	08:47	18:46	20:07	21:25
S 60°	07:10	08:07	09:05	18:36	20:00	21:21
S 62°	07:19	08:21	09:27	18:24	19:52	21:16

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 18	Moonset 19	Moonset 20
N 72°	-	-	-	-	05:28	07:39
N 70°	-	-	-	03:40	05:59	07:54
68°	-	-	-	04:26	06:22	08:07
66°	-	-	-	04:56	06:40	08:17
64°	22:32	-	-	05:18	06:54	08:25
62°	21:54	-	-	05:36	07:06	08:33
60°	21:27	23:14	-	05:51	07:16	08:39
N 58°	21:07	22:23	-	06:03	07:25	08:44
56°	20:50	21:53	-	06:14	07:32	08:49
54°	20:36	21:30	23:18	06:23	07:39	08:53
52°	20:23	21:12	22:31	06:31	07:45	08:57
50°	20:12	20:57	22:03	06:39	07:51	09:01
45°	19:50	20:27	21:17	06:55	08:03	09:08
N 40°	19:32	20:05	20:46	07:08	08:12	09:15
35°	19:17	19:46	20:23	07:19	08:21	09:20
30°	19:04	19:31	20:04	07:29	08:28	09:25
20°	18:42	19:06	19:35	07:45	08:40	09:33
N 10°	18:23	18:46	19:13	07:59	08:51	09:40
0°	18:05	18:28	18:54	08:13	09:01	09:47
S 10°	17:48	18:10	18:37	08:26	09:12	09:54
20°	17:29	17:53	18:20	08:40	09:22	10:01
30°	17:08	17:34	18:04	08:56	09:34	10:08
35°	16:55	17:24	17:55	09:05	09:41	10:13
40°	16:41	17:12	17:46	09:16	09:49	10:18
45°	16:24	16:58	17:35	09:28	09:58	10:24
S 50°	16:04	16:42	17:24	09:43	10:09	10:31
52°	15:54	16:35	17:18	09:50	10:14	10:34
54°	15:43	16:26	17:13	09:58	10:20	10:38
56°	15:30	16:17	17:06	10:06	10:26	10:42
58°	15:15	16:07	17:00	10:16	10:33	10:46
S 60°	14:58	15:55	16:52	10:27	10:41	10:51
S 62°	14:36	15:42	16:44	10:40	10:50	10:56

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
18	0 58	1 04	12:01	02:00	14:26	17d 92%
19	1 11	1 17	12:01	02:50	15:14	18d 85%
20	1 24	1 30	12:02	03:36	15:58	19d 77%

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2011 June 21, 22, 23 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
21 Tuesday 00	268° 50'.9	196° 14'.2	21° 50'.7 N	211° 04'.3	19° 55'.9 N	237° 28'.5	11° 29'.4 N	78° 12'.6	1° 49'.5 S
01	283° 53'.4	211° 13'.4	51'.2	226° 04'.9	56'.3	252° 30'.5	29'.5	93° 15'.0	49'.5
02	298° 55'.9	226° 12'.6	51'.6	241° 05'.5	56'.7	267° 32'.6	29'.7	108° 17'.4	49'.5
03	313° 58'.3	241° 11'.8	52'.1	256° 06'.1	57'.1	282° 34'.6	29'.8	123° 19'.9	49'.6
04	329° 00'.8	256° 11'.0	52'.5	271° 06'.7	57'.5	297° 36'.6	30'.0	138° 22'.3	49'.6
05	344° 03'.3	271° 10'.3	53'.0	286° 07'.4	57'.9	312° 38'.7	30'.1	153° 24'.7	49'.6
06	359° 05'.7	286° 09'.5	53'.5	301° 08'.0	58'.3	327° 40'.7	30'.3	168° 27'.2	49'.6
07	14° 08'.2	301° 08'.7	53'.9	316° 08'.6	58'.7	342° 42'.7	30'.4	183° 29'.6	49'.6
08	29° 10'.7	316° 07'.9	54'.4	331° 09'.2	59'.1	357° 44'.7	30'.6	198° 32'.1	49'.7
09	44° 13'.1	331° 07'.1	54'.8	346° 09'.8	59'.5	12° 46'.8	30'.7	213° 34'.5	49'.7
10	59° 15'.6	346° 06'.3	55'.3	1° 10'.4	59'.9	27° 48'.8	30'.9	228° 36'.9	49'.7
11	74° 18'.0	1° 05'.5	55'.7	16° 11'.0	20° 00'.3 N	42° 50'.8	31'.0	243° 39'.4	49'.7
12	89° 20'.5	16° 04'.7	21° 56'.2 N	31° 11'.6	20° 00'.7 N	57° 52'.8	11° 31'.2 N	258° 41'.8	1° 49'.8 S
13	104° 23'.0	31° 03'.9	56'.6	46° 12'.2	01'.1	72° 54'.9	31'.3	273° 44'.2	49'.8
14	119° 25'.4	46° 03'.1	57'.0	61° 12'.8	01'.5	87° 56'.9	31'.4	288° 46'.7	49'.8
15	134° 27'.9	61° 02'.4	57'.5	76° 13'.5	01'.9	102° 58'.9	31'.6	303° 49'.1	49'.8
16	149° 30'.4	76° 01'.6	57'.9	91° 14'.1	02'.3	118° 00'.9	31'.7	318° 51'.5	49'.9
17	164° 32'.8	91° 00'.8	58'.4	106° 14'.7	02'.7	133° 03'.0	31'.9	333° 54'.0	49'.9
18	179° 35'.3	106° 00'.0	58'.8	121° 15'.3	03'.1	148° 05'.0	32'.0	348° 56'.4	49'.9
19	194° 37'.8	120° 59'.2	59'.3	136° 15'.9	03'.5	163° 07'.0	32'.2	3° 58'.8	49'.9
20	209° 40'.2	135° 58'.4	59'.7	151° 16'.5	04'.0	178° 09'.1	32'.3	19° 01'.3	50'.0
21	224° 42'.7	150° 57'.6	22° 00'.1 N	166° 17'.1	04'.4	193° 11'.1	32'.5	34° 03'.7	50'.0
22	239° 45'.2	165° 56'.8	00'.6	181° 17'.7	04'.8	208° 13'.1	32'.6	49° 06'.2	50'.0
23	254° 47'.6	180° 56'.0	01'.0	196° 18'.3	05'.2	223° 15'.1	32'.8	64° 08'.6	50'.0
22 Wednesday 00	269° 50'.1	195° 55'.2	22° 01'.4 N	211° 18'.9	20° 05'.5 N	238° 17'.2	11° 32'.9 N	79° 11'.0	1° 50'.0 S
01	284° 52'.5	210° 54'.4	01'.9	226° 19'.6	05'.9	253° 19'.2	33'.1	94° 13'.5	50'.1
02	299° 55'.0	225° 53'.6	02'.3	241° 20'.2	06'.3	268° 21'.2	33'.2	109° 15'.9	50'.1
03	314° 57'.5	240° 52'.8	02'.7	256° 20'.8	06'.7	283° 23'.3	33'.4	124° 18'.3	50'.1
04	329° 59'.9	255° 52'.0	03'.2	271° 21'.4	07'.1	298° 25'.3	33'.5	139° 20'.8	50'.1
05	345° 02'.4	270° 51'.2	03'.6	286° 22'.0	07'.5	313° 27'.3	33'.7	154° 23'.2	50'.2
06	0° 04'.9	285° 50'.4	04'.0	301° 22'.6	07'.9	328° 29'.4	33'.8	169° 25'.6	50'.2
07	15° 07'.3	300° 49'.6	04'.4	316° 23'.2	08'.3	343° 31'.4	34'.0	184° 28'.1	50'.2
08	30° 09'.8	315° 48'.8	04'.9	331° 23'.8	08'.7	358° 33'.4	34'.1	199° 30'.5	50'.2
09	45° 12'.3	330° 48'.0	05'.3	346° 24'.4	09'.1	13° 35'.4	34'.3	214° 32'.9	50'.3
10	60° 14'.7	345° 47'.2	05'.7	1° 25'.0	09'.5	28° 37'.5	34'.4	229° 35'.4	50'.3
11	75° 17'.2	0° 46'.4	06'.1	16° 25'.6	09'.9	43° 39'.5	34'.5	244° 37'.8	50'.3
12	90° 19'.6	15° 45'.6	22° 06'.6 N	31° 26'.3	20° 10'.3 N	58° 41'.5	11° 34'.7 N	259° 40'.2	1° 50'.3 S
13	105° 22'.1	30° 44'.8	07'.0	46° 26'.9	10'.7	73° 43'.6	34'.8	274° 42'.7	50'.4
14	120° 24'.6	45° 44'.0	07'.4	61° 27'.5	11'.1	88° 45'.6	35'.0	289° 45'.1	50'.4
15	135° 27'.0	60° 43'.2	07'.8	76° 28'.1	11'.5	103° 47'.6	35'.1	304° 47'.5	50'.4
16	150° 29'.5	75° 42'.4	08'.2	91° 28'.7	11'.9	118° 49'.7	35'.3	319° 50'.0	50'.4
17	165° 32'.0	90° 41'.6	08'.7	106° 29'.3	12'.3	133° 51'.7	35'.4	334° 52'.4	50'.5
18	180° 34'.4	105° 40'.8	09'.1	121° 29'.9	12'.7	148° 53'.7	35'.6	349° 54'.8	50'.5
19	195° 36'.9	120° 40'.0	09'.5	136° 30'.5	13'.1	163° 55'.8	35'.7	4° 57'.2	50'.5
20	210° 39'.4	135° 39'.2	09'.9	151° 31'.1	13'.5	178° 57'.8	35'.9	19° 59'.7	50'.5
21	225° 41'.8	150° 38'.4	10'.3	166° 31'.7	13'.9	193° 59'.8	36'.0	35° 02'.1	50'.6
22	240° 44'.3	165° 37'.6	10'.7	181° 32'.3	14'.3	209° 01'.9	36'.2	50° 04'.5	50'.6
23	255° 46'.8	180° 36'.8	11'.1	196° 32'.9	14'.6	224° 03'.9	36'.3	65° 07'.0	50'.6
23 Thursday 00	270° 49'.2	195° 36'.0	22° 11'.5 N	211° 33'.6	20° 15'.0 N	239° 05'.9	11° 36'.4 N	80° 09'.4	1° 50'.6 S
01	285° 51'.7	210° 35'.2	12'.0	226° 34'.2	15'.4	254° 08'.0	36'.6	95° 11'.8	50'.7
02	300° 54'.1	225° 34'.4	12'.4	241° 34'.8	15'.8	269° 10'.0	36'.7	110° 14'.3	50'.7
03	315° 56'.6	240° 33'.6	12'.8	256° 35'.4	16'.2	284° 12'.0	36'.9	125° 16'.7	50'.7
04	330° 59'.1	255° 32'.8	13'.2	271° 36'.0	16'.6	299° 14'.1	37'.0	140° 19'.1	50'.7
05	346° 01'.5	270° 32'.0	13'.6	286° 36'.6	17'.0	314° 16'.1	37'.2	155° 21'.5	50'.8
06	1° 04'.0	285° 31'.2	14'.0	301° 37'.2	17'.4	329° 18'.1	37'.3	170° 24'.0	50'.8
07	16° 06'.5	300° 30'.4	14'.4	316° 37'.8	17'.8	344° 20'.2	37'.5	185° 26'.4	50'.8
08	31° 08'.9	315° 29'.6	14'.8	331° 38'.4	18'.1	359° 22'.2	37'.6	200° 28'.8	50'.8
09	46° 11'.4	330° 28'.8	15'.2	346° 39'.0	18'.5	14° 24'.2	37'.8	215° 31'.3	50'.9
10	61° 13'.9	345° 28'.0	15'.6	1° 39'.6	18'.9	29° 26'.3	37'.9	230° 33'.7	50'.9
11	76° 16'.3	0° 27'.2	16'.0	16° 40'.2	19'.3	44° 28'.3	38'.0	245° 36'.1	50'.9
12	91° 18'.8	15° 26'.3	22° 16'.4 N	31° 40'.9	20° 19'.7 N	59° 30'.3	11° 38'.2 N	260° 38'.6	1° 50'.9 S
13	106° 21'.3	30° 25'.5	16'.8	46° 41'.5	20'.1	74° 32'.4	38'.3	275° 41'.0	51'.0
14	121° 23'.7	45° 24'.7	17'.2	61° 42'.1	20'.5	89° 34'.4	38'.5	290° 43'.4	51'.0
15	136° 26'.2	60° 23'.9	17'.5	76° 42'.7	20'.9	104° 36'.4	38'.6	305° 45'.8	51'.0
16	151° 28'.6	75° 23'.1	17'.9	91° 43'.3	21'.2	119° 38'.5	38'.8	320° 48'.3	51'.1
17	166° 31'.1	90° 22'.3	18'.3	106° 43'.9	21'.6	134° 40'.5	38'.9	335° 50'.7	51'.1
18	181° 33'.6	105° 21'.5	18'.7	121° 44'.5	22'.0	149° 42'.5	39'.1	350° 53'.1	51'.1
19	196° 36'.0	120° 20'.7	19'.1	136° 45'.1	22'.4	164° 44'.6	39'.2	5° 55'.5	51'.1
20	211° 38'.5	135° 19'.9	19'.5	151° 45'.7	22'.8	179° 46'.6	39'.3	20° 58'.0	51'.2
21	226° 41'.0	150° 19'.1	19'.9	166° 46'.3	23'.2	194° 48'.6	39'.5	36° 00'.4	51'.2
22	241° 43'.4	165° 18'.3	20'.3	181° 46'.9	23'.6	209° 50'.7	39'.6	51° 02'.8	51'.2
23	256° 45'.9	180° 17'.4	20'.6	196° 47'.5	23'.9	224° 52'.7	39'.8	66° 05'.3	51'.2
	M.P. 05:56	v -0'.8	d 0'.4	v 0'.6	d 0'.4	v 2'.0	d 0'.1	v 2'.4	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.3 S
Achernar	335° 28'.0	57° 10'.4 S
Acrux	173° 10'.9	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.7	55° 54'.0 N
Alkaid	152° 59'.7	49° 15'.5 N
Alnair	27° 45'.2	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.6 N
Alpheratz	357° 45'.0	29° 09'.2 N
Altair	62° 09'.3	8° 54'.0 N
Ankaa	353° 17'.1	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 02'.9 S
Avior	234° 19'.2	59° 33'.1 S
Bellatrix	278° 33'.9	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.0	46° 00'.5 N
Deneb	49° 32'.1	45° 19'.2 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.3	17° 55'.2 S
Dubhe	193° 53'.5	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.3 N
Enif	33° 48'.3	9° 55'.7 N
Fomalhaut	15° 25'.4	29° 33'.4 S
Gacrux	172° 02'.5	57° 11'.0 S
Gienah	175° 53'.7	17° 36'.5 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.6	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 19'.0	74° 06'.7 N
Markab	13° 39'.7	15° 16'.1 N
Menkar	314° 16'.8	4° 08'.1 N
Menkent	148° 09'.0	36° 25'.8 S
Miaplacidus	221° 40'.7	69° 46'.2 S
Mirfak	308° 42'.8	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.6 S
Polaris	318° 46'.4	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.2	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.3	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.0 S
Vega	80° 39'.5	38° 47'.7 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	286° 05'.1	10:57
Mars	301° 28'.9	09:54
Jupiter	328° 27'.1	08:06
Saturn	169° 20'.9	18:40

SUN

GHA	Dec
179° 35'.8	23° 26'.1 N
194° 35'.6	26'.2
209° 35'.5	26'.2
224° 35'.4	26'.2
239° 35'.2	26'.2
254° 35'.1	26'.2
269° 35'.0	26'.2
284° 34'.8	26'.2
299° 34'.7	26'.2
314° 34'.6	26'.2
329° 34'.4	26'.2
344° 34'.3	26'.2
359° 34'.2	23° 26'.2 N
14° 34'.0	26'.2
29° 33'.9	26'.2
44° 33'.7	26'.2
59° 33'.6	26'.2
74° 33'.5	26'.2
89° 33'.3	26'.2
104° 33'.2	26'.2
119° 33'.1	26'.2
134° 32'.9	26'.2
149° 32'.8	26'.2
164° 32'.7	26'.2
179° 32'.5	23° 26'.2 N
194° 32'.4	26'.2
209° 32'.3	26'.2
224° 32'.1	26'.2
239° 32'.0	26'.2
254° 31'.9	26'.2
269° 31'.7	26'.2
284° 31'.6	26'.2
299° 31'.4	26'.2
314° 31'.3	26'.2
329° 31'.2	26'.1
344° 31'.0	26'.1
359° 30'.9	23° 26'.1 N
14° 30'.8	26'.1
29° 30'.6	26'.1
44° 30'.5	26'.1
59° 30'.4	26'.1
74° 30'.2	26'.0
89° 30'.1	26'.0
104° 30'.0	26'.0
119° 29'.8	26'.0
134° 29'.7	26'.0
149° 29'.6	26'.0
164° 29'.4	25'.9
179° 29'.3	23° 25'.9 N
194° 29'.1	25'.9
209° 29'.0	25'.9
224° 28'.9	25'.8
239° 28'.7	25'.8
254° 28'.6	25'.8
269° 28'.5	25'.8
284° 28'.3	25'.7
299° 28'.2	25'.7
314° 28'.1	25'.7
329° 27'.9	25'.7
344° 27'.8	25'.6
359° 27'.7	23° 25'.6 N
14° 27'.5	25'.6
29° 27'.4	25'.5
44° 27'.3	25'.5
59° 27'.1	25'.5
74° 27'.0	25'.4
89° 26'.9	25'.4
104° 26'.7	25'.4
119° 26'.6	25'.3
134° 26'.4	25'.3
149° 26'.3	25'.2
164° 26'.2	25'.2

SD 15'.7 d 0'.0

MOON

GHA	v	Dec	d	HP
296° 55'.9	15'.1	6° 17'.8 S	11'.8	55'.1
311° 30'.0	15'.1	06'.0	11'.8	
326° 04'.1	15'.1	5° 54'.2 S	11'.7	55'.0
340° 38'.2	15'.2	42'.5	11'.8	
355° 12'.4	15'.3	30'.7	11'.8	
9° 46'.7	15'.3	18'.9	11'.9	
24° 21'.0	15'.3	07'.0	11'.8	
38° 55'.3	15'.3	4° 55'.2 S	11'.8	54'.9
53° 29'.6	15'.4	43'.4	11'.9	
68° 04'.0	15'.5	31'.5	11'.8	
82° 38'.5	15'.5	19'.7	11'.9	
97° 13'.0	15'.5	07'.8	11'.9	
111° 47'.5	15'.5	3° 55'.9 S	11'.9	54'.8
126° 22'.0	15'.6	44'.0	11'.8	
140° 56'.6	15'.6	32'.2	11'.9	
155° 31'.2	15'.6	20'.3	11'.9	
170° 05'.8	15'.7	08'.4	11'.9	
184° 40'.5	15'.7	2° 56'.5 S	11'.9	
199° 15'.2	15'.7	44'.6	11'.9	54'.7
213° 49'.9	15'.7	32'.7	12'.0	
228° 24'.6	15'.8	20'.7	11'.9	
242° 59'.4	15'.8	08'.8	11'.9	
257° 34'.2	15'.8	1° 56'.9 S	11'.9	
272° 09'.0	15'.9	45'.0	11'.9	
286° 43'.9	15'.8	1° 33'.1 S	11'.9	54'.6
301° 18'.7	15'.9	21'.2	11'.9	
315° 53'.6	15'.9	09'.3	11'.9	
330° 28'.5	16'.0	0° 57'.4 S	11'.9	
345° 03'.5	15'.9	45'.5	11'.9	
359° 38'.4	16'.0	33'.6	11'.9	
14° 13'.4	16'.0	21'.7	11'.9	
28° 48'.4	16'.0	09'.8	11'.9	54'.5
43° 23'.4	16'.0	0° 02'.1 N	11'.9	
57° 58'.4	16'.0	14'.0	11'.8	
72° 33'.4	16'.0	25'.8	11'.9	
87° 08'.4	16'.1	37'.7	11'.8	
101° 43'.5	16'.0	0° 49'.5 N	11'.9	54'.5
116° 18'.5	16'.1	1° 01'.4 N	11'.8	
130° 53'.6	16'.0	13'.2	11'.8	
145° 28'.6	16'.1	25'.0	11'.9	54'.4
160° 03'.7	16'.1	36'.9	11'.8	
174° 38'.8	16'.1	48'.7	11'.8	
189° 13'.9	16'.1	2° 00'.5 N	11'.7	
203° 49'.0	16'.1	12'.2	11'.8	
218° 24'.1	16'.1	24'.0	11'.8	
232° 59'.2	16'.1	35'.8	11'.7	
247° 34'.3	16'.1	47'.5	11'.7	
262° 09'.4	16'.1	59'.2	11'.7	
276° 44'.5	16'.1	3° 10'.9 N	11'.7	54'.4
291° 19'.6	16'.1	22'.6	11'.7	
305° 54'.7	16'.1	34'.3	11'.7	54'.3
320° 29'.8	16'.1	46'.0	11'.6	
335° 04'.9	16'.1	57'.6	11'.6	
349° 40'.0	16'.1	4° 09'.2 N	11'.6	
4° 15'.1	16'.0	20'.8	11'.6	
18° 50'.1	16'.1	32'.4	11'.6	
33° 25'.2	16'.1	44'.0	11'.5	
48° 00'.3	16'.0	55'.5	11'.6	
62° 35'.3	16'.0	5° 07'.1 N	11'.5	
77° 10'.3	16'.1	18'.6	11'.4	
91° 45'.4	16'.0	5° 30'.0 N	11'.5	54'.3
106° 20'.4	16'.0	41'.5	11'.4	
120° 55'.4	15'.9	52'.9	11'.4	
135° 30'.3	16'.0	6° 04'.3 N	11'.4	
150° 05'.3	16'.0	15'.7	11'.4	
164° 40'.3	15'.9	27'.1	11'.3	
179° 15'.2	15'.9	38'.4	11'.3	
193° 50'.1	15'.9	49'.7	11'.3	
208° 25'.0	15'.9	7° 01'.0 N	11'.2	54'.2
222° 59'.9	15'.8	12'.2	11'.3	
237° 34'.7	15'.9	23'.5	11'.2	
252° 09'.6	15'.8	34'.7	11'.1	

SD 14'.9 14'.8 14'.8

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 21	Moonrise 22	Moonrise 23
N 72°	-	-	-	23:14	22:56	22:36
N 70°	-	-	-	23:12	23:00	22:47
68°	-	-	-	23:10	23:03	22:56
66°	-	-	-	23:08	23:05	23:03
64°	-	-	01:31	23:07	23:08	23:09
62°	-	-	02:09	23:05	23:10	23:14
60°	-	00:49	02:36	23:04	23:11	23:19
N 58°	-	01:41	02:56	23:03	23:13	23:23
56°	-	02:11	03:13	23:02	23:14	23:27
54°	00:45	02:33	03:28	23:02	23:16	23:30
52°	01:32	02:51	03:40	23:01	23:17	23:33
50°	02:00	03:06	03:51	23:00	23:18	23:36
45°	02:46	03:36	04:13	22:59	23:20	23:42
N 40°	03:17	03:59	04:31	22:58	23:22	23:47
35°	03:40	04:17	04:47	22:57	23:24	23:51
30°	03:59	04:32	05:00	22:56	23:25	23:55
20°	04:28	04:57	05:22	22:54	23:28	24:02
N 10°	04:50	05:18	05:41	22:53	23:30	24:08
0°	05:09	05:36	05:58	22:52	23:33	24:14
S 10°	05:27	05:53	06:16	22:50	23:35	24:20
20°	05:43	06:10	06:34	22:49	23:37	24:26
30°	05:59	06:29	06:56	22:47	23:40	24:33
35°	06:08	06:40	07:08	22:46	23:42	24:37
40°	06:17	06:52	07:22	22:45	23:44	24:41
45°	06:28	07:05	07:39	22:44	23:46	24:47
S 50°	06:40	07:21	08:00	22:43	23:48	24:53
52°	06:45	07:29	08:10	22:42	23:49	24:56
54°	06:51	07:37	08:21	22:42	23:51	25:00
56°	06:57	07:46	08:34	22:41	23:52	25:03
58°	07:04	07:56	08:48	22:40	23:54	25:07
S 60°	07:11	08:08	09:06	22:39	23:56	25:12
S 62°	07:20	08:22	09:28	22:38	23:58	25:17

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 21	Moonset 22	Moonset 23
N 72°	-	-	-	09:32	11:19	13:05
N 70°	-	-	-	09:39	11:18	12:57
68°	-	-	-	09:44	11:18	12:50
66°	-	-	-	09:49	11:17	12:45
64°	22:33	-	-	09:52	11:17	12:40
62°	21:54	-	-	09:56	11:16	12:36
60°	21:28	23:14	-	09:58	11:16	12:32
N 58°	21:07	22:23	-	10:01	11:16	12:29
56°	20:51	21:53	-	10:03	11:15	12:26
54°	20:36	21:31	23:19	10:05	11:15	12:24
52°	20:24	21:13	22:31	10:07	11:15	12:22
50°	20:13	20:58	22:03	10:08	11:14	12:20
45°	19:50	20:28	21:18	10:12	11:14	12:15
N 40°	19:32	20:05	20:47	10:15	11:14	12:11
35°	19:17	19:47	20:24	10:17	11:13	12:08
30°	19:04	19:32	20:05	10:20	11:13	12:05
20°	18:42	19:07	19:36	10:23	11:12	12:01
N 10°	18:23	18:46	19:13	10:27	11:12	11:56
0°	18:06	18:28	18:54	10:30	11:11	11:52
S 10°	17:48	18:11	18:37	10:33	11:11	11:48
20°	17:30	17:54	18:21	10:36	11:10	11:44
30°	17:08	17:35	18:05	10:40	11:10	11:39
35°	16:56	17:24	17:56	10:42	11:09	11:37
40°	16:42	17:12	17:46	10:44	11:09	11:34
45°	16:25	16:59	17:36	10:47	11:09	11:30
S 50°	16:04	16:43	17:24	10:50	11:08	11:26
52°	15:54	16:35	17:19	10:52	11:08	11:24
54°	15:43	16:27	17:13	10:53	11:07	11:21
56°	15:30	16:18	17:07	10:55	11:07	11:19
58°	15:16	16:08	17:00	10:57	11:07	11:17
S 60°	14:58	15:56	16:53	10:59	11:06	11:14
S 62°	14:36	15:42	16:44	11:02	11:06	11:10

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
21	1 37	1 43	12:02	04:20	16:41	20d 69%
22	1 50	1 56	12:02	05:01	17:22	21d 60%
23	2 03	2 09	12:02	05:43	18:03	22d 50%

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2011 June 24, 25, 26 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
24 Friday 00	271° 48'.4	195° 16'.6	22° 21'.0 N	211° 48'.1	20° 24'.3 N	239° 54'.8	11° 39'.9 N	81° 07'.7	1° 51'.3 S
01	286° 50'.8	210° 15'.8	21'.4	226° 48'.7	24'.7	254° 56'.8	40'.1	96° 10'.1	51'.3
02	301° 53'.3	225° 15'.0	21'.8	241° 49'.4	25'.1	269° 58'.8	40'.2	111° 12'.5	51'.3
03	316° 55'.7	240° 14'.2	22'.2	256° 50'.0	25'.5	285° 00'.9	40'.4	126° 15'.0	51'.4
04	331° 58'.2	255° 13'.4	22'.6	271° 50'.6	25'.8	300° 02'.9	40'.5	141° 17'.4	51'.4
05	347° 00'.7	270° 12'.6	22'.9	286° 51'.2	26'.2	315° 04'.9	40'.6	156° 19'.8	51'.4
06	2° 03'.1	285° 11'.8	23'.3	301° 51'.8	26'.6	330° 07'.0	40'.8	171° 22'.2	51'.4
07	17° 05'.6	300° 10'.9	23'.7	316° 52'.4	27'.0	345° 09'.0	40'.9	186° 24'.7	51'.5
08	32° 08'.1	315° 10'.1	24'.1	331° 53'.0	27'.4	0° 11'.1	41'.1	201° 27'.1	51'.5
09	47° 10'.5	330° 09'.3	24'.4	346° 53'.6	27'.7	15° 13'.1	41'.2	216° 29'.5	51'.5
10	62° 13'.0	345° 08'.5	24'.8	1° 54'.2	28'.1	30° 15'.1	41'.4	231° 31'.9	51'.5
11	77° 15'.5	0° 07'.7	25'.2	16° 54'.8	28'.5	45° 17'.2	41'.5	246° 34'.4	51'.6
12	92° 17'.9	15° 06'.9	22° 25'.5 N	31° 55'.4	20° 28'.9 N	60° 19'.2	11° 41'.6 N	261° 36'.8	1° 51'.6 S
13	107° 20'.4	30° 06'.0	25'.9	46° 56'.0	29'.3	75° 21'.2	41'.8	276° 39'.2	51'.6
14	122° 22'.9	45° 05'.2	26'.3	61° 56'.6	29'.6	90° 23'.3	41'.9	291° 41'.6	51'.7
15	137° 25'.3	60° 04'.4	26'.6	76° 57'.2	30'.0	105° 25'.3	42'.1	306° 44'.1	51'.7
16	152° 27'.8	75° 03'.6	27'.0	91° 57'.8	30'.4	120° 27'.4	42'.2	321° 46'.5	51'.7
17	167° 30'.2	90° 02'.8	27'.4	106° 58'.5	30'.8	135° 29'.4	42'.4	336° 48'.9	51'.7
18	182° 32'.7	105° 02'.0	27'.7	121° 59'.1	31'.1	150° 31'.4	42'.5	351° 51'.3	51'.8
19	197° 35'.2	120° 01'.1	28'.1	136° 59'.7	31'.5	165° 33'.5	42'.6	6° 53'.8	51'.8
20	212° 37'.6	135° 00'.3	28'.5	152° 00'.3	31'.9	180° 35'.5	42'.8	21° 56'.2	51'.8
21	227° 40'.1	149° 59'.5	28'.8	167° 00'.9	32'.3	195° 37'.6	42'.9	36° 58'.6	51'.9
22	242° 42'.6	164° 58'.7	29'.2	182° 01'.5	32'.7	210° 39'.6	43'.1	52° 01'.0	51'.9
23	257° 45'.0	179° 57'.9	29'.5	197° 02'.1	33'.0	225° 41'.6	43'.2	67° 03'.5	51'.9
25 Saturday 00	272° 47'.5	194° 57'.0	22° 29'.9 N	212° 02'.7	20° 33'.4 N	240° 43'.7	11° 43'.4 N	82° 05'.9	1° 51'.9 S
01	287° 50'.0	209° 56'.2	30'.2	227° 03'.3	33'.8	255° 45'.7	43'.5	97° 08'.3	52'.0
02	302° 52'.4	224° 55'.4	30'.6	242° 03'.9	34'.1	270° 47'.8	43'.6	112° 10'.7	52'.0
03	317° 54'.9	239° 54'.6	30'.9	257° 04'.5	34'.5	285° 49'.8	43'.8	127° 13'.1	52'.0
04	332° 57'.4	254° 53'.8	31'.3	272° 05'.1	34'.9	300° 51'.8	43'.9	142° 15'.6	52'.1
05	347° 59'.8	269° 52'.9	31'.7	287° 05'.7	35'.3	315° 53'.9	44'.1	157° 18'.0	52'.1
06	3° 02'.3	284° 52'.1	32'.0	302° 06'.3	35'.6	330° 55'.9	44'.2	172° 20'.4	52'.1
07	18° 04'.7	299° 51'.3	32'.3	317° 06'.9	36'.0	345° 58'.0	44'.3	187° 22'.8	52'.1
08	33° 07'.2	314° 50'.5	32'.7	332° 07'.5	36'.4	1° 00'.0	44'.5	202° 25'.3	52'.2
09	48° 09'.7	329° 49'.7	33'.0	347° 08'.2	36'.8	16° 02'.1	44'.6	217° 27'.7	52'.2
10	63° 12'.1	344° 48'.8	33'.4	2° 08'.8	37'.1	31° 04'.1	44'.8	232° 30'.1	52'.2
11	78° 14'.6	359° 48'.0	33'.7	17° 09'.4	37'.5	46° 06'.1	44'.9	247° 32'.5	52'.3
12	93° 17'.1	14° 47'.2	22° 34'.1 N	32° 10'.0	20° 37'.9 N	61° 08'.2	11° 45'.1 N	262° 34'.9	1° 52'.3 S
13	108° 19'.5	29° 46'.4	34'.4	47° 10'.6	38'.2	76° 10'.2	45'.2	277° 37'.4	52'.3
14	123° 22'.0	44° 45'.5	34'.8	62° 11'.2	38'.6	91° 12'.3	45'.3	292° 39'.8	52'.3
15	138° 24'.5	59° 44'.7	35'.1	77° 11'.8	39'.0	106° 14'.3	45'.5	307° 42'.2	52'.4
16	153° 26'.9	74° 43'.9	35'.4	92° 12'.4	39'.3	121° 16'.4	45'.6	322° 44'.6	52'.4
17	168° 29'.4	89° 43'.1	35'.8	107° 13'.0	39'.7	136° 18'.4	45'.8	337° 47'.0	52'.4
18	183° 31'.8	104° 42'.2	36'.1	122° 13'.6	40'.1	151° 20'.4	45'.9	352° 49'.5	52'.5
19	198° 34'.3	119° 41'.4	36'.4	137° 14'.2	40'.4	166° 22'.5	46'.0	7° 51'.9	52'.5
20	213° 36'.8	134° 40'.6	36'.8	152° 14'.8	40'.8	181° 24'.5	46'.2	22° 54'.3	52'.5
21	228° 39'.2	149° 39'.8	37'.1	167° 15'.4	41'.2	196° 26'.6	46'.3	37° 56'.7	52'.6
22	243° 41'.7	164° 38'.9	37'.4	182° 16'.0	41'.5	211° 28'.6	46'.5	52° 59'.1	52'.6
23	258° 44'.2	179° 38'.1	37'.8	197° 16'.6	41'.9	226° 30'.7	46'.6	68° 01'.6	52'.6
26 Sunday 00	273° 46'.6	194° 37'.3	22° 38'.1 N	212° 17'.2	20° 42'.3 N	241° 32'.7	11° 46'.7 N	83° 04'.0	1° 52'.6 S
01	288° 49'.1	209° 36'.5	38'.4	227° 17'.8	42'.6	256° 34'.8	46'.9	98° 06'.4	52'.7
02	303° 51'.6	224° 35'.6	38'.8	242° 18'.4	43'.0	271° 36'.8	47'.0	113° 08'.8	52'.7
03	318° 54'.0	239° 34'.8	39'.1	257° 19'.0	43'.4	286° 38'.8	47'.2	128° 11'.2	52'.7
04	333° 56'.5	254° 34'.0	39'.4	272° 19'.7	43'.7	301° 40'.9	47'.3	143° 13'.7	52'.8
05	348° 59'.0	269° 33'.1	39'.7	287° 20'.3	44'.1	316° 42'.9	47'.4	158° 16'.1	52'.8
06	4° 01'.4	284° 32'.3	40'.1	302° 20'.9	44'.5	331° 45'.0	47'.6	173° 18'.5	52'.8
07	19° 03'.9	299° 31'.5	40'.4	317° 21'.5	44'.8	346° 47'.0	47'.7	188° 20'.9	52'.9
08	34° 06'.3	314° 30'.7	40'.7	332° 22'.1	45'.2	1° 49'.1	47'.9	203° 23'.3	52'.9
09	49° 08'.8	329° 29'.8	41'.0	347° 22'.7	45'.6	16° 51'.1	48'.0	218° 25'.7	52'.9
10	64° 11'.3	344° 29'.0	41'.3	2° 23'.3	45'.9	31° 53'.2	48'.1	233° 28'.2	53'.0
11	79° 13'.7	359° 28'.2	41'.7	17° 23'.9	46'.3	46° 55'.2	48'.3	248° 30'.6	53'.0
12	94° 16'.2	14° 27'.3	22° 42'.0 N	32° 24'.5	20° 46'.6 N	61° 57'.3	11° 48'.4 N	263° 33'.0	1° 53'.0 S
13	109° 18'.7	29° 26'.5	42'.3	47° 25'.1	47'.0	76° 59'.3	48'.6	278° 35'.4	53'.0
14	124° 21'.1	44° 25'.7	42'.6	62° 25'.7	47'.4	92° 01'.3	48'.7	293° 37'.8	53'.1
15	139° 23'.6	59° 24'.8	42'.9	77° 26'.3	47'.7	107° 03'.4	48'.8	308° 40'.2	53'.1
16	154° 26'.1	74° 24'.0	43'.2	92° 26'.9	48'.1	122° 05'.4	49'.0	323° 42'.7	53'.1
17	169° 28'.5	89° 23'.2	43'.5	107° 27'.5	48'.5	137° 07'.5	49'.1	338° 45'.1	53'.2
18	184° 31'.0	104° 22'.3	43'.8	122° 28'.1	48'.8	152° 09'.5	49'.3	353° 47'.5	53'.2
19	199° 33'.5	119° 21'.5	44'.2	137° 28'.7	49'.2	167° 11'.6	49'.4	8° 49'.9	53'.2
20	214° 35'.9	134° 20'.7	44'.5	152° 29'.3	49'.5	182° 13'.6	49'.5	23° 52'.3	53'.3
21	229° 38'.4	149° 19'.8	44'.8	167° 29'.9	49'.9	197° 15'.7	49'.7	38° 54'.7	53'.3
22	244° 40'.8	164° 19'.0	45'.1	182° 30'.5	50'.2	212° 17'.7	49'.8	53° 57'.2	53'.3
23	259° 43'.3	179° 18'.2	45'.4	197° 31'.1	50'.6	227° 19'.8	49'.9	68° 59'.6	53'.4
	M.P. 05:44	v -0'.8	d 0'.3	v 0'.6	d 0'.4	v 2'.0	d 0'.1	v 2'.4	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.7	40° 15'.3 S
Achernar	335° 28'.0	57° 10'.4 S
Acrux	173° 10'.9	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.7	55° 54'.0 N
Alkaid	152° 59'.7	49° 15'.5 N
Alnair	27° 45'.2	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 45'.0	29° 09'.2 N
Altair	62° 09'.3	8° 54'.0 N
Ankaa	353° 17'.1	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.5 N
Betelgeuse	271° 03'.2	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.0	46° 00'.5 N
Deneb	49° 32'.1	45° 19'.3 N
Denebola	182° 35'.1	14° 30'.4 N
Diphda	348° 57'.3	17° 55'.2 S
Dubhe	193° 53'.5	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.3 N
Enif	33° 48'.3	9° 55'.8 N
Fomalhaut	15° 25'.4	29° 33'.4 S
Gacrux	172° 02'.5	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.5	23° 30'.9 N
Kaus Aust.	83° 45'.3	34° 22'.6 S
Kochab	137° 19'.1	74° 06'.7 N
Markab	13° 39'.6	15° 16'.1 N
Menkar	314° 16'.7	4° 08'.1 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.8	69° 46'.2 S
Mirfak	308° 42'.8	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.6 S
Polaris	318° 45'.2	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.9 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.2	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.3	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.8	43° 29'.0 S
Vega	80° 39'.5	38° 47'.7 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	282° 09'.5	11:01
Mars	299° 15'.2	09:51
Jupiter	327° 56'.2	07:56
Saturn	169° 18'.4	18:29

SUN

GHA	Dec
179° 26'.0	23° 25'.2 N
194° 25'.9	25'.1
209° 25'.8	25'.1
224° 25'.6	25'.1
239° 25'.5	25'.0
254° 25'.4	25'.0
269° 25'.2	24'.9
284° 25'.1	24'.9
299° 25'.0	24'.8
314° 24'.8	24'.8
329° 24'.7	24'.7
344° 24'.6	24'.7
359° 24'.4	23° 24'.6 N
14° 24'.3	24'.6
29° 24'.2	24'.6
44° 24'.0	24'.5
59° 23'.9	24'.5
74° 23'.8	24'.4
89° 23'.6	24'.3
104° 23'.5	24'.3
119° 23'.4	24'.2
134° 23'.2	24'.2
149° 23'.1	24'.1
164° 23'.0	24'.1
179° 22'.8	23° 24'.0 N
194° 22'.7	24'.0
209° 22'.6	23'.9
224° 22'.4	23'.9
239° 22'.3	23'.8
254° 22'.2	23'.7
269° 22'.0	23'.7
284° 21'.9	23'.6
299° 21'.8	23'.5
314° 21'.6	23'.5
329° 21'.5	23'.4
344° 21'.4	23'.4
359° 21'.2	23° 23'.3 N
14° 21'.1	23'.2
29° 21'.0	23'.2
44° 20'.8	23'.1
59° 20'.7	23'.0
74° 20'.6	23'.0
89° 20'.4	22'.9
104° 20'.3	22'.8
119° 20'.2	22'.8
134° 20'.0	22'.7
149° 19'.9	22'.6
164° 19'.8	22'.5
179° 19'.6	23° 22'.5 N
194° 19'.5	22'.4
209° 19'.4	22'.3
224° 19'.2	22'.2
239° 19'.1	22'.2
254° 19'.0	22'.1
269° 18'.8	22'.0
284° 18'.7	21'.9
299° 18'.6	21'.8
314° 18'.4	21'.8
329° 18'.3	21'.7
344° 18'.2	21'.6
359° 18'.0	23° 21'.5 N
14° 17'.9	21'.4
29° 17'.8	21'.4
44° 17'.6	21'.3
59° 17'.5	21'.2
74° 17'.4	21'.1
89° 17'.2	21'.0
104° 17'.1	20'.9
119° 17'.0	20'.8
134° 16'.8	20'.8
149° 16'.7	20'.7
164° 16'.6	20'.6

SD 15'.7 d 0'.1

MOON

GHA	v	Dec	d	HP
266° 44'.4	15'.8	7° 45'.8 N	11'.2	54'.2
281° 19'.2	15'.7	57'.0	11'.1	
295° 53'.9	15'.8	8° 08'.1 N	11'.0	
310° 28'.7	15'.7	19'.1	11'.1	
325° 03'.4	15'.7	30'.2	11'.0	
339° 38'.1	15'.6	41'.2	11'.0	
354° 12'.7	15'.6	52'.2	10'.9	
8° 47'.3	15'.6	9° 03'.1 N	10'.9	
23° 21'.9	15'.6	14'.0	10'.9	
37° 56'.5	15'.5	24'.9	10'.8	
52° 31'.0	15'.5	35'.7	10'.8	
67° 05'.5	15'.5	46'.5	10'.8	
81° 40'.0	15'.4	9° 57'.3 N	10'.7	54'.2
96° 14'.4	15'.4	10° 08'.0 N	10'.7	54'.3
110° 48'.8	15'.4	18'.7	10'.6	
125° 23'.2	15'.3	29'.3	10'.7	
139° 57'.5	15'.3	40'.0	10'.5	
154° 31'.8	15'.3	50'.5	10'.5	
169° 06'.1	15'.2	11° 01'.0 N	10'.5	
183° 40'.3	15'.2	11'.5	10'.5	
198° 14'.5	15'.1	22'.0	10'.4	
212° 48'.6	15'.1	32'.4	10'.3	
227° 22'.7	15'.0	42'.7	10'.3	
241° 56'.7	15'.0	53'.0	10'.3	
256° 30'.7	15'.0	12° 03'.3 N	10'.2	54'.3
271° 04'.7	14'.9	13'.5	10'.2	
285° 38'.6	14'.9	23'.7	10'.1	
300° 12'.5	14'.8	33'.8	10'.1	
314° 46'.3	14'.8	43'.9	10'.1	
329° 20'.1	14'.7	54'.0	9'.9	
343° 53'.8	14'.7	13° 03'.9 N	10'.0	
358° 27'.5	14'.7	13'.9	9'.9	
13° 01'.2	14'.5	23'.8	9'.8	54'.4
27° 34'.7	14'.6	33'.6	9'.8	
42° 08'.3	14'.5	43'.4	9'.7	
56° 41'.8	14'.4	53'.1	9'.7	
71° 15'.2	14'.4	14° 02'.8 N	9'.6	54'.4
85° 48'.6	14'.3	12'.4	9'.6	
100° 21'.9	14'.3	22'.0	9'.5	
114° 55'.2	14'.2	31'.5	9'.4	
129° 28'.4	14'.2	40'.9	9'.4	
144° 01'.6	14'.1	50'.3	9'.4	
158° 34'.7	14'.0	59'.7	9'.3	
173° 07'.7	14'.0	15° 09'.0 N	9'.2	54'.5
187° 40'.7	14'.0	18'.2	9'.2	
202° 13'.7	13'.9	27'.4	9'.1	
216° 46'.6	13'.8	36'.5	9'.0	
231° 19'.4	13'.7	45'.5	9'.0	
245° 52'.1	13'.8	15° 54'.5 N	8'.9	54'.5
260° 24'.9	13'.6	16° 03'.4 N	8'.9	
274° 57'.5	13'.6	12'.3	8'.7	
289° 30'.1	13'.5	21'.0	8'.8	54'.6
304° 02'.6	13'.5	29'.8	8'.6	
318° 35'.1	13'.4	38'.4	8'.6	
333° 07'.5	13'.3	47'.0	8'.5	
347° 39'.8	13'.3	55'.5	8'.5	
2° 12'.1	13'.2	17° 04'.0 N	8'.4	
16° 44'.3	13'.1	12'.4	8'.3	
31° 16'.4	13'.1	20'.7	8'.2	54'.7
45° 48'.5	13'.0	28'.9	8'.2	
60° 20'.5	13'.0	17° 37'.1 N	8'.1	54'.7
74° 52'.5	12'.9	45'.2	8'.0	
89° 24'.4	12'.8	53'.2	8'.0	
103° 56'.2	12'.7	18° 01'.2 N	7'.8	
118° 27'.9	12'.7	09'.0	7'.8	
132° 59'.6	12'.6	16'.8	7'.8	54'.8
147° 31'.2	12'.6	24'.6	7'.6	
162° 02'.8	12'.5	32'.2	7'.6	
176° 34'.3	12'.4	39'.8	7'.5	
191° 05'.7	12'.4	47'.3	7'.4	
205° 37'.1	12'.2	54'.7	7'.3	
220° 08'.3	12'.2	19° 02'.0 N	7'.2	54'.9

SD 14'.8 14'.8 14'.9

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26
N 72°	-	-	-	22:13	21:39	-
N 70°	-	-	-	22:33	22:14	21:41
68°	-	-	-	22:48	22:39	22:27
66°	-	-	-	23:00	22:59	22:58
64°	-	-	01:33	23:11	23:14	23:21
62°	-	-	02:11	23:20	23:28	23:39
60°	-	00:51	02:37	23:28	23:39	23:54
N 58°	-	01:42	02:58	23:35	23:49	24:07
56°	-	02:12	03:14	23:41	23:57	24:19
54°	00:47	02:34	03:29	23:46	-	00:05
52°	01:34	02:52	03:41	23:51	-	00:12
50°	02:02	03:07	03:52	23:56	-	00:18
45°	02:47	03:37	04:14	-	00:05	00:31
N 40°	03:18	03:59	04:32	-	00:13	00:43
35°	03:41	04:18	04:47	-	00:20	00:52
30°	03:59	04:33	05:00	-	00:27	01:01
20°	04:29	04:58	05:22	00:02	00:37	01:15
N 10°	04:51	05:18	05:41	00:08	00:47	01:28
0°	05:10	05:36	05:59	00:14	00:56	01:40
S 10°	05:27	05:54	06:16	00:20	01:05	01:52
20°	05:43	06:11	06:35	00:26	01:15	02:05
30°	06:00	06:30	06:56	00:33	01:26	02:20
35°	06:09	06:40	07:08	00:37	01:32	02:29
40°	06:18	06:52	07:23	00:41	01:40	02:39
45°	06:28	07:06	07:39	00:47	01:48	02:50
S 50°	06:40	07:22	08:00	00:53	01:59	03:05
52°	06:45	07:29	08:10	00:56	02:04	03:11
54°	06:51	07:37	08:21	01:00	02:09	03:19
56°	06:57	07:46	08:34	01:03	02:15	03:27
58°	07:04	07:57	08:48	01:07	02:22	03:37
S 60°	07:11	08:08	09:06	01:12	02:29	03:48
S 62°	07:20	08:22	09:28	01:17	02:38	04:00

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 24	Moonset 25	Moonset 26
N 72°	-	-	-	14:56	17:00	-
N 70°	-	-	-	14:38	16:27	18:35
68°	-	-	-	14:24	16:03	17:49
66°	-	-	-	14:13	15:44	17:19
64°	22:32	-	-	14:04	15:29	16:57
62°	21:54	-	-	13:56	15:17	16:39
60°	21:28	23:13	-	13:49	15:06	16:25
N 58°	21:07	22:23	-	13:43	14:57	16:12
56°	20:51	21:53	-	13:38	14:49	16:02
54°	20:36	21:31	23:17	13:33	14:42	15:52
52°	20:24	21:13	22:31	13:29	14:36	15:44
50°	20:13	20:58	22:03	13:25	14:30	15:36
45°	19:51	20:28	21:18	13:16	14:18	15:20
N 40°	19:33	20:06	20:47	13:09	14:08	15:07
35°	19:18	19:48	20:24	13:03	13:59	14:56
30°	19:05	19:32	20:06	12:58	13:52	14:47
20°	18:43	19:07	19:37	12:49	13:39	14:30
N 10°	18:24	18:47	19:14	12:41	13:27	14:16
0°	18:06	18:29	18:55	12:34	13:17	14:02
S 10°	17:49	18:12	18:38	12:27	13:06	13:49
20°	17:30	17:54	18:22	12:19	12:55	13:34
30°	17:09	17:35	18:05	12:10	12:42	13:18
35°	16:57	17:25	17:57	12:05	12:35	13:08
40°	16:43	17:13	17:47	11:59	12:27	12:58
45°	16:26	17:00	17:37	11:52	12:17	12:45
S 50°	16:05	16:44	17:25	11:44	12:05	12:30
52°	15:55	16:36	17:20	11:41	12:00	12:22
54°	15:44	16:28	17:14	11:37	11:54	12:14
56°	15:31	16:19	17:08	11:32	11:47	12:06
58°	15:17	16:09	17:01	11:27	11:40	11:56
S 60°	14:59	15:57	16:54	11:22	11:31	11:44
S 62°	14:38	15:43	16:45	11:15	11:22	11:31

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
24	2 16	2 22	12:02	06:24	18:45	23d 41%
25	2 28	2 35	12:03	07:06	19:28	24d 31%
26	2 41	2 48	12:03	07:51	20:14	25d 23%

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2011 June 27, 28, 29 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
27 Monday 00	274° 45'.8	194° 17'.3	22° 45'.7 N	212° 31'.7	20° 51'.0 N	242° 21'.8	11° 50'.1 N	84° 02'.0	1° 53'.4 S
01	289° 48'.2	209° 16'.5	46'.0	227° 32'.3	51'.3	257° 23'.9	50'.2	99° 04'.4	53'.4
02	304° 50'.7	224° 15'.7	46'.3	242° 32'.9	51'.7	272° 25'.9	50'.4	114° 06'.8	53'.5
03	319° 53'.2	239° 14'.8	46'.6	257° 33'.5	52'.0	287° 28'.0	50'.5	129° 09'.2	53'.5
04	334° 55'.6	254° 14'.0	46'.9	272° 34'.2	52'.4	302° 30'.0	50'.6	144° 11'.7	53'.5
05	349° 58'.1	269° 13'.2	47'.2	287° 34'.8	52'.7	317° 32'.1	50'.8	159° 14'.1	53'.6
06	5° 00'.6	284° 12'.3	47'.5	302° 35'.4	53'.1	332° 34'.1	50'.9	174° 16'.5	53'.6
07	20° 03'.0	299° 11'.5	47'.8	317° 36'.0	53'.5	347° 36'.2	51'.1	189° 18'.9	53'.6
08	35° 05'.5	314° 10'.7	48'.1	332° 36'.6	53'.8	2° 38'.2	51'.2	204° 21'.3	53'.7
09	50° 07'.9	329° 09'.8	48'.4	347° 37'.2	54'.2	17° 40'.3	51'.3	219° 23'.7	53'.7
10	65° 10'.4	344° 09'.0	48'.6	2° 37'.8	54'.5	32° 42'.3	51'.5	234° 26'.1	53'.7
11	80° 12'.9	359° 08'.1	48'.9	17° 38'.4	54'.9	47° 44'.4	51'.6	249° 28'.6	53'.8
12	95° 15'.3	14° 07'.3	22° 49'.2 N	32° 39'.0	20° 55'.2 N	62° 46'.4	11° 51'.7 N	264° 31'.0	1° 53'.8 S
13	110° 17'.8	29° 06'.5	49'.5	47° 39'.6	55'.6	77° 48'.5	51'.9	279° 33'.4	53'.8
14	125° 20'.3	44° 05'.6	49'.8	62° 40'.2	55'.9	92° 50'.5	52'.0	294° 35'.8	53'.9
15	140° 22'.7	59° 04'.8	50'.1	77° 40'.8	56'.3	107° 52'.6	52'.2	309° 38'.2	53'.9
16	155° 25'.2	74° 04'.0	50'.4	92° 41'.4	56'.6	122° 54'.6	52'.3	324° 40'.6	53'.9
17	170° 27'.7	89° 03'.1	50'.6	107° 42'.0	57'.0	137° 56'.7	52'.4	339° 43'.0	54'.0
18	185° 30'.1	104° 02'.3	50'.9	122° 42'.6	57'.3	152° 58'.7	52'.6	354° 45'.4	54'.0
19	200° 32'.6	119° 01'.4	51'.2	137° 43'.2	57'.7	168° 00'.8	52'.7	9° 47'.9	54'.0
20	215° 35'.1	134° 00'.6	51'.5	152° 43'.8	58'.0	183° 02'.8	52'.8	24° 50'.3	54'.0
21	230° 37'.5	148° 59'.8	51'.8	167° 44'.4	58'.4	198° 04'.9	53'.0	39° 52'.7	54'.1
22	245° 40'.0	163° 58'.9	52'.0	182° 45'.0	58'.7	213° 06'.9	53'.1	54° 55'.1	54'.1
23	260° 42'.4	178° 58'.1	52'.3	197° 45'.6	59'.1	228° 09'.0	53'.2	69° 57'.5	54'.1
28 Tuesday 00	275° 44'.9	193° 57'.2	22° 52'.6 N	212° 46'.2	20° 59'.4 N	243° 11'.0	11° 53'.4 N	84° 59'.9	1° 54'.2 S
01	290° 47'.4	208° 56'.4	52'.9	227° 46'.8	59'.8	258° 13'.1	53'.5	100° 02'.3	54'.2
02	305° 49'.8	223° 55'.6	53'.1	242° 47'.4	21° 00'.1 N	273° 15'.2	53'.7	115° 04'.7	54'.3
03	320° 52'.3	238° 54'.7	53'.4	257° 48'.0	00'.5	288° 17'.2	53'.8	130° 07'.1	54'.3
04	335° 54'.8	253° 53'.9	53'.7	272° 48'.6	00'.8	303° 19'.3	53'.9	145° 09'.6	54'.3
05	350° 57'.2	268° 53'.0	54'.0	287° 49'.2	01'.2	318° 21'.3	54'.1	160° 12'.0	54'.4
06	5° 59'.7	283° 52'.2	54'.2	302° 49'.8	01'.5	333° 23'.4	54'.2	175° 14'.4	54'.4
07	21° 02'.2	298° 51'.4	54'.5	317° 50'.4	01'.9	348° 25'.4	54'.3	190° 16'.8	54'.4
08	36° 04'.6	313° 50'.5	54'.8	332° 51'.0	02'.2	3° 27'.5	54'.5	205° 19'.2	54'.5
09	51° 07'.1	328° 49'.7	55'.0	347° 51'.7	02'.6	18° 29'.5	54'.6	220° 21'.6	54'.5
10	66° 09'.6	343° 48'.8	55'.3	2° 52'.3	02'.9	33° 31'.6	54'.7	235° 24'.0	54'.5
11	81° 12'.0	358° 48'.0	55'.6	17° 52'.9	03'.3	48° 33'.6	54'.9	250° 26'.4	54'.6
12	96° 14'.5	13° 47'.1	22° 55'.8 N	32° 53'.5	21° 03'.6 N	63° 35'.7	11° 55'.0 N	265° 28'.8	1° 54'.6 S
13	111° 16'.9	28° 46'.3	56'.1	47° 54'.1	03'.9	78° 37'.8	55'.2	280° 31'.2	54'.6
14	126° 19'.4	43° 45'.5	56'.3	62° 54'.7	04'.3	93° 39'.8	55'.3	295° 33'.7	54'.7
15	141° 21'.9	58° 44'.6	56'.6	77° 55'.3	04'.6	108° 41'.9	55'.4	310° 36'.1	54'.7
16	156° 24'.3	73° 43'.8	56'.9	92° 55'.9	05'.0	123° 43'.9	55'.6	325° 38'.5	54'.7
17	171° 26'.8	88° 42'.9	57'.1	107° 56'.5	05'.3	138° 46'.0	55'.7	340° 40'.9	54'.8
18	186° 29'.3	103° 42'.1	57'.4	122° 57'.1	05'.7	153° 48'.0	55'.8	355° 43'.3	54'.8
19	201° 31'.7	118° 41'.2	57'.6	137° 57'.7	06'.0	168° 50'.1	56'.0	10° 45'.7	54'.8
20	216° 34'.2	133° 40'.4	57'.9	152° 58'.3	06'.3	183° 52'.1	56'.1	25° 48'.1	54'.9
21	231° 36'.7	148° 39'.5	58'.1	167° 58'.9	06'.7	198° 54'.2	56'.2	40° 50'.5	54'.9
22	246° 39'.1	163° 38'.7	58'.4	182° 59'.5	07'.0	213° 56'.3	56'.4	55° 52'.9	54'.9
23	261° 41'.6	178° 37'.8	58'.6	198° 00'.1	07'.4	228° 58'.3	56'.5	70° 55'.3	55'.0
29 Wednesday 00	276° 44'.1	193° 37'.0	22° 58'.9 N	213° 00'.7	21° 07'.7 N	244° 00'.4	11° 56'.6 N	85° 57'.7	1° 55'.0 S
01	291° 46'.5	208° 36'.2	59'.1	228° 01'.3	08'.1	259° 02'.4	56'.8	101° 00'.2	55'.0
02	306° 49'.0	223° 35'.3	59'.4	243° 01'.9	08'.4	274° 04'.5	56'.9	116° 02'.6	55'.1
03	321° 51'.4	238° 34'.5	59'.6	258° 02'.5	08'.7	289° 06'.5	57'.0	131° 05'.0	55'.1
04	336° 53'.9	253° 33'.6	59'.8	273° 03'.1	09'.1	304° 08'.6	57'.2	146° 07'.4	55'.1
05	351° 56'.4	268° 32'.8	23° 00'.1 N	288° 03'.7	09'.4	319° 10'.7	57'.3	161° 09'.8	55'.2
06	6° 58'.8	283° 31'.9	00'.3	303° 04'.3	09'.7	334° 12'.7	57'.4	176° 12'.2	55'.2
07	22° 01'.3	298° 31'.1	00'.6	318° 04'.9	10'.1	349° 14'.8	57'.6	191° 14'.6	55'.3
08	37° 03'.8	313° 30'.2	00'.8	333° 05'.5	10'.4	4° 16'.8	57'.7	206° 17'.0	55'.3
09	52° 06'.2	328° 29'.4	01'.0	348° 06'.1	10'.8	19° 18'.9	57'.8	221° 19'.4	55'.3
10	67° 08'.7	343° 28'.5	01'.3	3° 06'.7	11'.1	34° 20'.9	58'.0	236° 21'.8	55'.4
11	82° 11'.2	358° 27'.7	01'.5	18° 07'.3	11'.4	49° 23'.0	58'.1	251° 24'.2	55'.4
12	97° 13'.6	13° 26'.8	23° 01'.8 N	33° 07'.9	21° 11'.8 N	64° 25'.1	11° 58'.2 N	266° 26'.6	1° 55'.4 S
13	112° 16'.1	28° 26'.0	02'.0	48° 08'.5	12'.1	79° 27'.1	58'.4	281° 29'.0	55'.5
14	127° 18'.6	43° 25'.1	02'.2	63° 09'.1	12'.4	94° 29'.2	58'.5	296° 31'.4	55'.5
15	142° 21'.0	58° 24'.3	02'.5	78° 09'.7	12'.8	109° 31'.2	58'.7	311° 33'.8	55'.5
16	157° 23'.5	73° 23'.4	02'.7	93° 10'.3	13'.1	124° 33'.3	58'.8	326° 36'.2	55'.6
17	172° 25'.9	88° 22'.6	02'.9	108° 10'.9	13'.4	139° 35'.4	58'.9	341° 38'.7	55'.6
18	187° 28'.4	103° 21'.7	03'.1	123° 11'.5	13'.8	154° 37'.4	59'.1	356° 41'.1	55'.7
19	202° 30'.9	118° 20'.9	03'.4	138° 12'.1	14'.1	169° 39'.5	59'.2	11° 43'.5	55'.7
20	217° 33'.3	133° 20'.0	03'.6	153° 12'.7	14'.5	184° 41'.5	59'.3	26° 45'.9	55'.7
21	232° 35'.8	148° 19'.2	03'.8	168° 13'.3	14'.8	199° 43'.6	59'.5	41° 48'.3	55'.8
22	247° 38'.3	163° 18'.3	04'.0	183° 13'.9	15'.1	214° 45'.7	59'.6	56° 50'.7	55'.8
23	262° 40'.7	178° 17'.5	04'.3	198° 14'.5	15'.4	229° 47'.7	59'.7	71° 53'.1	55'.8
	M.P. 05:32	v -0'.8	d 0'.3	v 0'.6	d 0'.3	v 2'.1	d 0'.1	v 2'.4	d 0'.0

STARS

Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.3 S
Achernar	335° 27'.9	57° 10'.4 S
Acrux	173° 11'.0	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.8	55° 54'.0 N
Alkaid	152° 59'.8	49° 15'.5 N
Alnair	27° 45'.2	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.9	29° 09'.2 N
Altair	62° 09'.3	8° 54'.0 N
Ankaa	353° 17'.0	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.0	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.3 N
Denebola	182° 35'.1	14° 30'.5 N
Diphda	348° 57'.3	17° 55'.2 S
Dubhe	193° 53'.6	61° 41'.5 N
Elnath	278° 14'.8	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.3 N
Enif	33° 48'.3	9° 55'.8 N
Fomalhaut	15° 25'.3	29° 33'.4 S
Gacrux	172° 02'.5	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.6	60° 26'.0 S
Hamal	328° 02'.5	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.6 S
Kochab	137° 19'.1	74° 06'.7 N
Markab	13° 39'.6	15° 16'.1 N
Menkar	314° 16'.7	4° 08'.1 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.8	69° 46'.2 S
Mirfak	308° 42'.8	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.6 S
Polaris	318° 43'.8	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.2	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.2	56° 35'.8 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.9	43° 29'.0 S
Vega	80° 39'.5	38° 47'.7 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	278° 12'.3	11:05
Mars	297° 01'.3	09:49
Jupiter	327° 26'.1	07:46
Saturn	169° 15'.0	18:17

SUN

GHA	Dec
179° 16'.5	23° 20'.5 N
194° 16'.3	20'.4
209° 16'.2	20'.3
224° 16'.1	20'.2
239° 15'.9	20'.1
254° 15'.8	20'.0
269° 15'.7	19'.9
284° 15'.5	19'.8
299° 15'.4	19'.7
314° 15'.3	19'.6
329° 15'.1	19'.5
344° 15'.0	19'.4
359° 14'.9	23° 19'.3 N
14° 14'.8	19'.2
29° 14'.6	19'.1
44° 14'.5	19'.0
59° 14'.4	18'.9
74° 14'.2	18'.8
89° 14'.1	18'.7
104° 14'.0	18'.6
119° 13'.8	18'.5
134° 13'.7	18'.4
149° 13'.6	18'.3
164° 13'.5	18'.2
179° 13'.3	23° 18'.1 N
194° 13'.2	18'.0
209° 13'.1	17'.9
224° 12'.9	17'.8
239° 12'.8	17'.7
254° 12'.7	17'.6
269° 12'.5	17'.4
284° 12'.4	17'.3
299° 12'.3	17'.2
314° 12'.2	17'.1
329° 12'.0	17'.0
344° 11'.9	16'.9
359° 11'.8	23° 16'.8 N
14° 11'.6	16'.6
29° 11'.5	16'.5
44° 11'.4	16'.4
59° 11'.3	16'.3
74° 11'.1	16'.2
89° 11'.0	16'.0
104° 10'.9	15'.9
119° 10'.7	15'.8
134° 10'.6	15'.7
149° 10'.5	15'.6
164° 10'.4	15'.4
179° 10'.2	23° 15'.3 N
194° 10'.1	15'.2
209° 10'.0	15'.1
224° 09'.8	14'.9
239° 09'.7	14'.8
254° 09'.6	14'.7
269° 09'.5	14'.5
284° 09'.3	14'.4
299° 09'.2	14'.3
314° 09'.1	14'.2
329° 09'.0	14'.0
344° 08'.8	13'.9
359° 08'.7	23° 13'.8 N
14° 08'.6	13'.6
29° 08'.4	13'.5
44° 08'.3	13'.4
59° 08'.2	13'.2
74° 08'.1	13'.1
89° 07'.9	12'.9
104° 07'.8	12'.8
119° 07'.7	12'.7
134° 07'.6	12'.5
149° 07'.4	12'.4
164° 07'.3	12'.2
SD 15'.7	d 0'.1

MOON

GHA	v	Dec	d	HP
234° 39'.5	12'.2	19° 09'.2 N	7'.2	54'.9
249° 10'.7	12'.1	16'.4	7'.1	
263° 41'.8	12'.0	23'.5	6'.9	
278° 12'.8	11'.9	30'.4	7'.0	
292° 43'.7	11'.9	37'.4	6'.8	55'.0
307° 14'.6	11'.8	44'.2	6'.7	
321° 45'.4	11'.7	50'.9	6'.6	
336° 16'.1	11'.7	57'.5	6'.6	
350° 46'.8	11'.6	20° 04'.1 N	6'.5	
5° 17'.4	11'.5	10'.6	6'.3	55'.1
19° 47'.9	11'.4	16'.9	6'.3	
34° 18'.3	11'.4	23'.2	6'.2	
48° 48'.7	11'.3	20° 29'.4 N	6'.1	55'.1
63° 19'.0	11'.3	35'.5	6'.0	
77° 49'.3	11'.2	41'.5	5'.9	55'.2
92° 19'.5	11'.1	47'.4	5'.8	
106° 49'.6	11'.0	53'.2	5'.7	
121° 19'.6	11'.0	58'.9	5'.7	
135° 49'.6	10'.9	21° 04'.6 N	5'.5	
150° 19'.5	10'.8	10'.1	5'.4	55'.3
164° 49'.3	10'.8	15'.5	5'.3	
179° 19'.1	10'.7	20'.8	5'.2	
193° 48'.8	10'.6	26'.0	5'.2	
208° 18'.4	10'.6	31'.2	5'.0	
222° 48'.0	10'.4	21° 36'.2 N	4'.9	55'.4
237° 17'.4	10'.5	41'.1	4'.8	
251° 46'.9	10'.3	45'.9	4'.7	
266° 16'.2	10'.3	50'.6	4'.6	
280° 45'.5	10'.3	55'.2	4'.5	55'.5
295° 14'.8	10'.1	59'.7	4'.4	
309° 43'.9	10'.1	22° 04'.1 N	4'.2	
324° 13'.0	10'.1	08'.3	4'.2	
338° 42'.1	9'.9	12'.5	4'.0	55'.6
353° 11'.0	10'.0	16'.5	4'.0	
7° 40'.0	9'.8	20'.5	3'.8	
22° 08'.8	9'.8	24'.3	3'.7	
36° 37'.6	9'.7	22° 28'.0 N	3'.6	55'.7
51° 06'.3	9'.7	31'.6	3'.5	
65° 35'.0	9'.6	35'.1	3'.4	
80° 03'.6	9'.5	38'.5	3'.3	
94° 32'.1	9'.5	41'.8	3'.1	
109° 00'.6	9'.4	44'.9	3'.0	55'.8
123° 29'.0	9'.4	47'.9	3'.0	
137° 57'.4	9'.3	50'.9	2'.7	
152° 25'.7	9'.3	53'.6	2'.7	
166° 54'.0	9'.2	56'.3	2'.6	55'.9
181° 22'.2	9'.1	58'.9	2'.4	
195° 50'.3	9'.1	23° 01'.3 N	2'.3	
210° 18'.4	9'.1	23° 03'.6 N	2'.2	55'.9
224° 46'.5	9'.0	05'.8	2'.1	56'.0
239° 14'.5	8'.9	07'.9	1'.9	
253° 42'.4	8'.9	09'.8	1'.8	
268° 10'.3	8'.8	11'.6	1'.7	
282° 38'.1	8'.8	13'.3	1'.6	56'.1
297° 05'.9	8'.8	14'.9	1'.4	
311° 33'.7	8'.7	16'.3	1'.4	
326° 01'.4	8'.7	17'.7	1'.2	
340° 29'.1	8'.6	18'.9	1'.0	56'.2
354° 56'.7	8'.5	19'.9	1'.0	
9° 24'.2	8'.6	20'.9	0'.8	
23° 51'.8	8'.5	23° 21'.7 N	0'.7	56'.3
38° 19'.3	8'.4	22'.4	0'.5	
52° 46'.7	8'.4	22'.9	0'.4	
67° 14'.1	8'.4	23'.3	0'.3	
81° 41'.5	8'.3	23'.6	0'.2	56'.4
96° 08'.8	8'.3	23'.8	0'.0	
110° 36'.1	8'.3	23'.8	0'.1	
125° 03'.4	8'.2	23'.7	0'.2	
139° 30'.6	8'.2	23'.5	0'.4	56'.5
153° 57'.8	8'.2	23'.1	0'.5	
168° 25'.0	8'.1	22'.6	0'.6	
182° 52'.1	8'.1	22'.0	0'.7	
SD 15'.0		15'.2	15'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 29
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	-	22:04	-	-
66°	-	-	-	23:00	23:10	23:52
64°	-	-	01:36	23:33	23:58	24:46
62°	-	-	02:13	23:58	-	00:28
60°	-	00:56	02:39	-	00:17	00:52
N 58°	-	01:44	02:59	00:07	00:33	01:10
56°	-	02:14	03:16	00:19	00:47	01:26
54°	00:51	02:36	03:30	00:28	00:59	01:39
52°	01:36	02:54	03:42	00:37	01:10	01:51
50°	02:03	03:09	03:53	00:45	01:19	02:02
45°	02:49	03:38	04:15	01:02	01:39	02:23
N 40°	03:19	04:01	04:33	01:16	01:55	02:41
35°	03:42	04:19	04:48	01:28	02:09	02:56
30°	04:00	04:34	05:01	01:38	02:21	03:09
20°	04:29	04:59	05:23	01:56	02:41	03:31
N 10°	04:52	05:19	05:42	02:12	02:59	03:50
0°	05:11	05:37	06:00	02:26	03:16	04:08
S 10°	05:28	05:54	06:17	02:41	03:33	04:26
20°	05:44	06:11	06:35	02:57	03:51	04:45
30°	06:00	06:30	06:56	03:15	04:12	05:08
35°	06:09	06:41	07:09	03:26	04:24	05:21
40°	06:18	06:52	07:23	03:38	04:38	05:36
45°	06:29	07:06	07:39	03:53	04:55	05:54
S 50°	06:40	07:22	08:00	04:11	05:16	06:16
52°	06:45	07:29	08:10	04:19	05:25	06:27
54°	06:51	07:37	08:21	04:29	05:37	06:39
56°	06:57	07:46	08:33	04:39	05:49	06:53
58°	07:04	07:56	08:48	04:52	06:04	07:09
S 60°	07:11	08:08	09:05	05:06	06:22	07:29
S 62°	07:20	08:21	09:27	05:23	06:44	07:54

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 27	Moonset 28	Moonset 29
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	-	19:53	-	-
66°	-	-	-	18:58	20:35	21:45
64°	22:29	-	-	18:25	19:47	20:51
62°	21:53	-	-	18:01	19:17	20:19
60°	21:27	23:09	-	17:42	18:54	19:54
N 58°	21:07	22:21	-	17:26	18:35	19:35
56°	20:50	21:52	-	17:13	18:20	19:19
54°	20:36	21:30	23:14	17:01	18:07	19:05
52°	20:24	21:13	22:30	16:51	17:55	18:53
50°	20:13	20:58	22:03	16:42	17:45	18:42
45°	19:51	20:28	21:18	16:23	17:23	18:20
N 40°	19:33	20:06	20:47	16:07	17:06	18:02
35°	19:18	19:48	20:24	15:54	16:51	17:47
30°	19:05	19:33	20:06	15:42	16:39	17:34
20°	18:43	19:08	19:37	15:23	16:17	17:12
N 10°	18:24	18:47	19:14	15:06	15:58	16:52
0°	18:07	18:29	18:56	14:50	15:41	16:34
S 10°	17:50	18:12	18:39	14:34	15:23	16:16
20°	17:31	17:55	18:23	14:17	15:04	15:56
30°	17:10	17:36	18:06	13:58	14:43	15:34
35°	16:58	17:26	17:58	13:46	14:30	15:21
40°	16:44	17:14	17:48	13:34	14:16	15:05
45°	16:27	17:01	17:38	13:18	13:59	14:47
S 50°	16:06	16:45	17:26	13:00	13:37	14:25
52°	15:57	16:37	17:21	12:51	13:27	14:14
54°	15:46	16:29	17:16	12:41	13:16	14:02
56°	15:33	16:20	17:09	12:30	13:03	13:48
58°	15:19	16:10	17:03	12:17	12:48	13:31
S 60°	15:01	15:59	16:55	12:02	12:30	13:12
S 62°	14:40	15:45	16:47	11:45	12:08	12:47

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
27	2 54	3 00	12:03	08:38	21:03	26d 15%
28	3 06	3 13	12:03	09:28	21:54	27d 9%
29	3 19	3 25	12:03	10:21	22:48	28d 4%

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2011 Jun 30, Jul. 1, 2 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.2		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
30 00	277° 43'.2	193° 16'.6	23° 04'.5 N	213° 15'.1	21° 15'.8 N	244° 49'.8	11° 59'.8 N	86° 55'.5	1° 55'.9 S
01	292° 45'.7	208° 15'.8	04'.7	228° 15'.7	16'.1	259° 51'.9	12° 00'.0 N	101° 57'.9	55'.9
02	307° 48'.1	223° 14'.9	04'.9	243° 16'.3	16'.4	274° 53'.9	00'.1	117° 00'.3	55'.9
03	322° 50'.6	238° 14'.1	05'.1	258° 16'.9	16'.8	289° 56'.0	00'.2	132° 02'.7	56'.0
04	337° 53'.0	253° 13'.2	05'.3	273° 17'.5	17'.1	304° 58'.0	00'.4	147° 05'.1	56'.0
05	352° 55'.5	268° 12'.4	05'.6	288° 18'.1	17'.4	320° 00'.1	00'.5	162° 07'.5	56'.1
06	7° 58'.0	283° 11'.5	05'.8	303° 18'.7	17'.8	335° 02'.2	00'.6	177° 09'.9	56'.1
07	23° 00'.4	298° 10'.7	06'.0	318° 19'.3	18'.1	350° 04'.2	00'.8	192° 12'.3	56'.1
08	38° 02'.9	313° 09'.8	06'.2	333° 19'.9	18'.4	5° 06'.3	00'.9	207° 14'.7	56'.2
09	53° 05'.4	328° 08'.9	06'.4	348° 20'.6	18'.8	20° 08'.4	01'.0	222° 17'.1	56'.2
10	68° 07'.8	343° 08'.1	06'.6	3° 21'.2	19'.1	35° 10'.4	01'.2	237° 19'.5	56'.2
11	83° 10'.3	358° 07'.2	06'.8	18° 21'.8	19'.4	50° 12'.5	01'.3	252° 21'.9	56'.3
12	98° 12'.8	13° 06'.4	23° 07'.0 N	33° 22'.4	21° 19'.7 N	65° 14'.5	12° 01'.4 N	267° 24'.3	1° 56'.3 S
13	113° 15'.2	28° 05'.5	07'.2	48° 23'.0	20'.1	80° 16'.6	01'.6	282° 26'.7	56'.4
14	128° 17'.7	43° 04'.7	07'.4	63° 23'.6	20'.4	95° 18'.7	01'.7	297° 29'.1	56'.4
15	143° 20'.2	58° 03'.8	07'.6	78° 24'.2	20'.7	110° 20'.7	01'.8	312° 31'.5	56'.4
16	158° 22'.6	73° 03'.0	07'.8	93° 24'.8	21'.0	125° 22'.8	02'.0	327° 33'.9	56'.5
17	173° 25'.1	88° 02'.1	08'.0	108° 25'.4	21'.4	140° 24'.9	02'.1	342° 36'.3	56'.5
18	188° 27'.5	103° 01'.3	08'.2	123° 26'.0	21'.7	155° 26'.9	02'.2	357° 38'.7	56'.5
19	203° 30'.0	118° 00'.4	08'.4	138° 26'.6	22'.0	170° 29'.0	02'.4	12° 41'.1	56'.6
20	218° 32'.5	132° 59'.5	08'.6	153° 27'.2	22'.3	185° 31'.1	02'.5	27° 43'.5	56'.6
21	233° 34'.9	147° 58'.7	08'.8	168° 27'.8	22'.7	200° 33'.1	02'.6	42° 45'.9	56'.7
22	248° 37'.4	162° 57'.8	09'.0	183° 28'.4	23'.0	215° 35'.2	02'.8	57° 48'.3	56'.7
23	263° 39'.9	177° 57'.0	09'.2	198° 29'.0	23'.3	230° 37'.3	02'.9	72° 50'.7	56'.7
1 00	278° 42'.3	192° 56'.1	23° 09'.4 N	213° 29'.6	21° 23'.6 N	245° 39'.3	12° 03'.0 N	87° 53'.1	1° 56'.8 S
01	293° 44'.8	207° 55'.3	09'.6	228° 30'.2	24'.0	260° 41'.4	03'.1	102° 55'.5	56'.8
02	308° 47'.3	222° 54'.4	09'.8	243° 30'.8	24'.3	275° 43'.5	03'.3	117° 57'.9	56'.8
03	323° 49'.7	237° 53'.6	10'.0	258° 31'.4	24'.6	290° 45'.5	03'.4	133° 00'.3	56'.9
04	338° 52'.2	252° 52'.7	10'.2	273° 32'.0	24'.9	305° 47'.6	03'.5	148° 02'.7	56'.9
05	353° 54'.7	267° 51'.8	10'.4	288° 32'.6	25'.3	320° 49'.7	03'.7	163° 05'.1	57'.0
06	8° 57'.1	282° 51'.0	10'.5	303° 33'.2	25'.6	335° 51'.7	03'.8	178° 07'.5	57'.0
07	23° 59'.6	297° 50'.1	10'.7	318° 33'.8	25'.9	350° 53'.8	03'.9	193° 09'.9	57'.0
08	39° 02'.0	312° 49'.3	10'.9	333° 34'.4	26'.2	5° 55'.9	04'.1	208° 12'.3	57'.1
09	54° 04'.5	327° 48'.4	11'.1	348° 35'.0	26'.5	20° 57'.9	04'.2	223° 14'.7	57'.1
10	69° 07'.0	342° 47'.5	11'.3	3° 35'.6	26'.9	36° 00'.0	04'.3	238° 17'.1	57'.2
11	84° 09'.4	357° 46'.7	11'.5	18° 36'.2	27'.2	51° 02'.1	04'.4	253° 19'.5	57'.2
12	99° 11'.9	12° 45'.8	23° 11'.6 N	33° 36'.8	21° 27'.5 N	66° 04'.1	12° 04'.6 N	268° 21'.9	1° 57'.2 S
13	114° 14'.4	27° 45'.0	11'.8	48° 37'.4	27'.8	81° 06'.2	04'.7	283° 24'.3	57'.3
14	129° 16'.8	42° 44'.1	12'.0	63° 38'.0	28'.1	96° 08'.3	04'.8	298° 26'.7	57'.3
15	144° 19'.3	57° 43'.3	12'.2	78° 38'.6	28'.5	111° 10'.3	05'.0	313° 29'.1	57'.4
16	159° 21'.8	72° 42'.4	12'.3	93° 39'.2	28'.8	126° 12'.4	05'.1	328° 31'.5	57'.4
17	174° 24'.2	87° 41'.5	12'.5	108° 39'.8	29'.1	141° 14'.5	05'.2	343° 33'.9	57'.4
18	189° 26'.7	102° 40'.7	12'.7	123° 40'.4	29'.4	156° 16'.5	05'.4	358° 36'.3	57'.5
19	204° 29'.2	117° 39'.8	12'.9	138° 41'.0	29'.7	171° 18'.6	05'.5	13° 38'.7	57'.5
20	219° 31'.6	132° 39'.0	13'.0	153° 41'.6	30'.0	186° 20'.7	05'.6	28° 41'.1	57'.5
21	234° 34'.1	147° 38'.1	13'.2	168° 42'.2	30'.4	201° 22'.7	05'.7	43° 43'.5	57'.6
22	249° 36'.5	162° 37'.2	13'.4	183° 42'.8	30'.7	216° 24'.8	05'.9	58° 45'.9	57'.6
23	264° 39'.0	177° 36'.4	13'.5	198° 43'.4	31'.0	231° 26'.9	06'.0	73° 48'.3	57'.7
2 00	279° 41'.5	192° 35'.5	23° 13'.7 N	213° 44'.0	21° 31'.3 N	246° 29'.0	12° 06'.1 N	88° 50'.7	1° 57'.7 S
01	294° 43'.9	207° 34'.7	13'.8	228° 44'.6	31'.6	261° 31'.0	06'.3	103° 53'.1	57'.7
02	309° 46'.4	222° 33'.8	14'.0	243° 45'.2	31'.9	276° 33'.1	06'.4	118° 55'.5	57'.8
03	324° 48'.9	237° 32'.9	14'.2	258° 45'.8	32'.2	291° 35'.2	06'.5	133° 57'.9	57'.8
04	339° 51'.3	252° 32'.1	14'.3	273° 46'.4	32'.6	306° 37'.2	06'.6	149° 00'.3	57'.9
05	354° 53'.8	267° 31'.2	14'.5	288° 47'.0	32'.9	321° 39'.3	06'.8	164° 02'.7	57'.9
06	9° 56'.3	282° 30'.3	14'.6	303° 47'.6	33'.2	336° 41'.4	06'.9	179° 05'.1	57'.9
07	24° 58'.7	297° 29'.5	14'.8	318° 48'.2	33'.5	351° 43'.5	07'.0	194° 07'.5	58'.0
08	40° 01'.2	312° 28'.6	15'.0	333° 48'.8	33'.8	6° 45'.5	07'.2	209° 09'.9	58'.0
09	55° 03'.7	327° 27'.8	15'.1	348° 49'.4	34'.1	21° 47'.6	07'.3	224° 12'.3	58'.1
10	70° 06'.1	342° 26'.9	15'.3	3° 50'.0	34'.4	36° 49'.7	07'.4	239° 14'.6	58'.1
11	85° 08'.6	357° 26'.0	15'.4	18° 50'.6	34'.7	51° 51'.7	07'.5	254° 17'.0	58'.2
12	100° 11'.0	12° 25'.2	23° 15'.6 N	33° 51'.2	21° 35'.1 N	66° 53'.8	12° 07'.7 N	269° 19'.4	1° 58'.2 S
13	115° 13'.5	27° 24'.3	15'.7	48° 51'.8	35'.4	81° 55'.9	07'.8	284° 21'.8	58'.2
14	130° 16'.0	42° 23'.4	15'.9	63° 52'.4	35'.7	96° 58'.0	07'.9	299° 24'.2	58'.3
15	145° 18'.4	57° 22'.6	16'.0	78° 53'.0	36'.0	112° 00'.0	08'.1	314° 26'.6	58'.3
16	160° 20'.9	72° 21'.7	16'.2	93° 53'.6	36'.3	127° 02'.1	08'.2	329° 29'.0	58'.4
17	175° 23'.4	87° 20'.9	16'.3	108° 54'.2	36'.6	142° 04'.2	08'.3	344° 31'.4	58'.4
18	190° 25'.8	102° 20'.0	16'.4	123° 54'.8	36'.9	157° 06'.3	08'.4	359° 33'.8	58'.4
19	205° 28'.3	117° 19'.1	16'.6	138° 55'.4	37'.2	172° 08'.3	08'.6	14° 36'.2	58'.5
20	220° 30'.8	132° 18'.3	16'.7	153° 56'.0	37'.5	187° 10'.4	08'.7	29° 38'.6	58'.5
21	235° 33'.2	147° 17'.4	16'.9	168° 56'.6	37'.8	202° 12'.5	08'.8	44° 41'.0	58'.6
22	250° 35'.7	162° 16'.5	17'.0	183° 57'.2	38'.1	217° 14'.5	09'.0	59° 43'.4	58'.6
23	265° 38'.2	177° 15'.7	17'.1	198° 57'.8	38'.4	232° 16'.6	09'.1	74° 45'.8	58'.6
	M.P. 05:20	v -0'.9	d 0'.2	v 0'.6	d 0'.3	v 2'.1	d 0'.1	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.3 S
Achernar	335° 27'.9	57° 10'.3 S
Acrux	173° 11'.0	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.4 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.8	55° 54'.0 N
Alkaid	152° 59'.8	49° 15'.5 N
Alnair	27° 45'.1	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.9	29° 09'.2 N
Altair	62° 09'.3	8° 54'.0 N
Ankaa	353° 17'.0	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.2 S
Capella	280° 37'.0	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.3 N
Denebola	182° 35'.1	14° 30'.5 N
Diphda	348° 57'.3	17° 55'.2 S
Dubhe	193° 53'.6	61° 41'.5 N
Elnath	278° 14'.7	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.4 N
Enif	33° 48'.2	9° 55'.8 N
Fomalhaut	15° 25'.3	29° 33'.4 S
Gacrux	172° 02'.5	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.7	60° 26'.0 S
Hamal	328° 02'.5	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.6 S
Kochab	137° 19'.2	74° 06'.7 N
Markab	13° 39'.6	15° 16'.1 N
Menkar	314° 16'.7	4° 08'.1 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.8	69° 46'.2 S
Mirfak	308° 42'.7	49° 53'.9 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.6 S
Polaris	318° 42'.4	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.3	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.2	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.9	43° 29'.0 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	274° 13'.8	11:09
Mars	294° 47'.2	09:46
Jupiter	326° 57'.0	07:36
Saturn	169° 10'.8	18:06

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 07'.2	23° 12'.1 N	197° 19'.2	8'.1	23° 21'.3 N	0'.9	56'.6
194° 07'.1	12'.0	211° 46'.3	8'.1	20'.4	1'.1	
209° 06'.9	11'.8	226° 13'.4	8'.0	19'.3	1'.1	
224° 06'.8	11'.7	240° 40'.4	8'.0	18'.2	1'.3	
239° 06'.7	11'.5	255° 07'.4	8'.0	16'.9	1'.4	56'.7
254° 06'.6	11'.4	269° 34'.4	8'.0	15'.5	1'.6	
269° 06'.4	11'.2	284° 01'.4	8'.0	13'.9	1'.7	
284° 06'.3	11'.1	298° 28'.4	7'.9	12'.2	1'.8	56'.8
299° 06'.2	10'.9	312° 55'.3	7'.9	10'.4	2'.0	
314° 06'.1	10'.8	327° 22'.2	7'.9	08'.4	2'.1	
329° 05'.9	10'.7	341° 49'.1	7'.9	06'.3	2'.2	
344° 05'.8	10'.5	356° 16'.0	7'.9	04'.1	2'.4	56'.9
359° 05'.7	23° 10'.4 N	10° 42'.9	7'.8	23° 01'.7 N	2'.5	56'.9
14° 05'.6	10'.2	25° 09'.7	7'.9	22° 59'.2 N	2'.6	
29° 05'.4	10'.1	39° 36'.6	7'.8	56'.6	2'.8	
44° 05'.3	09'.9	54° 03'.4	7'.8	53'.8	2'.9	57'.0
59° 05'.2	09'.7	68° 30'.2	7'.8	50'.9	3'.1	
74° 05'.1	09'.6	82° 57'.0	7'.9	47'.8	3'.1	
89° 04'.9	09'.4	97° 23'.9	7'.8	44'.7	3'.4	
104° 04'.8	09'.3	111° 50'.7	7'.8	41'.3	3'.4	57'.1
119° 04'.7	09'.1	126° 17'.5	7'.8	37'.9	3'.6	
134° 04'.6	09'.0	140° 44'.3	7'.8	34'.3	3'.7	
149° 04'.4	08'.8	155° 11'.1	7'.8	30'.6	3'.9	
164° 04'.3	08'.7	169° 37'.9	7'.8	26'.7	3'.9	57'.2
179° 04'.2	23° 08'.5 N	184° 04'.7	7'.8	22° 22'.8 N	4'.2	57'.2
194° 04'.1	08'.3	198° 31'.5	7'.8	18'.6	4'.2	
209° 03'.9	08'.2	212° 58'.3	7'.8	14'.4	4'.4	
224° 03'.8	08'.0	227° 25'.1	7'.9	10'.0	4'.5	57'.3
239° 03'.7	07'.9	241° 52'.0	7'.8	05'.5	4'.7	
254° 03'.6	07'.7	256° 18'.8	7'.8	00'.8	4'.7	
269° 03'.5	07'.5	270° 45'.6	7'.9	21° 56'.1 N	5'.0	
284° 03'.3	07'.4	285° 12'.5	7'.8	51'.1	5'.0	57'.4
299° 03'.2	07'.2	299° 39'.3	7'.9	46'.1	5'.2	
314° 03'.1	07'.0	314° 06'.2	7'.9	40'.9	5'.3	
329° 03'.0	06'.9	328° 33'.1	7'.9	35'.6	5'.4	
344° 02'.8	06'.7	343° 00'.0	7'.9	30'.2	5'.6	57'.5
359° 02'.7	23° 06'.5 N	357° 26'.9	7'.9	21° 24'.6 N	5'.7	57'.5
14° 02'.6	06'.4	11° 53'.8	7'.9	18'.9	5'.8	
29° 02'.5	06'.2	26° 20'.7	8'.0	13'.1	6'.0	
44° 02'.4	06'.0	40° 47'.7	8'.0	07'.1	6'.1	57'.6
59° 02'.2	05'.9	55° 14'.7	8'.0	01'.0	6'.2	
74° 02'.1	05'.7	69° 41'.7	8'.0	20° 54'.8 N	6'.3	
89° 02'.0	05'.5	84° 08'.7	8'.0	48'.5	6'.5	
104° 01'.9	05'.4	98° 35'.7	8'.1	42'.0	6'.6	57'.7
119° 01'.8	05'.2	113° 02'.8	8'.1	35'.4	6'.7	
134° 01'.6	05'.0	127° 29'.9	8'.1	28'.7	6'.8	
149° 01'.5	04'.8	141° 57'.0	8'.1	21'.9	7'.0	
164° 01'.4	04'.7	156° 24'.1	8'.1	14'.9	7'.1	57'.8
179° 01'.3	23° 04'.5 N	170° 51'.2	8'.2	20° 07'.8 N	7'.2	57'.8
194° 01'.1	04'.3	185° 18'.4	8'.2	00'.6	7'.3	
209° 01'.0	04'.1	199° 45'.6	8'.3	19° 53'.3 N	7'.5	
224° 00'.9	04'.0	214° 12'.9	8'.2	45'.8	7'.6	
239° 00'.8	03'.8	228° 40'.1	8'.3	38'.2	7'.7	57'.9
254° 00'.7	03'.6	243° 07'.4	8'.4	30'.5	7'.8	
269° 00'.5	03'.4	257° 34'.8	8'.3	22'.7	7'.9	
284° 00'.4	03'.2	272° 02'.1	8'.4	14'.8	8'.1	
299° 00'.3	03'.1	286° 29'.5	8'.4	06'.7	8'.1	58'.0
314° 00'.2	02'.9	300° 56'.9	8'.5	18° 58'.6 N	8'.3	
329° 00'.1	02'.7	315° 24'.4	8'.5	50'.3	8'.4	
343° 59'.9	02'.5	329° 51'.9	8'.5	41'.9	8'.5	
358° 59'.8	23° 02'.3 N	344° 19'.4	8'.5	18° 33'.4 N	8'.6	58'.0
13° 59'.7	02'.1	358° 46'.9	8'.6	24'.8	8'.8	58'.1
28° 59'.6	02'.0	13° 14'.5	8'.6	16'.0	8'.8	
43° 59'.5	01'.8	27° 42'.1	8'.7	07'.2	9'.0	
58° 59'.4	01'.6	42° 09'.8	8'.7	17° 58'.2 N	9'.0	
73° 59'.2	01'.4	56° 37'.5	8'.7	49'.2	9'.2	58'.2
88° 59'.1	01'.2	71° 05'.2	8'.8	40'.0	9'.3	
103° 59'.0	01'.0	85° 33'.0	8'.8	30'.7	9'.4	
118° 58'.9	00'.8	100° 00'.8	8'.8	21'.3	9'.5	
133° 58'.8	00'.6	114° 28'.6	8'.9	11'.8	9'.6	
148° 58'.6	00'.4	128° 56'.5	8'.9	02'.2	9'.7	58'.3
163° 58'.5	00'.3	143° 24'.4	8'.9	16° 52'.5 N	9'.8	
SD 15'.7	d 0'.2	SD	15'.5	15'.7	15'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 30	Moonrise 1	Moonrise 2
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	01:07
68°	-	-	-	-	-	02:33
66°	-	-	00:15	-	01:22	03:11
64°	-	-	01:40	00:46	02:03	03:38
62°	-	-	02:16	01:19	02:30	03:58
60°	-	01:02	02:42	01:43	02:52	04:15
N 58°	-	01:48	03:02	02:02	03:09	04:29
56°	-	02:17	03:18	02:18	03:24	04:41
54°	00:57	02:38	03:32	02:32	03:37	04:51
52°	01:39	02:56	03:44	02:44	03:48	05:01
50°	02:06	03:10	03:55	02:54	03:58	05:09
45°	02:50	03:40	04:17	03:17	04:18	05:27
N 40°	03:20	04:02	04:35	03:35	04:35	05:41
35°	03:43	04:20	04:49	03:50	04:49	05:53
30°	04:02	04:35	05:02	04:03	05:01	06:04
20°	04:30	05:00	05:24	04:25	05:22	06:22
N 10°	04:53	05:20	05:43	04:44	05:40	06:37
0°	05:11	05:38	06:00	05:02	05:57	06:52
S 10°	05:28	05:55	06:17	05:20	06:14	07:07
20°	05:44	06:12	06:36	05:40	06:32	07:22
30°	06:00	06:30	06:57	06:02	06:53	07:40
35°	06:09	06:41	07:09	06:15	07:05	07:51
40°	06:18	06:52	07:23	06:30	07:19	08:03
45°	06:28	07:06	07:39	06:48	07:36	08:16
S 50°	06:40	07:21	08:00	07:10	07:56	08:33
52°	06:45	07:29	08:09	07:21	08:06	08:41
54°	06:51	07:37	08:20	07:33	08:16	08:50
56°	06:57	07:46	08:33	07:47	08:29	09:00
58°	07:03	07:56	08:47	08:03	08:43	09:11
S 60°	07:11	08:07	09:04	08:22	08:59	09:24
S 62°	07:19	08:20	09:25	08:46	09:19	09:39

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 30	Moonset 1	Moonset 2
N 72°	-	-	-	-	-	23:54
N 70°	-	-	-	-	-	23:09
68°	-	-	-	-	22:55	22:39
66°	23:43	-	-	22:10	22:16	22:16
64°	22:26	-	-	21:29	21:48	21:58
62°	21:50	-	-	21:01	21:27	21:43
60°	21:25	23:03	-	20:39	21:10	21:31
N 58°	21:05	22:19	-	20:21	20:55	21:20
56°	20:49	21:50	-	20:06	20:43	21:10
54°	20:35	21:29	23:08	19:54	20:32	21:02
52°	20:23	21:11	22:27	19:42	20:22	20:54
50°	20:13	20:57	22:01	19:32	20:14	20:47
45°	19:50	20:28	21:17	19:11	19:55	20:33
N 40°	19:33	20:05	20:47	18:54	19:40	20:21
35°	19:18	19:48	20:24	18:39	19:27	20:10
30°	19:05	19:33	20:06	18:27	19:16	20:01
20°	18:43	19:08	19:37	18:05	18:57	19:45
N 10°	18:25	18:48	19:15	17:46	18:40	19:31
0°	18:07	18:30	18:56	17:29	18:24	19:18
S 10°	17:50	18:13	18:39	17:11	18:08	19:05
20°	17:32	17:56	18:23	16:52	17:51	18:50
30°	17:11	17:37	18:07	16:30	17:31	18:34
35°	16:59	17:27	17:59	16:17	17:19	18:24
40°	16:45	17:15	17:49	16:03	17:06	18:13
45°	16:29	17:02	17:39	15:45	16:50	18:01
S 50°	16:08	16:46	17:28	15:23	16:30	17:45
52°	15:58	16:39	17:23	15:12	16:21	17:37
54°	15:48	16:31	17:17	15:00	16:11	17:29
56°	15:35	16:22	17:11	14:47	15:59	17:20
58°	15:21	16:12	17:05	14:31	15:45	17:09
S 60°	15:04	16:01	16:57	14:12	15:29	16:57
S 62°	14:43	15:48	16:49	13:48	15:09	16:42

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
30	3 31	3 37	12:04	11:16	23:43	29d 1%
1	3 43	3 49	12:04	12:11	24:38	0d 0%
2	3 55	4 00	12:04	13:05	00:38	1d 2%

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2011 July 3, 4, 5 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
3 00	280° 40'.6	192° 14'.8	23° 17'.3 N	213° 58'.4	21° 38'.8 N	247° 18'.7	12° 09'.2 N	89° 48'.2	1° 58'.7 S
01	295° 43'.1	207° 13'.9	17'.4	228° 59'.0	39'.1	262° 20'.8	09'.3	104° 50'.6	58'.7
02	310° 45'.5	222° 13'.1	17'.6	243° 59'.6	39'.4	277° 22'.8	09'.5	119° 52'.9	58'.8
03	325° 48'.0	237° 12'.2	17'.7	259° 00'.2	39'.7	292° 24'.9	09'.6	134° 55'.3	58'.8
S 04	340° 50'.5	252° 11'.4	17'.8	274° 00'.8	40'.0	307° 27'.0	09'.7	149° 57'.7	58'.8
u 05	355° 52'.9	267° 10'.5	17'.9	289° 01'.4	40'.3	322° 29'.1	09'.8	165° 00'.1	58'.9
n 06	10° 55'.4	282° 09'.6	18'.1	304° 02'.0	40'.6	337° 31'.2	10'.0	180° 02'.5	58'.9
d 07	25° 57'.9	297° 08'.8	18'.2	319° 02'.6	40'.9	352° 33'.2	10'.1	195° 04'.9	59'.0
a 08	41° 00'.3	312° 07'.9	18'.3	334° 03'.2	41'.2	7° 35'.3	10'.2	210° 07'.3	59'.0
y 09	56° 02'.8	327° 07'.0	18'.5	349° 03'.8	41'.5	22° 37'.4	10'.3	225° 09'.7	59'.1
10	71° 05'.3	342° 06'.2	18'.6	4° 04'.4	41'.8	37° 39'.5	10'.5	240° 12'.1	59'.1
11	86° 07'.7	357° 05'.3	18'.7	19° 05'.0	42'.1	52° 41'.5	10'.6	255° 14'.5	59'.1
12	101° 10'.2	12° 04'.4	23° 18'.8 N	34° 05'.6	21° 42'.4 N	67° 43'.6	12° 10'.7 N	270° 16'.9	1° 59'.2 S
13	116° 12'.6	27° 03'.6	18'.9	49° 06'.2	42'.7	82° 45'.7	10'.8	285° 19'.3	59'.2
14	131° 15'.1	42° 02'.7	19'.1	64° 06'.8	43'.0	97° 47'.8	11'.0	300° 21'.6	59'.3
15	146° 17'.6	57° 01'.8	19'.2	79° 07'.4	43'.3	112° 49'.8	11'.1	315° 24'.0	59'.3
16	161° 20'.0	72° 01'.0	19'.3	94° 08'.0	43'.6	127° 51'.9	11'.2	330° 26'.4	59'.4
17	176° 22'.5	87° 00'.1	19'.4	109° 08'.6	43'.9	142° 54'.0	11'.4	345° 28'.8	59'.4
18	191° 25'.0	101° 59'.2	19'.5	124° 09'.2	44'.2	157° 56'.1	11'.5	0° 31'.2	59'.4
19	206° 27'.4	116° 58'.4	19'.6	139° 09'.8	44'.5	172° 58'.2	11'.6	15° 33'.6	59'.5
20	221° 29'.9	131° 57'.5	19'.8	154° 10'.4	44'.8	188° 00'.2	11'.7	30° 36'.0	59'.5
21	236° 32'.4	146° 56'.6	19'.9	169° 11'.0	45'.1	203° 02'.3	11'.9	45° 38'.4	59'.6
22	251° 34'.8	161° 55'.8	20'.0	184° 11'.6	45'.4	218° 04'.4	12'.0	60° 40'.8	59'.6
23	266° 37'.3	176° 54'.9	20'.1	199° 12'.2	45'.7	233° 06'.5	12'.1	75° 43'.2	59'.7
4 00	281° 39'.8	191° 54'.0	23° 20'.2 N	214° 12'.8	21° 46'.0 N	248° 08'.5	12° 12'.2 N	90° 45'.5	1° 59'.7 S
01	296° 42'.2	206° 53'.2	20'.3	229° 13'.4	46'.3	263° 10'.6	12'.4	105° 47'.9	59'.7
02	311° 44'.7	221° 52'.3	20'.4	244° 14'.0	46'.6	278° 12'.7	12'.5	120° 50'.3	59'.8
03	326° 47'.1	236° 51'.4	20'.5	259° 14'.6	46'.9	293° 14'.8	12'.6	135° 52'.7	59'.8
M 04	341° 49'.6	251° 50'.6	20'.6	274° 15'.2	47'.2	308° 16'.9	12'.7	150° 55'.1	59'.9
o 05	356° 52'.1	266° 49'.7	20'.7	289° 15'.8	47'.5	323° 19'.0	12'.9	165° 57'.5	59'.9
n 06	11° 54'.5	281° 48'.8	20'.8	304° 16'.4	47'.8	338° 21'.0	13'.0	180° 59'.9	2° 00'.0 S
d 07	26° 57'.0	296° 47'.9	20'.9	319° 17'.0	48'.1	353° 23'.1	13'.1	196° 02'.3	00'.0
a 08	41° 59'.5	311° 47'.1	21'.0	334° 17'.6	48'.4	8° 25'.2	13'.2	211° 04'.6	00'.0
y 09	57° 01'.9	326° 46'.2	21'.1	349° 18'.2	48'.7	23° 27'.3	13'.4	226° 07'.0	00'.1
10	72° 04'.4	341° 45'.3	21'.2	4° 18'.8	48'.9	38° 29'.4	13'.5	241° 09'.4	00'.1
11	87° 06'.9	356° 44'.5	21'.3	19° 19'.4	49'.2	53° 31'.4	13'.6	256° 11'.8	00'.2
12	102° 09'.3	11° 43'.6	23° 21'.4 N	34° 20'.0	21° 49'.5 N	68° 33'.5	12° 13'.7 N	271° 14'.2	2° 00'.2 S
13	117° 11'.8	26° 42'.7	21'.5	49° 20'.6	49'.8	83° 35'.6	13'.8	286° 16'.6	00'.3
14	132° 14'.3	41° 41'.9	21'.6	64° 21'.2	50'.1	98° 37'.7	14'.0	301° 19'.0	00'.3
15	147° 16'.7	56° 41'.0	21'.7	79° 21'.8	50'.4	113° 39'.8	14'.1	316° 21'.4	00'.3
16	162° 19'.2	71° 40'.1	21'.8	94° 22'.4	50'.7	128° 41'.8	14'.2	331° 23'.7	00'.4
17	177° 21'.6	86° 39'.3	21'.9	109° 23'.0	51'.0	143° 43'.9	14'.3	346° 26'.1	00'.4
18	192° 24'.1	101° 38'.4	21'.9	124° 23'.6	51'.3	158° 46'.0	14'.5	1° 28'.5	00'.5
19	207° 26'.6	116° 37'.5	22'.0	139° 24'.2	51'.6	173° 48'.1	14'.6	16° 30'.9	00'.5
20	222° 29'.0	131° 36'.6	22'.1	154° 24'.8	51'.9	188° 50'.2	14'.7	31° 33'.3	00'.6
21	237° 31'.5	146° 35'.8	22'.2	169° 25'.4	52'.2	203° 52'.3	14'.8	46° 35'.7	00'.6
22	252° 34'.0	161° 34'.9	22'.3	184° 26'.0	52'.4	218° 54'.3	15'.0	61° 38'.1	00'.7
23	267° 36'.4	176° 34'.0	22'.4	199° 26'.6	52'.7	233° 56'.4	15'.1	76° 40'.4	00'.7
5 00	282° 38'.9	191° 33'.2	23° 22'.4 N	214° 27'.2	21° 53'.0 N	248° 58'.5	12° 15'.2 N	91° 42'.8	2° 00'.7 S
01	297° 41'.4	206° 32'.3	22'.5	229° 27'.8	53'.3	264° 00'.6	15'.3	106° 45'.2	00'.8
02	312° 43'.8	221° 31'.4	22'.6	244° 28'.4	53'.6	279° 02'.7	15'.5	121° 47'.6	00'.8
03	327° 46'.3	236° 30'.6	22'.7	259° 29'.0	53'.9	294° 04'.8	15'.6	136° 50'.0	00'.9
T 04	342° 48'.7	251° 29'.7	22'.7	274° 29'.6	54'.2	309° 06'.9	15'.7	151° 52'.4	00'.9
u 05	357° 51'.2	266° 28'.8	22'.8	289° 30'.2	54'.5	324° 08'.9	15'.8	166° 54'.8	01'.0
e 06	12° 53'.7	281° 27'.9	22'.9	304° 30'.8	54'.8	339° 11'.0	15'.9	181° 57'.1	01'.0
s 07	27° 56'.1	296° 27'.1	23'.0	319° 31'.4	55'.0	354° 13'.1	16'.1	196° 59'.5	01'.1
d 08	42° 58'.6	311° 26'.2	23'.0	334° 32'.0	55'.3	9° 15'.2	16'.2	212° 01'.9	01'.1
a 09	58° 01'.1	326° 25'.3	23'.1	349° 32'.6	55'.6	24° 17'.3	16'.3	227° 04'.3	01'.1
y 10	73° 03'.5	341° 24'.5	23'.2	4° 33'.2	55'.9	39° 19'.4	16'.4	242° 06'.7	01'.2
11	88° 06'.0	356° 23'.6	23'.2	19° 33'.8	56'.2	54° 21'.5	16'.6	257° 09'.1	01'.2
12	103° 08'.5	11° 22'.7	23° 23'.3 N	34° 34'.4	21° 56'.5 N	69° 23'.5	12° 16'.7 N	272° 11'.4	2° 01'.3 S
13	118° 10'.9	26° 21'.9	23'.4	49° 35'.0	56'.7	84° 25'.6	16'.8	287° 13'.8	01'.3
14	133° 13'.4	41° 21'.0	23'.4	64° 35'.6	57'.0	99° 27'.7	16'.9	302° 16'.2	01'.4
15	148° 15'.9	56° 20'.1	23'.5	79° 36'.2	57'.3	114° 29'.8	17'.0	317° 18'.6	01'.4
16	163° 18'.3	71° 19'.2	23'.5	94° 36'.8	57'.6	129° 31'.9	17'.2	332° 21'.0	01'.5
17	178° 20'.8	86° 18'.4	23'.6	109° 37'.4	57'.9	144° 34'.0	17'.3	347° 23'.4	01'.5
18	193° 23'.2	101° 17'.5	23'.7	124° 38'.0	58'.2	159° 36'.1	17'.4	2° 25'.7	01'.6
19	208° 25'.7	116° 16'.6	23'.7	139° 38'.6	58'.4	174° 38'.2	17'.5	17° 28'.1	01'.6
20	223° 28'.2	131° 15'.7	23'.8	154° 39'.2	58'.7	189° 40'.2	17'.7	32° 30'.5	01'.6
21	238° 30'.6	146° 14'.9	23'.8	169° 39'.8	59'.0	204° 42'.3	17'.8	47° 32'.9	01'.7
22	253° 33'.1	161° 14'.0	23'.9	184° 40'.4	59'.3	219° 44'.4	17'.9	62° 35'.3	01'.7
23	268° 35'.6	176° 13'.1	23'.9	199° 41'.0	59'.6	234° 46'.5	18'.0	77° 37'.7	01'.8
	M.P. 05:09	v -0'.9	d 0'.1	v 0'.6	d 0'.3	v 2'.1	d 0'.1	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.3 S
Achernar	335° 27'.9	57° 10'.3 S
Acrux	173° 11'.0	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.3	16° 31'.9 N
Alioth	166° 21'.8	55° 54'.0 N
Alkaid	152° 59'.8	49° 15'.5 N
Alnair	27° 45'.1	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.7 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.9	29° 09'.2 N
Altair	62° 09'.3	8° 54'.1 N
Ankaa	353° 17'.0	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.1 S
Capella	280° 36'.9	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.3 N
Denebola	182° 35'.1	14° 30'.5 N
Diphda	348° 57'.2	17° 55'.2 S
Dubhe	193° 53'.6	61° 41'.5 N
Elnath	278° 14'.7	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.4 N
Enif	33° 48'.2	9° 55'.8 N
Fomalhaut	15° 25'.3	29° 33'.4 S
Gacrux	172° 02'.5	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.7	60° 26'.0 S
Hamal	328° 02'.5	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.6 S
Kochab	137° 19'.2	74° 06'.7 N
Markab	13° 39'.6	15° 16'.1 N
Menkar	314° 16'.7	4° 08'.1 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.8	69° 46'.2 S
Mirfak	308° 42'.7	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.6 S
Polaris	318° 41'.1	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.3	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.1	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.9	43° 29'.0 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	270° 14'.3	11:13
Mars	292° 33'.0	09:43
Jupiter	326° 28'.8	07:26
Saturn	169° 05'.8	17:54

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 58'.4	23° 00'.1 N	157° 52'.3	9'.0	16° 42'.7 N	9'.9	58'.3
193° 58'.3	22° 59'.9 N	172° 20'.3	9'.0	32'.8	10'.0	
208° 58'.2	59'.7	186° 48'.3	9'.1	22'.8	10'.1	
223° 58'.1	59'.5	201° 16'.4	9'.1	12'.7	10'.2	
238° 57'.9	59'.3	215° 44'.5	9'.1	02'.5	10'.3	58'.4
253° 57'.8	59'.1	230° 12'.6	9'.2	15° 52'.2 N	10'.4	
268° 57'.7	58'.9	244° 40'.8	9'.2	41'.8	10'.5	
283° 57'.6	58'.7	259° 09'.0	9'.3	31'.3	10'.5	
298° 57'.5	58'.5	273° 37'.3	9'.3	20'.8	10'.7	
313° 57'.4	58'.3	288° 05'.6	9'.3	10'.1	10'.8	58'.5
328° 57'.2	58'.1	302° 33'.9	9'.4	14° 59'.3 N	10'.8	
343° 57'.1	57'.9	317° 02'.3	9'.4	48'.5	11'.0	
358° 57'.0	22° 57'.7 N	331° 30'.7	9'.4	14° 37'.5 N	11'.0	58'.5
13° 56'.9	57'.5	345° 59'.1	9'.5	26'.5	11'.1	
28° 56'.8	57'.3	0° 27'.6	9'.5	15'.4	11'.3	
43° 56'.7	57'.1	14° 56'.1	9'.6	04'.1	11'.2	58'.6
58° 56'.5	56'.9	29° 24'.7	9'.6	13° 52'.9 N	11'.4	
73° 56'.4	56'.7	43° 53'.3	9'.6	41'.5	11'.5	
88° 56'.3	56'.5	58° 21'.9	9'.7	30'.0	11'.5	
103° 56'.2	56'.3	72° 50'.6	9'.7	18'.5	11'.6	
118° 56'.1	56'.1	87° 19'.3	9'.8	06'.9	11'.7	
133° 56'.0	55'.9	101° 48'.1	9'.8	12° 55'.2 N	11'.8	58'.7
148° 55'.9	55'.7	116° 16'.9	9'.8	43'.4	11'.9	
163° 55'.7	55'.5	130° 45'.7	9'.9	31'.5	11'.9	
178° 55'.6	22° 55'.2 N	145° 14'.6	9'.9	12° 19'.6 N	12'.0	58'.7
193° 55'.5	55'.0	159° 43'.5	9'.9	07'.6	12'.1	
208° 55'.4	54'.8	174° 12'.4	10'.0	11° 55'.5 N	12'.1	
223° 55'.3	54'.6	188° 41'.4	10'.0	43'.4	12'.2	58'.8
238° 55'.2	54'.4	203° 10'.4	10'.0	31'.2	12'.3	
253° 55'.1	54'.2	217° 39'.4	10'.1	18'.9	12'.3	
268° 54'.9	54'.0	232° 08'.5	10'.1	06'.6	12'.5	
283° 54'.8	53'.8	246° 37'.6	10'.1	10° 54'.1 N	12'.4	
298° 54'.7	53'.6	261° 06'.7	10'.2	41'.7	12'.6	
313° 54'.6	53'.3	275° 35'.9	10'.2	29'.1	12'.6	
328° 54'.5	53'.1	290° 05'.1	10'.2	16'.5	12'.7	58'.9
343° 54'.4	52'.9	304° 34'.3	10'.3	03'.8	12'.7	
358° 54'.3	22° 52'.7 N	319° 03'.6	10'.3	9° 51'.1 N	12'.8	58'.9
13° 54'.1	52'.5	333° 32'.9	10'.3	38'.3	12'.8	
28° 54'.0	52'.3	348° 02'.2	10'.3	25'.5	12'.9	
43° 53'.9	52'.0	2° 31'.5	10'.4	12'.6	13'.0	
58° 53'.8	51'.8	17° 00'.9	10'.4	8° 59'.6 N	13'.0	
73° 53'.7	51'.6	31° 30'.3	10'.5	46'.6	13'.0	
88° 53'.6	51'.4	45° 59'.8	10'.5	33'.6	13'.2	59'.0
103° 53'.5	51'.2	60° 29'.3	10'.4	20'.4	13'.1	
118° 53'.4	50'.9	74° 58'.7	10'.6	07'.3	13'.2	
133° 53'.3	50'.7	89° 28'.3	10'.5	7° 54'.1 N	13'.3	
148° 53'.1	50'.5	103° 57'.8	10'.6	40'.8	13'.3	
163° 53'.0	50'.3	118° 27'.4	10'.6	27'.5	13'.3	
178° 52'.9	22° 50'.0 N	132° 57'.0	10'.6	7° 14'.2 N	13'.4	59'.0
193° 52'.8	49'.8	147° 26'.6	10'.6	00'.8	13'.4	
208° 52'.7	49'.6	161° 56'.2	10'.7	6° 47'.4 N	13'.5	
223° 52'.6	49'.4	176° 25'.9	10'.7	33'.9	13'.5	
238° 52'.5	49'.1	190° 55'.6	10'.7	20'.4	13'.6	59'.1
253° 52'.4	48'.9	205° 25'.3	10'.7	06'.8	13'.5	
268° 52'.3	48'.7	219° 55'.0	10'.7	5° 53'.3 N	13'.7	
283° 52'.1	48'.4	234° 24'.7	10'.8	39'.6	13'.6	
298° 52'.0	48'.2	248° 54'.5	10'.7	26'.0	13'.7	
313° 51'.9	48'.0	263° 24'.2	10'.8	12'.3	13'.7	
328° 51'.8	47'.7	277° 54'.0	10'.8	4° 58'.6 N	13'.8	
343° 51'.7	47'.5	292° 23'.8	10'.8	44'.8	13'.7	
358° 51'.6	22° 47'.3 N	306° 53'.6	10'.9	4° 31'.1 N	13'.8	59'.1
13° 51'.5	47'.0	321° 23'.5	10'.8	17'.3	13'.9	
28° 51'.4	46'.8	335° 53'.3	10'.9	03'.4	13'.8	
43° 51'.3	46'.6	350° 23'.2	10'.8	3° 49'.6 N	13'.9	59'.2
58° 51'.2	46'.3	4° 53'.0	10'.9	35'.7	13'.9	
73° 51'.1	46'.1	19° 22'.9	10'.9	21'.8	13'.9	
88° 50'.9	45'.9	33° 52'.8	10'.9	07'.9	13'.9	
103° 50'.8	45'.6	48° 22'.7	10'.9	2° 54'.0 N	14'.0	
118° 50'.7	45'.4	62° 52'.6	10'.9	40'.0	14'.0	
133° 50'.6	45'.1	77° 22'.5	10'.9	26'.0	14'.0	
148° 50'.5	44'.9	91° 52'.4	11'.0	12'.0	14'.0	
163° 50'.4	44'.7	106° 22'.4	10'.9	1° 58'.0 N	14'.0	
SD 15'.7	d 0'.2	SD	15'.9	16'.0	16'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 3	Moonrise 4	Moonrise 5
N 72°	-	-	-	03:28	06:06	08:20
N 70°	-	-	-	04:12	06:25	08:28
68°	-	-	-	04:41	06:40	08:34
66°	-	-	00:39	05:02	06:52	08:39
64°	-	-	01:46	05:19	07:02	08:44
62°	-	-	02:20	05:33	07:11	08:47
60°	-	01:10	02:45	05:45	07:18	08:51
N 58°	-	01:52	03:05	05:55	07:24	08:54
56°	-	02:20	03:21	06:04	07:30	08:56
54°	01:04	02:41	03:34	06:12	07:35	08:59
52°	01:44	02:58	03:46	06:19	07:40	09:01
50°	02:09	03:13	03:57	06:25	07:44	09:03
45°	02:53	03:42	04:19	06:39	07:53	09:07
N 40°	03:22	04:04	04:36	06:50	08:00	09:10
35°	03:45	04:21	04:51	06:59	08:06	09:13
30°	04:03	04:36	05:04	07:07	08:12	09:16
20°	04:32	05:01	05:25	07:22	08:21	09:20
N 10°	04:54	05:21	05:44	07:34	08:30	09:24
0°	05:12	05:38	06:01	07:46	08:37	09:28
S 10°	05:29	05:55	06:18	07:57	08:45	09:32
20°	05:44	06:12	06:36	08:09	08:54	09:36
30°	06:00	06:30	06:56	08:23	09:03	09:40
35°	06:09	06:41	07:09	08:31	09:08	09:43
40°	06:18	06:52	07:22	08:41	09:14	09:46
45°	06:28	07:05	07:39	08:51	09:22	09:49
S 50°	06:39	07:21	07:59	09:04	09:30	09:53
52°	06:44	07:28	08:08	09:10	09:34	09:55
54°	06:50	07:36	08:19	09:17	09:38	09:57
56°	06:56	07:44	08:31	09:24	09:43	09:59
58°	07:02	07:54	08:45	09:32	09:48	10:02
S 60°	07:09	08:06	09:02	09:41	09:54	10:04
S 62°	07:17	08:18	09:22	09:52	10:01	10:07

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 3	Moonset 4	Moonset 5
N 72°	-	-	-	23:07	22:39	22:17
N 70°	-	-	-	22:45	22:29	22:15
68°	-	-	-	22:29	22:20	22:13
66°	23:24	-	-	22:15	22:13	22:11
64°	22:21	-	-	22:04	22:07	22:09
62°	21:47	-	-	21:54	22:02	22:08
60°	21:23	22:56	-	21:46	21:57	22:07
N 58°	21:03	22:15	-	21:38	21:53	22:06
56°	20:47	21:48	-	21:32	21:49	22:05
54°	20:34	21:27	23:02	21:26	21:46	22:04
52°	20:22	21:10	22:24	21:20	21:43	22:03
50°	20:12	20:55	21:59	21:16	21:40	22:02
45°	19:50	20:27	21:15	21:05	21:34	22:00
N 40°	19:32	20:05	20:46	20:56	21:29	21:59
35°	19:18	19:47	20:24	20:49	21:24	21:58
30°	19:05	19:32	20:05	20:42	21:20	21:57
20°	18:44	19:08	19:37	20:30	21:13	21:55
N 10°	18:25	18:48	19:15	20:20	21:07	21:53
0°	18:08	18:30	18:57	20:10	21:02	21:52
S 10°	17:51	18:14	18:40	20:01	20:56	21:50
20°	17:33	17:57	18:24	19:50	20:49	21:48
30°	17:12	17:39	18:08	19:38	20:42	21:46
35°	17:00	17:28	18:00	19:31	20:38	21:45
40°	16:47	17:17	17:51	19:23	20:33	21:44
45°	16:30	17:04	17:41	19:14	20:28	21:42
S 50°	16:10	16:48	17:30	19:02	20:21	21:40
52°	16:01	16:41	17:25	18:57	20:18	21:39
54°	15:50	16:33	17:19	18:51	20:15	21:38
56°	15:38	16:25	17:13	18:45	20:11	21:37
58°	15:24	16:15	17:07	18:37	20:06	21:36
S 60°	15:07	16:03	17:00	18:29	20:02	21:34
S 62°	14:47	15:51	16:52	18:19	19:56	21:33

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
3	4 06	4 12	12:04	13:58	01:32	2d 6%
4	4 17	4 23	12:04	14:50	02:24	3d 12%
5	4 28	4 33	12:05	15:40	03:15	4d 20%

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2011 July 6, 7, 8 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
6 00	283° 38'.0	191° 12'.3	23° 24'.0 N	214° 41'.6	21° 59'.8 N	249° 48'.6	12° 18'.1 N	92° 40'.0	2° 01'.8 S
01	298° 40'.5	206° 11'.4	24'.0	229° 42'.2	22° 00'.1 N	264° 50'.7	18'.3	107° 42'.4	01'.9
02	313° 43'.0	221° 10'.5	24'.1	244° 42'.8	00'.4	279° 52'.8	18'.4	122° 44'.8	01'.9
03	328° 45'.4	236° 09'.6	24'.1	259° 43'.4	00'.7	294° 54'.9	18'.5	137° 47'.2	02'.0
04	343° 47'.9	251° 08'.8	24'.2	274° 44'.0	01'.0	309° 57'.0	18'.6	152° 49'.6	02'.0
05	358° 50'.4	266° 07'.9	24'.2	289° 44'.6	01'.2	324° 59'.0	18'.7	167° 51'.9	02'.1
06	13° 52'.8	281° 07'.0	24'.3	304° 45'.2	01'.5	340° 01'.1	18'.9	182° 54'.3	02'.1
07	28° 55'.3	296° 06'.2	24'.3	319° 45'.8	01'.8	355° 03'.2	19'.0	197° 56'.7	02'.1
08	43° 57'.7	311° 05'.3	24'.4	334° 46'.4	02'.1	10° 05'.3	19'.1	212° 59'.1	02'.2
09	59° 00'.2	326° 04'.4	24'.4	349° 47'.0	02'.4	25° 07'.4	19'.2	228° 01'.5	02'.2
10	74° 02'.7	341° 03'.5	24'.4	4° 47'.6	02'.6	40° 09'.5	19'.3	243° 03'.8	02'.3
11	89° 05'.1	356° 02'.7	24'.5	19° 48'.2	02'.9	55° 11'.6	19'.5	258° 06'.2	02'.3
12	104° 07'.6	11° 01'.8	23° 24'.5 N	34° 48'.8	22° 03'.2 N	70° 13'.7	12° 19'.6 N	273° 08'.6	2° 02'.4 S
13	119° 10'.1	26° 00'.9	24'.5	49° 49'.4	03'.5	85° 15'.8	19'.7	288° 11'.0	02'.4
14	134° 12'.5	41° 00'.0	24'.6	64° 50'.0	03'.7	100° 17'.9	19'.8	303° 13'.4	02'.5
15	149° 15'.0	55° 59'.2	24'.6	79° 50'.6	04'.0	115° 20'.0	19'.9	318° 15'.7	02'.5
16	164° 17'.5	70° 58'.3	24'.6	94° 51'.2	04'.3	130° 22'.0	20'.1	333° 18'.1	02'.6
17	179° 19'.9	85° 57'.4	24'.7	109° 51'.8	04'.6	145° 24'.1	20'.2	348° 20'.5	02'.6
18	194° 22'.4	100° 56'.6	24'.7	124° 52'.4	04'.8	160° 26'.2	20'.3	3° 22'.9	02'.7
19	209° 24'.8	115° 55'.7	24'.7	139° 53'.0	05'.1	175° 28'.3	20'.4	18° 25'.3	02'.7
20	224° 27'.3	130° 54'.8	24'.8	154° 53'.6	05'.4	190° 30'.4	20'.5	33° 27'.6	02'.8
21	239° 29'.8	145° 53'.9	24'.8	169° 54'.2	05'.6	205° 32'.5	20'.7	48° 30'.0	02'.8
22	254° 32'.2	160° 53'.1	24'.8	184° 54'.8	05'.9	220° 34'.6	20'.8	63° 32'.4	02'.8
23	269° 34'.7	175° 52'.2	24'.8	199° 55'.4	06'.2	235° 36'.7	20'.9	78° 34'.8	02'.9
7 00	284° 37'.2	190° 51'.3	23° 24'.9 N	214° 56'.0	22° 06'.5 N	250° 38'.8	12° 21'.0 N	93° 37'.2	2° 02'.9 S
01	299° 39'.6	205° 50'.4	24'.9	229° 56'.6	06'.7	265° 40'.9	21'.1	108° 39'.5	03'.0
02	314° 42'.1	220° 49'.6	24'.9	244° 57'.2	07'.0	280° 43'.0	21'.3	123° 41'.9	03'.0
03	329° 44'.6	235° 48'.7	24'.9	259° 57'.8	07'.3	295° 45'.1	21'.4	138° 44'.3	03'.1
04	344° 47'.0	250° 47'.8	24'.9	274° 58'.4	07'.5	310° 47'.2	21'.5	153° 46'.7	03'.1
05	359° 49'.5	265° 46'.9	25'.0	289° 59'.0	07'.8	325° 49'.3	21'.6	168° 49'.0	03'.2
06	14° 52'.0	280° 46'.1	25'.0	304° 59'.6	08'.1	340° 51'.4	21'.7	183° 51'.4	03'.2
07	29° 54'.4	295° 45'.2	25'.0	320° 00'.2	08'.4	355° 53'.4	21'.8	198° 53'.8	03'.3
08	44° 56'.9	310° 44'.3	25'.0	335° 00'.8	08'.6	10° 55'.5	22'.0	213° 56'.2	03'.3
09	59° 59'.3	325° 43'.5	25'.0	350° 01'.4	08'.9	25° 57'.6	22'.1	228° 58'.6	03'.4
10	75° 01'.8	340° 42'.6	25'.0	5° 02'.0	09'.2	40° 59'.7	22'.2	244° 00'.9	03'.4
11	90° 04'.3	355° 41'.7	25'.0	20° 02'.6	09'.4	56° 01'.8	22'.3	259° 03'.3	03'.5
12	105° 06'.7	10° 40'.8	23° 25'.0 N	35° 03'.2	22° 09'.7 N	71° 03'.9	12° 22'.4 N	274° 05'.7	2° 03'.5 S
13	120° 09'.2	25° 40'.0	25'.0	50° 03'.8	10'.0	86° 06'.0	22'.6	289° 08'.1	03'.6
14	135° 11'.7	40° 39'.1	25'.0	65° 04'.4	10'.2	101° 08'.1	22'.7	304° 10'.4	03'.6
15	150° 14'.1	55° 38'.2	25'.0	80° 05'.0	10'.5	116° 10'.2	22'.8	319° 12'.8	03'.7
16	165° 16'.6	70° 37'.3	25'.1	95° 05'.6	10'.8	131° 12'.3	22'.9	334° 15'.2	03'.7
17	180° 19'.1	85° 36'.5	25'.1	110° 06'.2	11'.0	146° 14'.4	23'.0	349° 17'.6	03'.8
18	195° 21'.5	100° 35'.6	25'.1	125° 06'.8	11'.3	161° 16'.5	23'.1	4° 19'.9	03'.8
19	210° 24'.0	115° 34'.7	25'.1	140° 07'.4	11'.5	176° 18'.6	23'.3	19° 22'.3	03'.9
20	225° 26'.5	130° 33'.8	25'.1	155° 08'.0	11'.8	191° 20'.7	23'.4	34° 24'.7	03'.9
21	240° 28'.9	145° 33'.0	25'.1	170° 08'.6	12'.1	206° 22'.8	23'.5	49° 27'.1	04'.0
22	255° 31'.4	160° 32'.1	25'.0	185° 09'.2	12'.3	221° 24'.9	23'.6	64° 29'.4	04'.0
23	270° 33'.8	175° 31'.2	25'.0	200° 09'.8	12'.6	236° 27'.0	23'.7	79° 31'.8	04'.0
8 00	285° 36'.3	190° 30'.3	23° 25'.0 N	215° 10'.4	22° 12'.9 N	251° 29'.1	12° 23'.9 N	94° 34'.2	2° 04'.1 S
01	300° 38'.8	205° 29'.5	25'.0	230° 11'.0	13'.1	266° 31'.2	24'.0	109° 36'.6	04'.1
02	315° 41'.2	220° 28'.6	25'.0	245° 11'.6	13'.4	281° 33'.3	24'.1	124° 38'.9	04'.2
03	330° 43'.7	235° 27'.7	25'.0	260° 12'.2	13'.6	296° 35'.4	24'.2	139° 41'.3	04'.2
04	345° 46'.2	250° 26'.8	25'.0	275° 12'.8	13'.9	311° 37'.5	24'.3	154° 43'.7	04'.3
05	0° 48'.6	265° 26'.0	25'.0	290° 13'.4	14'.2	326° 39'.6	24'.4	169° 46'.1	04'.3
06	15° 51'.1	280° 25'.1	25'.0	305° 14'.0	14'.4	341° 41'.7	24'.6	184° 48'.4	04'.4
07	30° 53'.6	295° 24'.2	25'.0	320° 14'.6	14'.7	356° 43'.8	24'.7	199° 50'.8	04'.4
08	45° 56'.0	310° 23'.3	24'.9	335° 15'.2	15'.0	11° 45'.9	24'.8	214° 53'.2	04'.5
09	60° 58'.5	325° 22'.5	24'.9	350° 15'.8	15'.2	26° 48'.0	24'.9	229° 55'.5	04'.5
10	76° 00'.9	340° 21'.6	24'.9	5° 16'.4	15'.5	41° 50'.1	25'.0	244° 57'.9	04'.6
11	91° 03'.4	355° 20'.7	24'.9	20° 17'.0	15'.7	56° 52'.2	25'.1	260° 00'.3	04'.6
12	106° 05'.9	10° 19'.9	23° 24'.9 N	35° 17'.6	22° 16'.0 N	71° 54'.3	12° 25'.3 N	275° 02'.7	2° 04'.7 S
13	121° 08'.3	25° 19'.0	24'.8	50° 18'.2	16'.2	86° 56'.4	25'.4	290° 05'.0	04'.7
14	136° 10'.8	40° 18'.1	24'.8	65° 18'.8	16'.5	101° 58'.5	25'.5	305° 07'.4	04'.8
15	151° 13'.3	55° 17'.2	24'.8	80° 19'.4	16'.8	117° 00'.6	25'.6	320° 09'.8	04'.8
16	166° 15'.7	70° 16'.4	24'.8	95° 20'.0	17'.0	132° 02'.7	25'.7	335° 12'.2	04'.9
17	181° 18'.2	85° 15'.5	24'.7	110° 20'.6	17'.3	147° 04'.8	25'.8	350° 14'.5	04'.9
18	196° 20'.7	100° 14'.6	24'.7	125° 21'.2	17'.5	162° 06'.9	25'.9	5° 16'.9	05'.0
19	211° 23'.1	115° 13'.7	24'.7	140° 21'.8	17'.8	177° 09'.0	26'.1	20° 19'.3	05'.0
20	226° 25'.6	130° 12'.9	24'.7	155° 22'.4	18'.0	192° 11'.1	26'.2	35° 21'.6	05'.1
21	241° 28'.1	145° 12'.0	24'.6	170° 23'.0	18'.3	207° 13'.2	26'.3	50° 24'.0	05'.1
22	256° 30'.5	160° 11'.1	24'.6	185° 23'.6	18'.5	222° 15'.3	26'.4	65° 26'.4	05'.2
23	271° 33'.0	175° 10'.2	24'.6	200° 24'.2	18'.8	237° 17'.4	26'.5	80° 28'.8	05'.2
	M.P. 04:57	v -0'.9	d 0'.0	v 0'.6	d 0'.3	v 2'.1	d 0'.1	v 2'.4	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.3 S
Achernar	335° 27'.8	57° 10'.3 S
Acrux	173° 11'.0	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.8	55° 54'.0 N
Alkaid	152° 59'.8	49° 15'.5 N
Alnair	27° 45'.1	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.9	29° 09'.2 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 17'.0	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.1 S
Capella	280° 36'.9	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.3 N
Denebola	182° 35'.1	14° 30'.5 N
Diphda	348° 57'.2	17° 55'.2 S
Dubhe	193° 53'.6	61° 41'.5 N
Elnath	278° 14'.7	28° 36'.9 N
Eltanin	90° 46'.2	51° 29'.4 N
Enif	33° 48'.2	9° 55'.8 N
Fomalhaut	15° 25'.3	29° 33'.4 S
Gacrux	172° 02'.6	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.7	60° 26'.0 S
Hamal	328° 02'.4	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.6 S
Kochab	137° 19'.2	74° 06'.7 N
Markab	13° 39'.5	15° 16'.1 N
Menkar	314° 16'.7	4° 08'.1 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 46'.2 S
Mirfak	308° 42'.7	49° 53'.9 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.6 S
Polaris	318° 39'.9	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.6 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.3	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.1	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 29'.0 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	266° 14'.1	11:17
Mars	290° 18'.8	09:40
Jupiter	326° 01'.6	07:16
Saturn	169° 00'.0	17:43

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 50'.3	22° 44'.4 N	120° 52'.3	10'.9	1° 44'.0 N	14'.0	59'.2
193° 50'.2	44'.2	135° 22'.2	10'.9	30'.0	14'.0	
208° 50'.1	43'.9	149° 52'.1	11'.0	16'.0	14'.1	
223° 50'.0	43'.7	164° 22'.1	10'.9	01'.9	14'.0	
238° 49'.9	43'.4	178° 52'.0	10'.9	0° 47'.9 N	14'.1	
253° 49'.8	43'.2	193° 21'.9	11'.0	33'.8	14'.0	
268° 49'.7	43'.0	207° 51'.9	10'.9	19'.8	14'.1	59'.3
283° 49'.6	42'.7	222° 21'.8	10'.9	05'.7	14'.1	
298° 49'.4	42'.5	236° 51'.7	10'.9	0° 08'.4 S	14'.0	
313° 49'.3	42'.2	251° 21'.6	11'.0	22'.4	14'.1	
328° 49'.2	42'.0	265° 51'.6	10'.9	36'.5	14'.1	
343° 49'.1	41'.7	280° 21'.5	10'.9	50'.6	14'.0	
358° 49'.0	22° 41'.5 N	294° 51'.4	10'.9	1° 04'.6 S	14'.1	59'.3
13° 48'.9	41'.2	309° 21'.3	10'.8	18'.7	14'.0	
28° 48'.8	41'.0	323° 51'.1	10'.9	32'.7	14'.1	
43° 48'.7	40'.7	338° 21'.0	10'.9	46'.8	14'.0	
58° 48'.6	40'.5	352° 50'.9	10'.8	2° 00'.8 S	14'.0	
73° 48'.5	40'.2	7° 20'.7	10'.9	14'.8	14'.1	
88° 48'.4	39'.9	21° 50'.6	10'.8	28'.9	14'.0	
103° 48'.3	39'.7	36° 20'.4	10'.8	42'.9	13'.9	
118° 48'.2	39'.4	50° 50'.2	10'.8	56'.8	14'.0	
133° 48'.1	39'.2	65° 20'.0	10'.8	3° 10'.8 S	14'.0	
148° 48'.0	38'.9	79° 49'.8	10'.8	24'.8	13'.9	
163° 47'.9	38'.7	94° 19'.6	10'.7	38'.7	13'.9	
178° 47'.8	22° 38'.4 N	108° 49'.3	10'.8	3° 52'.6 S	13'.9	59'.3
193° 47'.7	38'.2	123° 19'.1	10'.7	4° 06'.5 S	13'.9	
208° 47'.6	37'.9	137° 48'.8	10'.6	20'.4	13'.9	
223° 47'.5	37'.6	152° 18'.4	10'.7	34'.3	13'.8	
238° 47'.4	37'.4	166° 48'.1	10'.7	48'.1	13'.8	
253° 47'.3	37'.1	181° 17'.8	10'.6	5° 01'.9 S	13'.8	
268° 47'.2	36'.8	195° 47'.4	10'.6	15'.7	13'.7	
283° 47'.1	36'.6	210° 17'.0	10'.5	29'.4	13'.7	
298° 47'.0	36'.3	224° 46'.5	10'.6	43'.1	13'.7	
313° 46'.8	36'.1	239° 16'.1	10'.5	56'.8	13'.7	
328° 46'.7	35'.8	253° 45'.6	10'.5	6° 10'.5 S	13'.6	
343° 46'.6	35'.5	268° 15'.1	10'.4	24'.1	13'.6	
358° 46'.5	22° 35'.3 N	282° 44'.5	10'.5	6° 37'.7 S	13'.5	59'.3
13° 46'.4	35'.0	297° 14'.0	10'.4	51'.2	13'.5	
28° 46'.3	34'.7	311° 43'.4	10'.3	7° 04'.7 S	13'.5	
43° 46'.2	34'.5	326° 12'.7	10'.4	18'.2	13'.4	
58° 46'.1	34'.2	340° 42'.1	10'.3	31'.6	13'.4	
73° 46'.0	33'.9	355° 11'.4	10'.2	45'.0	13'.3	
88° 45'.9	33'.6	9° 40'.6	10'.3	58'.3	13'.3	
103° 45'.8	33'.4	24° 09'.9	10'.2	8° 11'.6 S	13'.3	
118° 45'.7	33'.1	38° 39'.1	10'.1	24'.9	13'.2	
133° 45'.6	32'.8	53° 08'.2	10'.2	38'.1	13'.2	
148° 45'.5	32'.6	67° 37'.4	10'.0	51'.3	13'.1	
163° 45'.4	32'.3	82° 06'.4	10'.1	9° 04'.4 S	13'.0	
178° 45'.3	22° 32'.0 N	96° 35'.5	10'.0	9° 17'.4 S	13'.0	59'.3
193° 45'.2	31'.7	111° 04'.5	10'.0	30'.4	13'.0	
208° 45'.1	31'.5	125° 33'.5	9'.9	43'.4	12'.9	
223° 45'.0	31'.2	140° 02'.4	9'.9	56'.3	12'.8	
238° 44'.9	30'.9	154° 31'.3	9'.8	10° 09'.1 S	12'.8	
253° 44'.9	30'.6	169° 00'.1	9'.8	21'.9	12'.7	
268° 44'.8	30'.4	183° 28'.9	9'.8	34'.6	12'.7	
283° 44'.7	30'.1	197° 57'.7	9'.7	47'.3	12'.6	
298° 44'.6	29'.8	212° 26'.4	9'.6	59'.9	12'.5	
313° 44'.5	29'.5	226° 55'.0	9'.7	11° 12'.4 S	12'.5	
328° 44'.4	29'.2	241° 23'.7	9'.5	24'.9	12'.4	
343° 44'.3	28'.9	255° 52'.2	9'.6	37'.3	12'.3	
358° 44'.2	22° 28'.7 N	270° 20'.8	9'.4	11° 49'.6 S	12'.3	59'.3
13° 44'.1	28'.4	284° 49'.2	9'.5	12° 01'.9 S	12'.2	
28° 44'.0	28'.1	299° 17'.7	9'.4	14'.1	12'.1	
43° 43'.9	27'.8	313° 46'.1	9'.3	26'.2	12'.0	
58° 43'.8	27'.5	328° 14'.4	9'.3	38'.2	12'.0	
73° 43'.7	27'.2	342° 42'.7	9'.2	50'.2	11'.9	
88° 43'.6	27'.0	357° 10'.9	9'.2	13° 02'.1 S	11'.9	
103° 43'.5	26'.7	11° 39'.1	9'.1	14'.0	11'.7	
118° 43'.4	26'.4	26° 07'.2	9'.1	25'.7	11'.7	
133° 43'.3	26'.1	40° 35'.3	9'.0	37'.4	11'.6	
148° 43'.2	25'.8	55° 03'.3	9'.0	49'.0	11'.5	
163° 43'.1	25'.5	69° 31'.3	8'.9	14° 00'.5 S	11'.4	
SD 15'.7	d 0'.3	SD	16'.2		16'.2	16'.2

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 6	Moonrise 7	Moonrise 8
N 72°	-	-	-	10:28	12:38	14:59
N 70°	-	-	-	10:27	12:28	14:34
68°	-	-	-	10:26	12:19	14:16
66°	-	-	00:56	10:25	12:12	14:01
64°	-	-	01:53	10:25	12:06	13:49
62°	-	-	02:25	10:24	12:01	13:39
60°	-	01:19	02:49	10:23	11:57	13:31
N 58°	-	01:58	03:08	10:23	11:53	13:23
56°	-	02:24	03:24	10:23	11:49	13:17
54°	01:12	02:45	03:37	10:22	11:46	13:11
52°	01:48	03:01	03:49	10:22	11:43	13:05
50°	02:13	03:16	03:59	10:22	11:41	13:01
45°	02:55	03:44	04:21	10:21	11:35	12:50
N 40°	03:25	04:06	04:38	10:20	11:31	12:42
35°	03:47	04:23	04:52	10:20	11:27	12:35
30°	04:05	04:38	05:05	10:19	11:24	12:28
20°	04:33	05:02	05:26	10:19	11:18	12:17
N 10°	04:54	05:21	05:44	10:18	11:13	12:08
0°	05:13	05:39	06:01	10:18	11:08	11:59
S 10°	05:29	05:55	06:18	10:17	11:03	11:50
20°	05:45	06:12	06:36	10:17	10:58	11:41
30°	06:00	06:30	06:56	10:16	10:53	11:31
35°	06:09	06:40	07:08	10:16	10:49	11:25
40°	06:18	06:51	07:22	10:16	10:46	11:18
45°	06:27	07:04	07:38	10:15	10:42	11:10
S 50°	06:38	07:20	07:57	10:15	10:37	11:01
52°	06:43	07:27	08:07	10:15	10:35	10:56
54°	06:49	07:34	08:17	10:14	10:32	10:52
56°	06:54	07:43	08:29	10:14	10:29	10:47
58°	07:01	07:53	08:43	10:14	10:26	10:41
S 60°	07:08	08:03	08:59	10:14	10:23	10:34
S 62°	07:16	08:16	09:19	10:13	10:19	10:27

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 6	Moonset 7	Moonset 8
N 72°	-	-	-	21:56	21:33	21:02
N 70°	-	-	-	22:01	21:46	21:28
68°	-	-	-	22:05	21:57	21:48
66°	23:09	-	-	22:08	22:06	22:04
64°	22:15	-	-	22:11	22:14	22:17
62°	21:43	-	-	22:14	22:20	22:28
60°	21:20	22:49	-	22:16	22:26	22:38
N 58°	21:01	22:10	-	22:18	22:31	22:46
56°	20:45	21:44	-	22:19	22:35	22:54
54°	20:32	21:24	22:55	22:21	22:39	23:00
52°	20:20	21:08	22:20	22:22	22:43	23:06
50°	20:10	20:53	21:56	22:24	22:46	23:12
45°	19:49	20:25	21:14	22:27	22:54	23:24
N 40°	19:32	20:04	20:45	22:29	23:00	23:34
35°	19:17	19:47	20:23	22:31	23:05	23:42
30°	19:05	19:32	20:05	22:33	23:10	23:49
20°	18:44	19:08	19:37	22:36	23:18	24:02
N 10°	18:25	18:48	19:15	22:39	23:25	24:14
0°	18:09	18:31	18:57	22:41	23:32	24:24
S 10°	17:52	18:14	18:41	22:44	23:39	24:35
20°	17:34	17:58	18:25	22:47	23:46	24:46
30°	17:14	17:40	18:10	22:50	23:54	25:00
35°	17:02	17:30	18:01	22:52	23:59	25:07
40°	16:48	17:19	17:52	22:54	-	00:05
45°	16:32	17:06	17:43	22:56	-	00:11
S 50°	16:13	16:50	17:32	22:59	-	00:19
52°	16:03	16:43	17:27	23:00	-	00:22
54°	15:53	16:36	17:21	23:02	-	00:26
56°	15:41	16:27	17:16	23:03	-	00:30
58°	15:27	16:18	17:09	23:05	-	00:35
S 60°	15:11	16:07	17:02	23:07	-	00:41
S 62°	14:51	15:54	16:55	23:10	-	00:47

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
6	4 39	4 44	12:05	16:30	04:05	5d 30%
7	4 49	4 54	12:05	17:20	04:55	6d 41%
8	4 58	5 03	12:05	18:12	05:46	7d 53%

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2011 July 9, 10, 11 (Sat, Sun, Mon)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
9 00	286° 35'.4	190° 09'.4	23° 24'.5 N	215° 24'.8	22° 19'.1 N	252° 19'.5	12° 26'.6 N	95° 31'.1	2° 05'.3 S
01	301° 37'.9	205° 08'.5	24'.5	230° 25'.4	19'.3	267° 21'.6	26'.8	110° 33'.5	05'.3
02	316° 40'.4	220° 07'.6	24'.5	245° 26'.0	19'.6	282° 23'.7	26'.9	125° 35'.9	05'.4
03	331° 42'.8	235° 06'.7	24'.4	260° 26'.6	19'.8	297° 25'.8	27'.0	140° 38'.2	05'.4
Saturday 04	346° 45'.3	250° 05'.9	24'.4	275° 27'.2	20'.1	312° 27'.9	27'.1	155° 40'.6	05'.5
05	1° 47'.8	265° 05'.0	24'.3	290° 27'.8	20'.3	327° 30'.0	27'.2	170° 43'.0	05'.5
06	16° 50'.2	280° 04'.1	24'.3	305° 28'.4	20'.6	342° 32'.1	27'.3	185° 45'.3	05'.6
07	31° 52'.7	295° 03'.2	24'.2	320° 29'.0	20'.8	357° 34'.3	27'.4	200° 47'.7	05'.6
08	46° 55'.2	310° 02'.4	24'.2	335° 29'.6	21'.1	12° 36'.4	27'.6	215° 50'.1	05'.7
09	61° 57'.6	325° 01'.5	24'.2	350° 30'.2	21'.3	27° 38'.5	27'.7	230° 52'.5	05'.7
10	77° 00'.1	340° 00'.6	24'.1	5° 30'.8	21'.6	42° 40'.6	27'.8	245° 54'.8	05'.8
11	92° 02'.6	354° 59'.7	24'.1	20° 31'.4	21'.8	57° 42'.7	27'.9	260° 57'.2	05'.8
12	107° 05'.0	9° 58'.9	23° 24'.0 N	35° 32'.0	22° 22'.1 N	72° 44'.8	12° 28'.0 N	275° 59'.6	2° 05'.9 S
13	122° 07'.5	24° 58'.0	24'.0	50° 32'.5	22'.3	87° 46'.9	28'.1	291° 01'.9	05'.9
14	137° 09'.9	39° 57'.1	23'.9	65° 33'.1	22'.6	102° 49'.0	28'.2	306° 04'.3	06'.0
15	152° 12'.4	54° 56'.2	23'.9	80° 33'.7	22'.8	117° 51'.1	28'.4	321° 06'.7	06'.0
16	167° 14'.9	69° 55'.4	23'.8	95° 34'.3	23'.1	132° 53'.2	28'.5	336° 09'.0	06'.1
17	182° 17'.3	84° 54'.5	23'.7	110° 34'.9	23'.3	147° 55'.3	28'.6	351° 11'.4	06'.2
18	197° 19'.8	99° 53'.6	23'.7	125° 35'.5	23'.6	162° 57'.4	28'.7	6° 13'.8	06'.2
19	212° 22'.3	114° 52'.7	23'.6	140° 36'.1	23'.8	177° 59'.5	28'.8	21° 16'.1	06'.3
20	227° 24'.7	129° 51'.9	23'.6	155° 36'.7	24'.1	193° 01'.6	28'.9	36° 18'.5	06'.3
21	242° 27'.2	144° 51'.0	23'.5	170° 37'.3	24'.3	208° 03'.7	29'.0	51° 20'.9	06'.4
22	257° 29'.7	159° 50'.1	23'.5	185° 37'.9	24'.5	223° 05'.9	29'.1	66° 23'.2	06'.4
23	272° 32'.1	174° 49'.2	23'.4	200° 38'.5	24'.8	238° 08'.0	29'.3	81° 25'.6	06'.5
10 00	287° 34'.6	189° 48'.4	23° 23'.3 N	215° 39'.1	22° 25'.0 N	253° 10'.1	12° 29'.4 N	96° 28'.0	2° 06'.5 S
01	302° 37'.0	204° 47'.5	23'.3	230° 39'.7	25'.3	268° 12'.2	29'.5	111° 30'.4	06'.6
02	317° 39'.5	219° 46'.6	23'.2	245° 40'.3	25'.5	283° 14'.3	29'.6	126° 32'.7	06'.6
03	332° 42'.0	234° 45'.8	23'.1	260° 40'.9	25'.8	298° 16'.4	29'.7	141° 35'.1	06'.7
Sunday 04	347° 44'.4	249° 44'.9	23'.1	275° 41'.5	26'.0	313° 18'.5	29'.8	156° 37'.5	06'.7
05	2° 46'.9	264° 44'.0	23'.0	290° 42'.1	26'.3	328° 20'.6	29'.9	171° 39'.8	06'.8
06	17° 49'.4	279° 43'.1	22'.9	305° 42'.7	26'.5	343° 22'.7	30'.0	186° 42'.2	06'.8
07	32° 51'.8	294° 42'.3	22'.8	320° 43'.3	26'.7	358° 24'.8	30'.2	201° 44'.6	06'.9
08	47° 54'.3	309° 41'.4	22'.8	335° 43'.9	27'.0	13° 26'.9	30'.3	216° 46'.9	06'.9
09	62° 56'.8	324° 40'.5	22'.7	350° 44'.5	27'.2	28° 29'.1	30'.4	231° 49'.3	07'.0
10	77° 59'.2	339° 39'.6	22'.6	5° 45'.1	27'.5	43° 31'.2	30'.5	246° 51'.7	07'.0
11	93° 01'.7	354° 38'.8	22'.5	20° 45'.7	27'.7	58° 33'.3	30'.6	261° 54'.0	07'.1
12	108° 04'.2	9° 37'.9	23° 22'.5 N	35° 46'.3	22° 27'.9 N	73° 35'.4	12° 30'.7 N	276° 56'.4	2° 07'.1 S
13	123° 06'.6	24° 37'.0	22'.4	50° 46'.9	28'.2	88° 37'.5	30'.8	291° 58'.7	07'.2
14	138° 09'.1	39° 36'.1	22'.3	65° 47'.5	28'.4	103° 39'.6	30'.9	307° 01'.1	07'.2
15	153° 11'.5	54° 35'.3	22'.2	80° 48'.1	28'.7	118° 41'.7	31'.1	322° 03'.5	07'.3
16	168° 14'.0	69° 34'.4	22'.1	95° 48'.7	28'.9	133° 43'.8	31'.2	337° 05'.8	07'.3
17	183° 16'.5	84° 33'.5	22'.1	110° 49'.3	29'.1	148° 46'.0	31'.3	352° 08'.2	07'.4
18	198° 18'.9	99° 32'.6	22'.0	125° 49'.9	29'.4	163° 48'.1	31'.4	7° 10'.6	07'.5
19	213° 21'.4	114° 31'.8	21'.9	140° 50'.5	29'.6	178° 50'.2	31'.5	22° 12'.9	07'.5
20	228° 23'.9	129° 30'.9	21'.8	155° 51'.1	29'.9	193° 52'.3	31'.6	37° 15'.3	07'.6
21	243° 26'.3	144° 30'.0	21'.7	170° 51'.7	30'.1	208° 54'.4	31'.7	52° 17'.7	07'.6
22	258° 28'.8	159° 29'.2	21'.6	185° 52'.3	30'.3	223° 56'.5	31'.8	67° 20'.0	07'.7
23	273° 31'.3	174° 28'.3	21'.5	200° 52'.9	30'.6	238° 58'.6	31'.9	82° 22'.4	07'.7
11 00	288° 33'.7	189° 27'.4	23° 21'.4 N	215° 53'.5	22° 30'.8 N	254° 00'.7	12° 32'.1 N	97° 24'.8	2° 07'.8 S
01	303° 36'.2	204° 26'.5	21'.3	230° 54'.1	31'.0	269° 02'.9	32'.2	112° 27'.1	07'.8
02	318° 38'.7	219° 25'.7	21'.3	245° 54'.7	31'.3	284° 05'.0	32'.3	127° 29'.5	07'.9
03	333° 41'.1	234° 24'.8	21'.2	260° 55'.3	31'.5	299° 07'.1	32'.4	142° 31'.8	07'.9
Monday 04	348° 43'.6	249° 23'.9	21'.1	275° 55'.9	31'.7	314° 09'.2	32'.5	157° 34'.2	08'.0
05	3° 46'.0	264° 23'.0	21'.0	290° 56'.6	32'.0	329° 11'.3	32'.6	172° 36'.6	08'.0
06	18° 48'.5	279° 22'.2	20'.9	305° 57'.2	32'.2	344° 13'.4	32'.7	187° 38'.9	08'.1
07	33° 51'.0	294° 21'.3	20'.8	320° 57'.8	32'.4	359° 15'.5	32'.8	202° 41'.3	08'.1
08	48° 53'.4	309° 20'.4	20'.7	335° 58'.4	32'.7	14° 17'.7	32'.9	217° 43'.7	08'.2
09	63° 55'.9	324° 19'.5	20'.6	350° 59'.0	32'.9	29° 19'.8	33'.1	232° 46'.0	08'.3
10	78° 58'.4	339° 18'.7	20'.5	5° 59'.6	33'.1	44° 21'.9	33'.2	247° 48'.4	08'.3
11	94° 00'.8	354° 17'.8	20'.3	21° 00'.2	33'.4	59° 24'.0	33'.3	262° 50'.8	08'.4
12	109° 03'.3	9° 16'.9	23° 20'.2 N	36° 00'.8	22° 33'.6 N	74° 26'.1	12° 33'.4 N	277° 53'.1	2° 08'.4 S
13	124° 05'.8	24° 16'.1	20'.1	51° 01'.4	33'.8	89° 28'.2	33'.5	292° 55'.5	08'.5
14	139° 08'.2	39° 15'.2	20'.0	66° 02'.0	34'.1	104° 30'.4	33'.6	307° 57'.8	08'.5
15	154° 10'.7	54° 14'.3	19'.9	81° 02'.6	34'.3	119° 32'.5	33'.7	323° 00'.2	08'.6
16	169° 13'.2	69° 13'.4	19'.8	96° 03'.2	34'.5	134° 34'.6	33'.8	338° 02'.6	08'.6
17	184° 15'.6	84° 12'.6	19'.7	111° 03'.8	34'.8	149° 36'.7	33'.9	353° 04'.9	08'.7
18	199° 18'.1	99° 11'.7	19'.6	126° 04'.4	35'.0	164° 38'.8	34'.0	8° 07'.3	08'.7
19	214° 20'.5	114° 10'.8	19'.5	141° 05'.0	35'.2	179° 40'.9	34'.2	23° 09'.6	08'.8
20	229° 23'.0	129° 10'.0	19'.3	156° 05'.6	35'.5	194° 43'.1	34'.3	38° 12'.0	08'.8
21	244° 25'.5	144° 09'.1	19'.2	171° 06'.2	35'.7	209° 45'.2	34'.4	53° 14'.4	08'.9
22	259° 27'.9	159° 08'.2	19'.1	186° 06'.8	35'.9	224° 47'.3	34'.5	68° 16'.7	09'.0
23	274° 30'.4	174° 07'.3	19'.0	201° 07'.4	36'.1	239° 49'.4	34'.6	83° 19'.1	09'.0
	M.P. 04:45	v -0'.9	d 0'.1	v 0'.6	d 0'.2	v 2'.1	d 0'.1	v 2'.4	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.6	40° 15'.3 S
Achernar	335° 27'.8	57° 10'.3 S
Acrux	173° 11'.1	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.8	55° 54'.0 N
Alkaid	152° 59'.8	49° 15'.5 N
Alnair	27° 45'.0	46° 54'.0 S
Alnilam	275° 48'.1	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.8	29° 09'.2 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.9	42° 14'.3 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.8	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.1 S
Capella	280° 36'.9	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.3 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.2	17° 55'.2 S
Dubhe	193° 53'.6	61° 41'.5 N
Elnath	278° 14'.7	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.4 N
Enif	33° 48'.2	9° 55'.8 N
Fomalhaut	15° 25'.2	29° 33'.4 S
Gacrux	172° 02'.6	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.7	60° 26'.0 S
Hamal	328° 02'.4	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.6 S
Kochab	137° 19'.3	74° 06'.7 N
Markab	13° 39'.5	15° 16'.1 N
Menkar	314° 16'.6	4° 08'.1 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 46'.1 S
Mirfak	308° 42'.6	49° 53'.9 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.6 S
Polaris	318° 38'.4	89° 18'.6 N
Pollux	243° 29'.8	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.7	8° 11'.3 S
Rigil Kent	139° 53'.3	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.1	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 29'.0 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	262° 13'.8	11:21
Mars	288° 04'.6	09:37
Jupiter	325° 35'.5	07:06
Saturn	168° 53'.4	17:31

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 43'.0	22° 25'.2 N	83° 59'.2	8'.9	14° 11'.9 S	11'.4	59'.2
193° 42'.9	24'.9	98° 27'.1	8'.8	23'.3	11'.2	
208° 42'.8	24'.6	112° 54'.9	8'.8	34'.5	11'.2	
223° 42'.7	24'.3	127° 22'.7	8'.7	45'.7	11'.1	
238° 42'.6	24'.1	141° 50'.4	8'.6	56'.8	11'.0	
253° 42'.5	23'.8	156° 18'.0	8'.7	15° 07'.8 S	10'.9	
268° 42'.5	23'.5	170° 45'.7	8'.5	18'.7	10'.8	
283° 42'.4	23'.2	185° 13'.2	8'.5	29'.5	10'.7	
298° 42'.3	22'.9	199° 40'.7	8'.4	40'.2	10'.6	
313° 42'.2	22'.6	214° 08'.1	8'.4	50'.8	10'.5	
328° 42'.1	22'.3	228° 35'.5	8'.3	16° 01'.3 S	10'.5	
343° 42'.0	22'.0	243° 02'.8	8'.3	11'.8	10'.3	
358° 41'.9	22° 21'.7 N	257° 30'.1	8'.2	16° 22'.1 S	10'.2	59'.2
13° 41'.8	21'.4	271° 57'.3	8'.2	32'.3	10'.2	
28° 41'.7	21'.1	286° 24'.5	8'.1	42'.5	10'.0	
43° 41'.6	20'.8	300° 51'.6	8'.0	52'.5	9'.9	
58° 41'.5	20'.5	315° 18'.6	8'.0	17° 02'.4 S	9'.9	
73° 41'.4	20'.2	329° 45'.6	8'.0	12'.3	9'.7	59'.1
88° 41'.3	19'.9	344° 12'.6	7'.9	22'.0	9'.6	
103° 41'.2	19'.6	358° 39'.5	7'.8	31'.6	9'.5	
118° 41'.2	19'.3	13° 06'.3	7'.8	41'.1	9'.4	
133° 41'.1	19'.0	27° 33'.1	7'.7	50'.5	9'.3	
148° 41'.0	18'.7	41° 59'.8	7'.6	59'.8	9'.1	
163° 40'.9	18'.4	56° 26'.4	7'.7	18° 08'.9 S	9'.1	
178° 40'.8	22° 18'.0 N	70° 53'.1	7'.5	18° 18'.0 S	8'.9	59'.1
193° 40'.7	17'.7	85° 19'.6	7'.5	26'.9	8'.9	
208° 40'.6	17'.4	99° 46'.1	7'.5	35'.8	8'.7	
223° 40'.5	17'.1	114° 12'.6	7'.4	44'.5	8'.6	
238° 40'.4	16'.8	128° 39'.0	7'.3	53'.1	8'.5	
253° 40'.3	16'.5	143° 05'.3	7'.3	19° 01'.6 S	8'.3	59'.0
268° 40'.3	16'.2	157° 31'.6	7'.2	09'.9	8'.3	
283° 40'.2	15'.9	171° 57'.8	7'.2	18'.2	8'.1	
298° 40'.1	15'.6	186° 24'.0	7'.2	26'.3	8'.0	
313° 40'.0	15'.3	200° 50'.2	7'.1	34'.3	7'.9	
328° 39'.9	14'.9	215° 16'.3	7'.0	42'.2	7'.7	
343° 39'.8	14'.6	229° 42'.3	7'.0	49'.9	7'.6	
358° 39'.7	22° 14'.3 N	244° 08'.3	6'.9	19° 57'.5 S	7'.5	59'.0
13° 39'.6	14'.0	258° 34'.2	6'.9	20° 05'.0 S	7'.4	
28° 39'.6	13'.7	273° 00'.1	6'.9	12'.4	7'.3	
43° 39'.5	13'.4	287° 26'.0	6'.8	19'.7	7'.1	58'.9
58° 39'.4	13'.1	301° 51'.8	6'.8	26'.8	7'.0	
73° 39'.3	12'.7	316° 17'.6	6'.7	33'.8	6'.8	
88° 39'.2	12'.4	330° 43'.3	6'.6	40'.6	6'.7	
103° 39'.1	12'.1	345° 08'.9	6'.7	47'.3	6'.6	
118° 39'.0	11'.8	359° 34'.6	6'.6	53'.9	6'.5	
133° 38'.9	11'.5	14° 00'.2	6'.5	21° 00'.4 S	6'.3	
148° 38'.9	11'.1	28° 25'.7	6'.5	06'.7	6'.2	
163° 38'.8	10'.8	42° 51'.2	6'.5	12'.9	6'.0	
178° 38'.7	22° 10'.5 N	57° 16'.7	6'.4	21° 18'.9 S	5'.9	58'.8
193° 38'.6	10'.2	71° 42'.1	6'.4	24'.8	5'.8	
208° 38'.5	09'.8	86° 07'.5	6'.3	30'.6	5'.6	
223° 38'.4	09'.5	100° 32'.8	6'.4	36'.2	5'.5	
238° 38'.3	09'.2	114° 58'.2	6'.3	41'.7	5'.4	
253° 38'.3	08'.9	129° 23'.5	6'.2	47'.1	5'.2	
268° 38'.2	08'.5	143° 48'.7	6'.2	52'.3	5'.1	
283° 38'.1	08'.2	158° 13'.9	6'.2	57'.4	4'.9	
298° 38'.0	07'.9	172° 39'.1	6'.2	22° 02'.3 S	4'.8	58'.7
313° 37'.9	07'.6	187° 04'.3	6'.1	07'.1	4'.7	
328° 37'.8	07'.2	201° 29'.4	6'.1	11'.8	4'.5	
343° 37'.8	06'.9	215° 54'.5	6'.1	16'.3	4'.3	
358° 37'.7	22° 06'.6 N	230° 19'.6	6'.1	22° 20'.6 S	4'.2	58'.7
13° 37'.6	06'.2	244° 44'.7	6'.0	24'.8	4'.1	
28° 37'.5	05'.9	259° 09'.7	6'.0	28'.9	3'.9	
43° 37'.4	05'.6	273° 34'.7	6'.0	32'.8	3'.8	
58° 37'.3	05'.2	287° 59'.7	6'.0	36'.6	3'.6	58'.6
73° 37'.3	04'.9	302° 24'.7	6'.0	40'.2	3'.5	
88° 37'.2	04'.6	316° 49'.7	5'.9	43'.7	3'.4	
103° 37'.1	04'.2	331° 14'.6	6'.0	47'.1	3'.2	
118° 37'.0	03'.9	345° 39'.6	5'.9	50'.3	3'.0	
133° 36'.9	03'.6	0° 04'.5	5'.9	53'.3	2'.9	
148° 36'.9	03'.2	14° 29'.4	5'.9	56'.2	2'.8	
163° 36'.8	02'.9	28° 54'.3	5'.9	59'.0	2'.6	58'.5
SD 15'.7	d 0'.3	SD	16'.1		16'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 9	Moonrise 10	Moonrise 11
N 72°	-	-	-	18:10	-	-
N 70°	-	-	-	16:57	-	-
68°	-	-	-	16:20	18:43	-
66°	-	-	01:11	15:55	17:51	19:45
64°	-	-	02:00	15:35	17:19	18:55
62°	-	-	02:31	15:19	16:56	18:24
60°	-	01:28	02:54	15:05	16:37	18:01
N 58°	-	02:04	03:12	14:54	16:22	17:42
56°	-	02:29	03:27	14:44	16:09	17:26
54°	01:21	02:49	03:40	14:35	15:57	17:13
52°	01:54	03:05	03:52	14:27	15:47	17:01
50°	02:18	03:19	04:02	14:20	15:38	16:50
45°	02:59	03:46	04:23	14:05	15:19	16:29
N 40°	03:27	04:08	04:40	13:53	15:04	16:11
35°	03:49	04:25	04:54	13:43	14:51	15:56
30°	04:06	04:39	05:06	13:34	14:40	15:44
20°	04:34	05:03	05:27	13:18	14:20	15:22
N 10°	04:55	05:22	05:45	13:05	14:04	15:03
0°	05:13	05:39	06:02	12:53	13:48	14:46
S 10°	05:29	05:56	06:18	12:40	13:33	14:28
20°	05:45	06:12	06:36	12:27	13:16	14:10
30°	06:00	06:30	06:56	12:12	12:58	13:48
35°	06:08	06:40	07:07	12:03	12:47	13:36
40°	06:17	06:51	07:21	11:54	12:34	13:22
45°	06:26	07:03	07:36	11:42	12:20	13:05
S 50°	06:37	07:18	07:56	11:28	12:02	12:44
52°	06:42	07:25	08:05	11:22	11:54	12:34
54°	06:47	07:32	08:15	11:15	11:44	12:23
56°	06:53	07:41	08:27	11:07	11:34	12:10
58°	06:59	07:50	08:40	10:58	11:22	11:56
S 60°	07:06	08:01	08:56	10:48	11:08	11:38
S 62°	07:13	08:13	09:15	10:37	10:52	11:17

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 9	Moonset 10	Moonset 11
N 72°	-	-	-	19:43	-	-
N 70°	-	-	-	20:57	-	-
68°	-	-	-	21:35	21:11	-
66°	22:56	-	-	22:02	22:03	22:09
64°	22:08	-	-	22:23	22:35	23:00
62°	21:38	-	-	22:40	22:59	23:31
60°	21:16	22:40	-	22:54	23:18	23:55
N 58°	20:58	22:05	-	23:06	23:34	24:14
56°	20:42	21:40	-	23:17	23:48	24:30
54°	20:30	21:21	22:48	23:26	24:00	24:44
52°	20:18	21:05	22:15	23:35	-	00:10
50°	20:08	20:51	21:52	23:42	-	00:19
45°	19:47	20:24	21:11	23:58	-	00:39
N 40°	19:31	20:03	20:43	-	00:11	00:55
35°	19:16	19:46	20:22	-	00:23	01:09
30°	19:04	19:31	20:04	-	00:33	01:21
20°	18:43	19:08	19:37	00:02	00:50	01:41
N 10°	18:26	18:48	19:15	00:14	01:05	01:59
0°	18:09	18:31	18:57	00:24	01:19	02:15
S 10°	17:53	18:15	18:41	00:35	01:33	02:32
20°	17:35	17:59	18:26	00:46	01:48	02:50
30°	17:15	17:41	18:11	01:00	02:05	03:10
35°	17:03	17:31	18:03	01:07	02:15	03:22
40°	16:50	17:20	17:54	01:16	02:27	03:36
45°	16:35	17:08	17:45	01:26	02:41	03:53
S 50°	16:15	16:53	17:34	01:38	02:57	04:13
52°	16:06	16:46	17:29	01:44	03:05	04:22
54°	15:56	16:39	17:24	01:51	03:14	04:33
56°	15:44	16:30	17:18	01:58	03:24	04:46
58°	15:31	16:21	17:12	02:06	03:35	05:00
S 60°	15:15	16:10	17:06	02:15	03:48	05:17
S 62°	14:56	15:58	16:58	02:26	04:04	05:38

	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
Day						
9	5 08	5 12	12:05	19:06	06:38	8d 64%
10	5 17	5 21	12:05	20:02	07:33	9d 75%
11	5 25	5 29	12:05	21:00	08:31	10d 84%

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2011 July 12, 13, 14 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
12 00	289° 32'.9	189° 06'.5	23° 18'.9 N	216° 08'.0	22° 36'.4 N	254° 51'.5	12° 34'.7 N	98° 21'.4	2° 09'.1 S
01	304° 35'.3	204° 05'.6	18'.7	231° 08'.6	36'.6	269° 53'.7	34'.8	113° 23'.8	09'.1
02	319° 37'.8	219° 04'.7	18'.6	246° 09'.2	36'.8	284° 55'.8	34'.9	128° 26'.2	09'.2
03	334° 40'.3	234° 03'.9	18'.5	261° 09'.8	37'.0	299° 57'.9	35'.0	143° 28'.5	09'.2
Tuesday 04	349° 42'.7	249° 03'.0	18'.4	276° 10'.4	37'.3	315° 00'.0	35'.1	158° 30'.9	09'.3
05	4° 45'.2	264° 02'.1	18'.2	291° 11'.0	37'.5	330° 02'.1	35'.2	173° 33'.2	09'.3
06	19° 47'.6	279° 01'.2	18'.1	306° 11'.6	37'.7	345° 04'.3	35'.4	188° 35'.6	09'.4
07	34° 50'.1	294° 00'.4	18'.0	321° 12'.2	37'.9	0° 06'.4	35'.5	203° 38'.0	09'.4
08	49° 52'.6	308° 59'.5	17'.9	336° 12'.8	38'.2	15° 08'.5	35'.6	218° 40'.3	09'.5
09	64° 55'.0	323° 58'.6	17'.7	351° 13'.4	38'.4	30° 10'.6	35'.7	233° 42'.7	09'.6
10	79° 57'.5	338° 57'.8	17'.6	6° 14'.0	38'.6	45° 12'.7	35'.8	248° 45'.0	09'.6
11	95° 00'.0	353° 56'.9	17'.5	21° 14'.6	38'.8	60° 14'.9	35'.9	263° 47'.4	09'.7
12	110° 02'.4	8° 56'.0	23° 17'.3 N	36° 15'.2	22° 39'.1 N	75° 17'.0	12° 36'.0 N	278° 49'.8	2° 09'.7 S
13	125° 04'.9	23° 55'.1	17'.2	51° 15'.8	39'.3	90° 19'.1	36'.1	293° 52'.1	09'.8
14	140° 07'.4	38° 54'.3	17'.0	66° 16'.4	39'.5	105° 21'.2	36'.2	308° 54'.5	09'.8
15	155° 09'.8	53° 53'.4	16'.9	81° 17'.0	39'.7	120° 23'.3	36'.3	323° 56'.8	09'.9
16	170° 12'.3	68° 52'.5	16'.8	96° 17'.6	40'.0	135° 25'.5	36'.4	338° 59'.2	09'.9
17	185° 14'.8	83° 51'.7	16'.6	111° 18'.2	40'.2	150° 27'.6	36'.5	354° 01'.6	10'.0
18	200° 17'.2	98° 50'.8	16'.5	126° 18'.8	40'.4	165° 29'.7	36'.6	9° 03'.9	10'.1
19	215° 19'.7	113° 49'.9	16'.3	141° 19'.4	40'.6	180° 31'.8	36'.8	24° 06'.3	10'.1
20	230° 22'.1	128° 49'.0	16'.2	156° 20'.0	40'.8	195° 34'.0	36'.9	39° 08'.6	10'.2
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22	260° 27'.1	158° 47'.3	15'.9	186° 21'.2	41'.3	225° 38'.2	37'.1	69° 13'.3	10'.3
23	275° 29'.5	173° 46'.4	15'.8	201° 21'.8	41'.5	240° 40'.3	37'.2	84° 15'.7	10'.3
13 00	290° 32'.0	188° 45'.6	23° 15'.6 N	216° 22'.4	22° 41'.7 N	255° 42'.5	12° 37'.3 N	99° 18'.1	2° 10'.4 S
01	305° 34'.5	203° 44'.7	15'.5	231° 23'.0	41'.9	270° 44'.6	37'.4	114° 20'.4	10'.4
02	320° 36'.9	218° 43'.8	15'.3	246° 23'.6	42'.1	285° 46'.7	37'.5	129° 22'.8	10'.5
03	335° 39'.4	233° 43'.0	15'.1	261° 24'.2	42'.4	300° 48'.8	37'.6	144° 25'.1	10'.6
Wednesday 04	350° 41'.9	248° 42'.1	15'.0	276° 24'.8	42'.6	315° 50'.9	37'.7	159° 27'.5	10'.6
05	5° 44'.3	263° 41'.2	14'.8	291° 25'.4	42'.8	330° 53'.1	37'.8	174° 29'.8	10'.7
06	20° 46'.8	278° 40'.4	14'.7	306° 26'.0	43'.0	345° 55'.2	37'.9	189° 32'.2	10'.7
07	35° 49'.3	293° 39'.5	14'.5	321° 26'.6	43'.2	0° 57'.3	38'.0	204° 34'.5	10'.8
08	50° 51'.7	308° 38'.6	14'.4	336° 27'.2	43'.4	15° 59'.5	38'.1	219° 36'.9	10'.8
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20	231° 21'.3	128° 28'.2	12'.4	156° 34'.4	46'.0	196° 25'.0	39'.4	40° 05'.2	11'.5
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Thursday 04	351° 41'.0	248° 21'.3	10'.9	276° 39'.2	47'.7	316° 42'.0	40'.2	160° 24'.0	12'.0
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06	21° 45'.9	278° 19'.5	10'.6	306° 40'.4	48'.1	346° 46'.3	40'.5	190° 28'.7	12'.1
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STARS		
Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.2 S
Achernar	335° 27'.8	57° 10'.3 S
Acrux	173° 11'.1	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.9	55° 54'.0 N
Alkaid	152° 59'.8	49° 15'.5 N
Alnair	27° 45'.0	46° 54'.0 S
Alnilam	275° 48'.0	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.8	29° 09'.2 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.9	42° 14'.2 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.2	59° 33'.0 S
Bellatrix	278° 33'.8	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.1 S
Capella	280° 36'.9	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.4 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.2	17° 55'.2 S
Dubhe	193° 53'.7	61° 41'.5 N
Elnath	278° 14'.7	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.4 N
Enif	33° 48'.2	9° 55'.8 N
Fomalhaut	15° 25'.2	29° 33'.4 S
Gacrux	172° 02'.6	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.7	60° 26'.0 S
Hamal	328° 02'.4	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.4	74° 06'.7 N
Markab	13° 39'.5	15° 16'.1 N
Menkar	314° 16'.6	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 46'.1 S
Mirfak	308° 42'.6	49° 53'.9 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.6 S
Polaris	318° 36'.8	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.6	8° 11'.3 S
Rigil Kent	139° 53'.3	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.0	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.3	16° 44'.0 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 29'.0 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	258° 13'.6	11:26
Mars	285° 50'.4	09:34
Jupiter	325° 10'.4	06:56
Saturn	168° 46'.0	17:20

SUN						
GHA	Dec	GHA	v	Dec	d	HP
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193° 36'.6	02'.2	57° 44'.1	5'.9	04'.0	2'.3	
208° 36'.5	01'.9	72° 09'.0	5'.8	06'.3	2'.2	
223° 36'.4	01'.5	86° 33'.8	5'.9	08'.5	2'.0	
238° 36'.4	01'.2	100° 58'.7	5'.9	10'.5	1'.8	
253° 36'.3	00'.9	115° 23'.6	5'.9	12'.3	1'.7	58'.4
268° 36'.2	00'.5	129° 48'.5	5'.9	14'.0	1'.6	
283° 36'.1	00'.2	144° 13'.4	5'.8	15'.6	1'.4	
298° 36'.0	21° 59'.8 N	158° 38'.2	5'.9	17'.0	1'.2	
313° 36'.0	59'.5	173° 03'.1	5'.9	18'.2	1'.1	
328° 35'.9	59'.1	187° 28'.0	5'.9	19'.3	1'.0	
343° 35'.8	58'.8	201° 52'.9	6'.0	20'.3	0'.8	58'.3
358° 35'.7	21° 58'.4 N	216° 17'.9	5'.9	23° 21'.1 S	0'.7	58'.3
13° 35'.7	58'.1	230° 42'.8	5'.9	21'.8	0'.5	
28° 35'.6	57'.7	245° 07'.7	6'.0	22'.3	0'.3	
43° 35'.5	57'.4	259° 32'.7	6'.0	22'.6	0'.2	
58° 35'.4	57'.1	273° 57'.7	6'.0	22'.8	0'.1	
73° 35'.3	56'.7	288° 22'.7	6'.0	22'.9	0'.1	58'.2
88° 35'.3	56'.4	302° 47'.7	6'.0	22'.8	0'.2	
103° 35'.2	56'.0	317° 12'.7	6'.1	22'.6	0'.4	
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163° 34'.9	54'.6	14° 53'.1	6'.2	20'.2	1'.0	58'.1
178° 34'.8	21° 54'.2 N	29° 18'.3	6'.2	23° 19'.2 S	1'.1	58'.1
193° 34'.7	53'.9	43° 43'.5	6'.3	18'.1	1'.3	
208° 34'.7	53'.5	58° 08'.8	6'.2	16'.8	1'.4	
223° 34'.6	53'.2	72° 34'.0	6'.4	15'.4	1'.6	
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253° 34'.4	52'.5	101° 24'.7	6'.4	12'.1	1'.8	
268° 34'.4	52'.1	115° 50'.1	6'.4	10'.3	2'.0	
283° 34'.3	51'.7	130° 15'.5	6'.5	08'.3	2'.1	
298° 34'.2	51'.4	144° 41'.0	6'.5	06'.2	2'.3	
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328° 34'.1	50'.7	173° 32'.1	6'.6	01'.5	2'.5	
343° 34'.0	50'.3	187° 57'.7	6'.6	22° 59'.0 S	2'.7	
358° 33'.9	21° 49'.9 N	202° 23'.3	6'.7	22° 56'.3 S	2'.9	57'.9
13° 33'.8	49'.6	216° 49'.0	6'.8	53'.4	2'.9	
28° 33'.8	49'.2	231° 14'.8	6'.8	50'.5	3'.1	57'.8
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13° 32'.1	40'.7	203° 23'.6	8'.3	05'.8	6'.0	57'.3
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MOON						
GHA	v	Dec	d	HP
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144° 13'.4	5'.8	15'.6	1'.4	
158° 38'.2	5'.9	17'.0	1'.2	
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187° 28'.0	5'.9	19'.3	1'.0	
201° 52'.9	6'.0	20'.3	0'.8	58'.3
216° 17'.9	5'.9	23° 21'.1 S	0'.7	58'.3
230° 42'.8	5'.9	21'.8	0'.5	
245° 07'.7	6'.0	22'.3	0'.3	
259° 32'.7	6'.0	22'.6	0'.2	
273° 57'.7	6'.0	22'.8	0'.1	
288° 22'.7	6'.0	22'.9	0'.1	58'.2
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317° 12'.7	6'.1	22'.6	0'.4	
331° 37'.8	6'.1	22'.2	0'.5	
346° 02'.9	6'.1	21'.7	0'.7	
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173° 32'.1	6'.6	01'.5	2'.5	
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203° 23'.6	8'.3	05'.8	6'.0	57'.3
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333° 32'.0	8'.9	07'.5	7'.0	57'.1
347° 59'.9	9'.1	00'.5	7'.2	
SD	15'.9	15'.8	15'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 12	Moonrise 13	Moonrise 14
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	-	-	-	22:10
66°	-	-	01:25	21:06	21:27	21:30
64°	-	-	02:09	20:06	20:44	21:02
62°	-	00:26	02:37	19:32	20:16	20:41
60°	-	01:37	02:59	19:07	19:53	20:23
N 58°	-	02:10	03:17	18:47	19:35	20:09
56°	00:24	02:34	03:31	18:31	19:20	19:56
54°	01:29	02:53	03:44	18:17	19:07	19:45
52°	02:00	03:09	03:55	18:05	18:56	19:35
50°	02:22	03:22	04:05	17:54	18:46	19:27
45°	03:02	03:49	04:25	17:31	18:24	19:08
N 40°	03:30	04:10	04:42	17:13	18:07	18:53
35°	03:51	04:27	04:56	16:58	17:52	18:40
30°	04:08	04:41	05:08	16:44	17:40	18:29
20°	04:35	05:04	05:28	16:22	17:18	18:10
N 10°	04:56	05:23	05:46	16:02	16:59	17:53
0°	05:14	05:40	06:02	15:44	16:42	17:37
S 10°	05:30	05:56	06:18	15:26	16:24	17:21
20°	05:45	06:12	06:35	15:07	16:05	17:04
30°	06:00	06:29	06:55	14:44	15:44	16:45
35°	06:07	06:39	07:06	14:31	15:31	16:33
40°	06:16	06:49	07:19	14:16	15:16	16:20
45°	06:25	07:02	07:35	13:58	14:59	16:05
S 50°	06:36	07:16	07:54	13:36	14:37	15:46
52°	06:40	07:23	08:03	13:25	14:27	15:37
54°	06:45	07:30	08:12	13:13	14:15	15:26
56°	06:51	07:38

2011 July 15, 16, 17 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.3		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
15 00	292° 30'.3	188° 04'.0	23° 07'.0 N	216° 51'.2	22° 51'.8 N	257° 24'.7	12° 42'.3 N	101° 11'.0	2° 13'.1 S
01	307° 32'.8	203° 03'.1	06'.8	231° 51'.8	52'.0	272° 26'.8	42'.4	116° 13'.4	13'.2
02	322° 35'.2	218° 02'.2	06'.6	246° 52'.4	52'.2	287° 28'.9	42'.5	131° 15'.7	13'.3
03	337° 37'.7	233° 01'.4	06'.4	261° 53'.0	52'.4	302° 31'.1	42'.6	146° 18'.1	13'.3
04	352° 40'.1	248° 00'.5	06'.2	276° 53'.6	52'.6	317° 33'.2	42'.7	161° 20'.4	13'.4
05	7° 42'.6	262° 59'.6	06'.0	291° 54'.3	52'.8	332° 35'.3	42'.8	176° 22'.8	13'.4
06	22° 45'.1	277° 58'.8	05'.8	306° 54'.9	53'.0	347° 37'.5	42'.9	191° 25'.1	13'.5
07	37° 47'.5	292° 57'.9	05'.5	321° 55'.5	53'.2	2° 39'.6	43'.0	206° 27'.5	13'.6
08	52° 50'.0	307° 57'.0	05'.3	336° 56'.1	53'.4	17° 41'.7	43'.1	221° 29'.8	13'.6
09	67° 52'.5	322° 56'.2	05'.1	351° 56'.7	53'.6	32° 43'.9	43'.2	236° 32'.2	13'.7
10	82° 54'.9	337° 55'.3	04'.9	6° 57'.3	53'.8	47° 46'.0	43'.3	251° 34'.5	13'.7
11	97° 57'.4	352° 54'.5	04'.7	21° 57'.9	54'.0	62° 48'.2	43'.4	266° 36'.9	13'.8
12	112° 59'.9	7° 53'.6	23° 04'.4 N	36° 58'.5	22° 54'.2 N	77° 50'.3	12° 43'.5 N	281° 39'.2	2° 13'.9 S
13	128° 02'.3	22° 52'.7	04'.2	51° 59'.1	54'.4	92° 52'.4	43'.6	296° 41'.6	13'.9
14	143° 04'.8	37° 51'.9	04'.0	66° 59'.7	54'.6	107° 54'.6	43'.7	311° 43'.9	14'.0
15	158° 07'.2	52° 51'.0	03'.8	82° 00'.3	54'.7	122° 56'.7	43'.9	326° 46'.2	14'.0
16	173° 09'.7	67° 50'.1	03'.5	97° 00'.9	54'.9	137° 58'.8	44'.0	341° 48'.6	14'.1
17	188° 12'.2	82° 49'.3	03'.3	112° 01'.5	55'.1	153° 01'.0	44'.1	356° 50'.9	14'.2
18	203° 14'.6	97° 48'.4	03'.1	127° 02'.1	55'.3	168° 03'.1	44'.2	11° 53'.3	14'.2
19	218° 17'.1	112° 47'.6	02'.9	142° 02'.7	55'.5	183° 05'.3	44'.3	26° 55'.6	14'.3
20	233° 19'.6	127° 46'.7	02'.6	157° 03'.3	55'.7	198° 07'.4	44'.4	41° 58'.0	14'.3
21	248° 22'.0	142° 45'.8	02'.4	172° 03'.9	55'.9	213° 09'.5	44'.5	57° 00'.3	14'.4
22	263° 24'.5	157° 45'.0	02'.2	187° 04'.5	56'.1	228° 11'.7	44'.6	72° 02'.7	14'.5
23	278° 27'.0	172° 44'.1	01'.9	202° 05'.1	56'.3	243° 13'.8	44'.7	87° 05'.0	14'.5
16 00	293° 29'.4	187° 43'.3	23° 01'.7 N	217° 05'.7	22° 56'.5 N	258° 16'.0	12° 44'.8 N	102° 07'.4	2° 14'.6 S
01	308° 31'.9	202° 42'.4	01'.5	232° 06'.3	56'.7	273° 18'.1	44'.9	117° 09'.7	14'.6
02	323° 34'.4	217° 41'.5	01'.2	247° 06'.9	56'.9	288° 20'.2	45'.0	132° 12'.1	14'.7
03	338° 36'.8	232° 40'.7	01'.0	262° 07'.5	57'.1	303° 22'.4	45'.1	147° 14'.4	14'.8
04	353° 39'.3	247° 39'.8	00'.7	277° 08'.1	57'.3	318° 24'.5	45'.2	162° 16'.8	14'.8
05	8° 41'.7	262° 39'.0	00'.5	292° 08'.7	57'.4	333° 26'.7	45'.3	177° 19'.1	14'.9
06	23° 44'.2	277° 38'.1	00'.3	307° 09'.3	57'.6	348° 28'.8	45'.4	192° 21'.5	14'.9
07	38° 46'.7	292° 37'.2	00'.0	322° 09'.9	57'.8	3° 31'.0	45'.5	207° 23'.8	15'.0
08	53° 49'.1	307° 36'.4	22° 59'.8 N	337° 10'.5	58'.0	18° 33'.1	45'.6	222° 26'.1	15'.1
09	68° 51'.6	322° 35'.5	59'.5	352° 11'.1	58'.2	33° 35'.2	45'.7	237° 28'.5	15'.1
10	83° 54'.1	337° 34'.7	59'.3	7° 11'.7	58'.4	48° 37'.4	45'.8	252° 30'.8	15'.2
11	98° 56'.5	352° 33'.8	59'.0	22° 12'.3	58'.6	63° 39'.5	45'.9	267° 33'.2	15'.2
12	113° 59'.0	7° 32'.9	22° 58'.8 N	37° 12'.9	22° 58'.8 N	78° 41'.7	12° 46'.0 N	282° 35'.5	2° 15'.3 S
13	129° 01'.5	22° 32'.1	58'.5	52° 13'.5	59'.0	93° 43'.8	46'.1	297° 37'.9	15'.4
14	144° 03'.9	37° 31'.2	58'.3	67° 14'.1	59'.1	108° 45'.9	46'.2	312° 40'.2	15'.4
15	159° 06'.4	52° 30'.4	58'.0	82° 14'.7	59'.3	123° 48'.1	46'.3	327° 42'.6	15'.5
16	174° 08'.9	67° 29'.5	57'.8	97° 15'.3	59'.5	138° 50'.2	46'.4	342° 44'.9	15'.5
17	189° 11'.3	82° 28'.7	57'.5	112° 15'.9	59'.7	153° 52'.4	46'.5	357° 47'.2	15'.6
18	204° 13'.8	97° 27'.8	57'.3	127° 16'.5	59'.9	168° 54'.5	46'.6	12° 49'.6	15'.7
19	219° 16'.2	112° 26'.9	57'.0	142° 17'.1	23° 00'.1 N	183° 56'.7	46'.7	27° 51'.9	15'.7
20	234° 18'.7	127° 26'.1	56'.8	157° 17'.8	00'.3	198° 58'.8	46'.8	42° 54'.3	15'.8
21	249° 21'.2	142° 25'.2	56'.5	172° 18'.4	00'.4	214° 01'.0	46'.9	57° 56'.6	15'.9
22	264° 23'.6	157° 24'.4	56'.2	187° 19'.0	00'.6	229° 03'.1	47'.0	72° 59'.0	15'.9
23	279° 26'.1	172° 23'.5	56'.0	202° 19'.6	00'.8	244° 05'.2	47'.1	88° 01'.3	16'.0
17 00	294° 28'.6	187° 22'.7	22° 55'.7 N	217° 20'.2	23° 01'.0 N	259° 07'.4	12° 47'.1 N	103° 03'.7	2° 16'.0 S
01	309° 31'.0	202° 21'.8	55'.4	232° 20'.8	01'.2	274° 09'.5	47'.2	118° 06'.0	16'.1
02	324° 33'.5	217° 20'.9	55'.2	247° 21'.4	01'.4	289° 11'.7	47'.3	133° 08'.3	16'.2
03	339° 36'.0	232° 20'.1	54'.9	262° 22'.0	01'.5	304° 13'.8	47'.4	148° 10'.7	16'.2
04	354° 38'.4	247° 19'.2	54'.6	277° 22'.6	01'.7	319° 16'.0	47'.5	163° 13'.0	16'.3
05	9° 40'.9	262° 18'.4	54'.4	292° 23'.2	01'.9	334° 18'.1	47'.6	178° 15'.4	16'.3
06	24° 43'.4	277° 17'.5	54'.1	307° 23'.8	02'.1	349° 20'.3	47'.7	193° 17'.7	16'.4
07	39° 45'.8	292° 16'.7	53'.8	322° 24'.4	02'.3	4° 22'.4	47'.8	208° 20'.1	16'.5
08	54° 48'.3	307° 15'.8	53'.6	337° 25'.0	02'.4	19° 24'.6	47'.9	223° 22'.4	16'.5
09	69° 50'.7	322° 15'.0	53'.3	352° 25'.6	02'.6	34° 26'.7	48'.0	238° 24'.7	16'.6
10	84° 53'.2	337° 14'.1	53'.0	7° 26'.2	02'.8	49° 28'.9	48'.1	253° 27'.1	16'.7
11	99° 55'.7	352° 13'.2	52'.7	22° 26'.8	03'.0	64° 31'.0	48'.2	268° 29'.4	16'.7
12	114° 58'.1	7° 12'.4	22° 52'.5 N	37° 27'.4	23° 03'.2 N	79° 33'.2	12° 48'.3 N	283° 31'.8	2° 16'.8 S
13	130° 00'.6	22° 11'.5	52'.2	52° 28'.0	03'.3	94° 35'.3	48'.4	298° 34'.1	16'.8
14	145° 03'.1	37° 10'.7	51'.9	67° 28'.6	03'.5	109° 37'.5	48'.5	313° 36'.4	16'.9
15	160° 05'.5	52° 09'.8	51'.6	82° 29'.2	03'.7	124° 39'.6	48'.6	328° 38'.8	17'.0
16	175° 08'.0	67° 09'.0	51'.3	97° 29'.8	03'.9	139° 41'.8	48'.7	343° 41'.1	17'.0
17	190° 10'.5	82° 08'.1	51'.0	112° 30'.4	04'.1	154° 43'.9	48'.8	358° 43'.5	17'.1
18	205° 12'.9	97° 07'.3	50'.8	127° 31'.0	04'.2	169° 46'.1	48'.9	13° 45'.8	17'.2
19	220° 15'.4	112° 06'.4	50'.5	142° 31'.6	04'.4	184° 48'.2	49'.0	28° 48'.1	17'.2
20	235° 17'.8	127° 05'.6	50'.2	157° 32'.2	04'.6	199° 50'.4	49'.1	43° 50'.5	17'.3
21	250° 20'.3	142° 04'.7	49'.9	172° 32'.8	04'.8	214° 52'.5	49'.2	58° 52'.8	17'.3
22	265° 22'.8	157° 03'.9	49'.6	187° 33'.4	04'.9	229° 54'.7	49'.3	73° 55'.2	17'.4
23	280° 25'.2	172° 03'.0	49'.3	202° 34'.1	05'.1	244° 56'.8	49'.4	88° 57'.5	17'.5
	M.P. 04:21	v -0'.9	d 0'.2	v 0'.6	d 0'.2	v 2'.1	d 0'.1	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.2 S
Achernar	335° 27'.7	57° 10'.3 S
Acrux	173° 11'.1	63° 10'.2 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.9	55° 54'.0 N
Alkaid	152° 59'.9	49° 15'.5 N
Alnair	27° 45'.0	46° 54'.0 S
Alnilam	275° 48'.0	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.8	29° 09'.3 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.9	42° 14'.2 S
Antares	112° 27'.6	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.2	69° 03'.0 S
Avior	234° 19'.3	59° 32'.9 S
Bellatrix	278° 33'.7	6° 21'.6 N
Betelgeuse	271° 03'.1	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.1 S
Capella	280° 36'.8	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.4 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.1	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.5 N
Elnath	278° 14'.6	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.4 N
Enif	33° 48'.2	9° 55'.8 N
Fomalhaut	15° 25'.2	29° 33'.4 S
Gacrux	172° 02'.6	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.8	60° 26'.0 S
Hamal	328° 02'.3	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.4	74° 06'.7 N
Markab	13° 39'.5	15° 16'.2 N
Menkar	314° 16'.6	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 46'.1 S
Mirfak	308° 42'.6	49° 53'.9 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.6 S
Polaris	318° 35'.4	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.2 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.6	8° 11'.3 S
Rigil Kent	139° 53'.3	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.0	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	254° 13'.8	11:30
Mars	283° 36'.3	09:31
Jupiter	324° 46'.5	06:46
Saturn	168° 37'.9	17:09

SUN				
GHA	Dec	GHA	v	Dec	d	HP
178° 31'.4	21° 36'.5 N	2° 28'.0	9'.2	19° 53'.3 S	7'.2	57'.1
193° 31'.3	36'.1	16° 56'.2	9'.2	46'.1	7'.4	
208° 31'.3	35'.7	31° 24'.4	9'.3	38'.7	7'.4	57'.0
223° 31'.2	35'.3	45° 52'.7	9'.4	31'.3	7'.5	
238° 31'.2	34'.9	60° 21'.1	9'.5	23'.8	7'.7	
253° 31'.1	34'.6	74° 49'.6	9'.5	16'.1	7'.7	
268° 31'.0	34'.2	89° 18'.1	9'.6	08'.4	7'.9	56'.9
283° 31'.0	33'.8	103° 46'.7	9'.8	00'.5	7'.9	
298° 30'.9	33'.4	118° 15'.5	9'.8	18° 52'.6 S	8'.0	
313° 30'.8	33'.0	132° 44'.3	9'.8	44'.6	8'.1	
328° 30'.8	32'.6	147° 13'.1	10'.0	36'.5	8'.2	56'.8
343° 30'.7	32'.2	161° 42'.1	10'.1	28'.3	8'.3	
358° 30'.6	21° 31'.8 N	176° 11'.2	10'.1	18° 20'.0 S	8'.4	56'.8
13° 30'.6	31'.4	190° 40'.3	10'.2	11'.6	8'.5	
28° 30'.5	31'.0	205° 09'.5	10'.3	03'.1	8'.6	56'.7
43° 30'.5	30'.6	219° 38'.8	10'.4	17° 54'.5 S	8'.6	
58° 30'.4	30'.2	234° 08'.2	10'.4	45'.9	8'.8	
73° 30'.3	29'.8	248° 37'.6	10'.6	37'.1	8'.8	
88° 30'.3	29'.5	263° 07'.2	10'.6	28'.3	8'.9	56'.6
103° 30'.2	29'.1	277° 36'.8	10'.7	19'.4	9'.0	
118° 30'.1	28'.7	292° 06'.5	10'.8	10'.4	9'.0	
133° 30'.1	28'.3	306° 36'.3	10'.8	01'.4	9'.2	
148° 30'.0	27'.9	321° 06'.1	11'.0	16° 52'.2 S	9'.2	56'.5
163° 30'.0	27'.5	335° 36'.1	11'.0	43'.0	9'.3	
178° 29'.9	21° 27'.1 N	350° 06'.1	11'.1	16° 33'.7 S	9'.3	56'.5
193° 29'.8	26'.7	4° 36'.2	11'.2	24'.4	9'.5	
208° 29'.8	26'.3	19° 06'.4	11'.3	14'.9	9'.5	
223° 29'.7	25'.9	33° 36'.7	11'.3	05'.4	9'.6	56'.4
238° 29'.7	25'.5	48° 07'.0	11'.5	15° 55'.8 S	9'.6	
253° 29'.6	25'.0	62° 37'.5	11'.5	46'.2	9'.8	
268° 29'.5	24'.6	77° 08'.0	11'.6	36'.4	9'.8	
283° 29'.5	24'.2	91° 38'.6	11'.7	26'.6	9'.8	56'.3
298° 29'.4	23'.8	106° 09'.3	11'.7	16'.8	9'.9	
313° 29'.4	23'.4	120° 40'.0	11'.8	06'.9	10'.0	
328° 29'.3	23'.0	135° 10'.8	11'.9	14° 56'.9 S	10'.1	
343° 29'.2	22'.6	149° 41'.7	12'.0	46'.8	10'.1	56'.2
358° 29'.2	21° 22'.2 N	164° 12'.7	12'.1	14° 36'.7 S	10'.2	56'.2
13° 29'.1	21'.8	178° 43'.8	12'.1	26'.5	10'.2	
28° 29'.1	21'.4	193° 14'.9	12'.2	16'.3	10'.3	
43° 29'.0	21'.0	207° 46'.1	12'.3	06'.0	10'.3	56'.1
58° 29'.0	20'.6	222° 17'.4	12'.4	13° 55'.7 S	10'.4	
73° 28'.9	20'.2	236° 48'.8	12'.4	45'.3	10'.5	
88° 28'.8	19'.7	251° 20'.2	12'.5	34'.8	10'.5	
103° 28'.8	19'.3	265° 51'.7	12'.6	24'.3	10'.6	56'.0
118° 28'.7	18'.9	280° 23'.3	12'.7	13'.7	10'.6	
133° 28'.7	18'.5	294° 55'.0	12'.7	03'.1	10'.7	
148° 28'.6	18'.1	309° 26'.7	12'.8	12° 52'.4 S	10'.7	
163° 28'.6	17'.7	323° 58'.5	12'.8	41'.7	10'.8	55'.9
178° 28'.5	21° 17'.3 N	338° 30'.3	13'.0	12° 30'.9 S	10'.8	55'.9
193° 28'.5	16'.9	353° 02'.3	13'.0	20'.1	10'.9	
208° 28'.4	16'.4	7° 34'.3	13'.1	09'.2	10'.9	
223° 28'.3	16'.0	22° 06'.4	13'.1	11° 58'.3 S	10'.9	55'.8
238° 28'.3	15'.6	36° 38'.5	13'.2	47'.4	11'.0	
253° 28'.2	15'.2	51° 10'.7	13'.3	36'.4	11'.1	
268° 28'.2	14'.8	65° 43'.0	13'.4	25'.3	11'.0	
283° 28'.1	14'.3	80° 15'.4	13'.4	14'.3	11'.2	
298° 28'.1	13'.9	94° 47'.8	13'.4	03'.1	11'.1	55'.7
313° 28'.0	13'.5	109° 20'.2	13'.6	10° 52'.0 S	11'.2	
328° 28'.0	13'.1	123° 52'.8	13'.6	40'.8	11'.2	
343° 27'.9	12'.7	138° 25'.4	13'.6	29'.6	11'.3	
358° 27'.9	21° 12'.2 N	152° 58'.0	13'.8	10° 18'.3 S	11'.3	55'.6
13° 27'.8	11'.8	167° 30'.8	13'.8	07'.0	11'.4	
28° 27'.8	11'.4	182° 03'.6	13'.8	9° 55'.6 S	11'.3	
43° 27'.7	11'.0	196° 36'.4	13'.9	44'.3	11'.4	
58° 27'.7	10'.5	211° 09'.3	14'.0	32'.9	11'.5	55'.5
73° 27'.6	10'.1	225° 42'.3	14'.0	21'.4	11'.4	
88° 27'.6	09'.7	240° 15'.3	14'.1	10'.0	11'.5	
103° 27'.5	09'.3	254° 48'.4	14'.1	8° 58'.5 S	11'.6	
118° 27'.5	08'.8	269° 21'.5	14'.2	46'.9	11'.5	
133° 27'.4	08'.4	283° 54'.7	14'.3	35'.4	11'.6	55'.4
148° 27'.4	08'.0	298° 28'.0	14'.3	23'.8	11'.6	
163° 27'.3	07'.5	313° 01'.3	14'.3	12'.2	11'.6	
SD 15'.7	d 0'.4	SD	15'.5	15'.3	15'.2	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 15	Moonrise 16	Moonrise 17
N 72°	-	-	-	23:11	22:23	21:56
N 70°	-	-	-	22:23	22:00	21:43
68°	-	-	-	21:52	21:42	21:33
66°	-	-	01:38	21:29	21:27	21:25
64°	-	-	02:17	21:11	21:15	21:18
62°	-	00:54	02:44	20:55	21:05	21:11
60°	-	01:47	03:05	20:43	20:56	21:06
N 58°	-	02:17	03:22	20:32	20:48	21:01
56°	00:50	02:40	03:36	20:22	20:41	20:57
54°	01:38	02:58	03:48	20:13	20:35	20:53
52°	02:06	03:13	03:59	20:06	20:30	20:50
50°	02:28	03:26	04:08	19:59	20:25	20:46
45°	03:06	03:52	04:28	19:44	20:14	20:39
N 40°	03:33	04:12	04:44	19:32	20:05	20:34
35°	03:53	04:29	04:58	19:21	19:57	20:29
30°	04:10	04:43	05:09	19:12	19:50	20:24
20°	04:37	05:05	05:29	18:56	19:38	20:16
N 10°	04:57	05:24	05:47	18:42	19:27	20:10
0°	05:14	05:40	06:02	18:29	19:18	20:03
S 10°	05:30	05:56	06:18	18:16	19:08	19:57
20°	05:44	06:11	06:35	18:02	18:57	19:50
30°	05:59	06:28	06:54	17:46	18:45	19:42
35°	06:06	06:38	07:05	17:36	18:38	19:37
40°	06:15	06:48	07:18	17:25	18:30	19:32
45°	06:24	07:00	07:33	17:13	18:20	19:26
S 50°	06:34	07:14	07:51	16:57	18:09	19:19
52°	06:38	07:21	08:00	16:50	18:04	19:16
54°	06:43	07:28	08:09	16:42	17:58	19:12
56°	06:48	07:35	08:20	16:33	17:51	19:08
58°	06:54	07:44	08:33	16:22	17:44	19:03
S 60°	07:00	07:54	08:47	16:10	17:35	18:58
S 62°	07:07	08:05	09:05	15:56	17:26	18:52

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 15	Moonset 16	Moonset 17
N 72°	-	-	-	-	02:28	04:56
N 70°	-	-	-	-	03:15	05:18
68°	-	-	-	01:41	03:45	05:34
66°	22:30	-	-	02:20	04:07	05:47
64°	21:53	-	-	02:47	04:24	05:58
62°	21:26	23:12	-	03:08	04:39	06:07
60°	21:06	22:23	-	03:25	04:51	06:15
N 58°	20:49	21:53	-	03:39	05:01	06:22
56°	20:35	21:31	23:17	03:51	05:10	06:28
54°	20:23	21:13	22:32	04:02	05:18	06:33
52°	20:13	20:58	22:04	04:11	05:25	06:38
50°	20:03	20:45	21:43	04:19	05:32	06:43
45°	19:43	20:19	21:06	04:37	05:45	06:52
N 40°	19:28	19:59	20:39	04:51	05:56	07:00
35°	19:14	19:43	20:18	05:04	06:06	07:07
30°	19:02	19:29	20:02	05:14	06:14	07:13
20°	18:43	19:07	19:35	05:32	06:29	07:23
N 10°	18:26	18:48	19:15	05:48	06:41	07:32
0°	18:10	18:32	18:58	06:02	06:53	07:40
S 10°	17:54	18:16	18:42	06:17	07:04	07:48
20°	17:37	18:01	18:28	06:32	07:16	07:57
30°	17:18	17:44	18:13	06:50	07:30	08:06
35°	17:07	17:35	18:06	07:00	07:38	08:12
40°	16:54	17:24	17:58	07:12	07:47	08:18
45°	16:40	17:12	17:49	07:25	07:58	08:26
S 50°	16:21	16:58	17:39	07:42	08:11	08:34
52°	16:13	16:52	17:35	07:50	08:17	08:39
54°	16:03	16:45	17:30	07:58	08:23	08:43
56°	15:52	16:37	17:25	08:08	08:30	08:48
58°	15:40	16:28	17:19	08:19	08:39	08:53
S 60°	15:25	16:19	17:13	08:31	08:48	08:59
S 62°	15:08	16:07	17:06	08:46	08:58	09:06

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
15	5 54	5 57	12:06	24:41	12:16	14d Full
16	6 00	6 03	12:06	00:41	13:05	15d 98%
17	6 06	6 08	12:06	01:29	13:52	16d 95%

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2011 July 18, 19, 20 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.4		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
18 00	295° 27'.7	187° 02'.2	22° 49'.0 N	217° 34'.7	23° 05'.3 N	259° 59'.0	12° 49'.5 N	103° 59'.8	2° 17'.5 S
01	310° 30'.2	202° 01'.3	48'.7	232° 35'.3	05'.5	275° 01'.1	49'.6	119° 02'.2	17'.6
02	325° 32'.6	217° 00'.5	48'.4	247° 35'.9	05'.6	290° 03'.3	49'.7	134° 04'.5	17'.7
03	340° 35'.1	231° 59'.6	48'.1	262° 36'.5	05'.8	305° 05'.4	49'.8	149° 06'.9	17'.7
04	355° 37'.6	246° 58'.8	47'.9	277° 37'.1	06'.0	320° 07'.6	49'.9	164° 09'.2	17'.8
05	10° 40'.0	261° 57'.9	47'.6	292° 37'.7	06'.1	335° 09'.7	50'.0	179° 11'.5	17'.8
06	25° 42'.5	276° 57'.1	47'.3	307° 38'.3	06'.3	350° 11'.9	50'.1	194° 13'.9	17'.9
07	40° 45'.0	291° 56'.2	47'.0	322° 38'.9	06'.5	5° 14'.0	50'.2	209° 16'.2	18'.0
08	55° 47'.4	306° 55'.4	46'.7	337° 39'.5	06'.7	20° 16'.2	50'.3	224° 18'.6	18'.0
09	70° 49'.9	321° 54'.5	46'.4	352° 40'.1	06'.8	35° 18'.3	50'.3	239° 20'.9	18'.1
10	85° 52'.3	336° 53'.7	46'.1	7° 40'.7	07'.0	50° 20'.5	50'.4	254° 23'.2	18'.2
11	100° 54'.8	351° 52'.8	45'.7	22° 41'.3	07'.2	65° 22'.6	50'.5	269° 25'.6	18'.2
12	115° 57'.3	6° 52'.0	22° 45'.4 N	37° 41'.9	23° 07'.3 N	80° 24'.8	12° 50'.6 N	284° 27'.9	2° 18'.3 S
13	130° 59'.7	21° 51'.1	45'.1	52° 42'.5	07'.5	95° 26'.9	50'.7	299° 30'.3	18'.3
14	146° 02'.2	36° 50'.3	44'.8	67° 43'.1	07'.7	110° 29'.1	50'.8	314° 32'.6	18'.4
15	161° 04'.7	51° 49'.4	44'.5	82° 43'.7	07'.9	125° 31'.3	50'.9	329° 34'.9	18'.5
16	176° 07'.1	66° 48'.6	44'.2	97° 44'.3	08'.0	140° 33'.4	51'.0	344° 37'.3	18'.5
17	191° 09'.6	81° 47'.7	43'.9	112° 44'.9	08'.2	155° 35'.6	51'.1	359° 39'.6	18'.6
18	206° 12'.1	96° 46'.9	43'.6	127° 45'.5	08'.4	170° 37'.7	51'.2	14° 41'.9	18'.7
19	221° 14'.5	111° 46'.0	43'.3	142° 46'.1	08'.5	185° 39'.9	51'.3	29° 44'.3	18'.7
20	236° 17'.0	126° 45'.2	43'.0	157° 46'.7	08'.7	200° 42'.0	51'.4	44° 46'.6	18'.8
21	251° 19'.5	141° 44'.3	42'.6	172° 47'.3	08'.9	215° 44'.2	51'.5	59° 49'.0	18'.9
22	266° 21'.9	156° 43'.5	42'.3	187° 48'.0	09'.0	230° 46'.3	51'.6	74° 51'.3	18'.9
23	281° 24'.4	171° 42'.6	42'.0	202° 48'.6	09'.2	245° 48'.5	51'.7	89° 53'.6	19'.0
19 00	296° 26'.8	186° 41'.8	22° 41'.7 N	217° 49'.2	23° 09'.4 N	260° 50'.7	12° 51'.8 N	104° 56'.0	2° 19'.0 S
01	311° 29'.3	201° 40'.9	41'.4	232° 49'.8	09'.5	275° 52'.8	51'.9	119° 58'.3	19'.1
02	326° 31'.8	216° 40'.1	41'.0	247° 50'.4	09'.7	290° 55'.0	52'.0	135° 00'.6	19'.2
03	341° 34'.2	231° 39'.2	40'.7	262° 51'.0	09'.9	305° 57'.1	52'.1	150° 03'.0	19'.2
04	356° 36'.7	246° 38'.4	40'.4	277° 51'.6	10'.0	320° 59'.3	52'.1	165° 05'.3	19'.3
05	11° 39'.2	261° 37'.6	40'.1	292° 52'.2	10'.2	336° 01'.4	52'.2	180° 07'.6	19'.4
06	26° 41'.6	276° 36'.7	39'.7	307° 52'.8	10'.3	351° 03'.6	52'.3	195° 10'.0	19'.4
07	41° 44'.1	291° 35'.9	39'.4	322° 53'.4	10'.5	6° 05'.8	52'.4	210° 12'.3	19'.5
08	56° 46'.6	306° 35'.0	39'.1	337° 54'.0	10'.7	21° 07'.9	52'.5	225° 14'.7	19'.6
09	71° 49'.0	321° 34'.2	38'.8	352° 54'.6	10'.8	36° 10'.1	52'.6	240° 17'.0	19'.6
10	86° 51'.5	336° 33'.3	38'.4	7° 55'.2	11'.0	51° 12'.2	52'.7	255° 19'.3	19'.7
11	101° 53'.9	351° 32'.5	38'.1	22° 55'.8	11'.2	66° 14'.4	52'.8	270° 21'.7	19'.8
12	116° 56'.4	6° 31'.6	22° 37'.8 N	37° 56'.4	23° 11'.3 N	81° 16'.6	12° 52'.9 N	285° 24'.0	2° 19'.8 S
13	131° 58'.9	21° 30'.8	37'.4	52° 57'.0	11'.5	96° 18'.7	53'.0	300° 26'.3	19'.9
14	147° 01'.3	36° 30'.0	37'.1	67° 57'.6	11'.6	111° 20'.9	53'.1	315° 28'.7	20'.0
15	162° 03'.8	51° 29'.1	36'.8	82° 58'.2	11'.8	126° 23'.0	53'.2	330° 31'.0	20'.0
16	177° 06'.3	66° 28'.3	36'.4	97° 58'.8	12'.0	141° 25'.2	53'.3	345° 33'.3	20'.1
17	192° 08'.7	81° 27'.4	36'.1	112° 59'.5	12'.1	156° 27'.4	53'.4	0° 35'.7	20'.1
18	207° 11'.2	96° 26'.6	35'.7	128° 00'.1	12'.3	171° 29'.5	53'.5	15° 38'.0	20'.2
19	222° 13'.7	111° 25'.7	35'.4	143° 00'.7	12'.4	186° 31'.7	53'.5	30° 40'.3	20'.3
20	237° 16'.1	126° 24'.9	35'.0	158° 01'.3	12'.6	201° 33'.8	53'.6	45° 42'.7	20'.3
21	252° 18'.6	141° 24'.1	34'.7	173° 01'.9	12'.8	216° 36'.0	53'.7	60° 45'.0	20'.4
22	267° 21'.1	156° 23'.2	34'.4	188° 02'.5	12'.9	231° 38'.2	53'.8	75° 47'.3	20'.5
23	282° 23'.5	171° 22'.4	34'.0	203° 03'.1	13'.1	246° 40'.3	53'.9	90° 49'.7	20'.5
20 00	297° 26'.0	186° 21'.5	22° 33'.7 N	218° 03'.7	23° 13'.2 N	261° 42'.5	12° 54'.0 N	105° 52'.0	2° 20'.6 S
01	312° 28'.4	201° 20'.7	33'.3	233° 04'.3	13'.4	276° 44'.7	54'.1	120° 54'.3	20'.7
02	327° 30'.9	216° 19'.8	33'.0	248° 04'.9	13'.5	291° 46'.8	54'.2	135° 56'.7	20'.7
03	342° 33'.4	231° 19'.0	32'.6	263° 05'.5	13'.7	306° 49'.0	54'.3	150° 59'.0	20'.8
04	357° 35'.8	246° 18'.2	32'.3	278° 06'.1	13'.8	321° 51'.1	54'.4	166° 01'.3	20'.9
05	12° 38'.3	261° 17'.3	31'.9	293° 06'.7	14'.0	336° 53'.3	54'.5	181° 03'.7	20'.9
06	27° 40'.8	276° 16'.5	31'.6	308° 07'.3	14'.2	351° 55'.5	54'.6	196° 06'.0	21'.0
07	42° 43'.2	291° 15'.7	31'.2	323° 07'.9	14'.3	6° 57'.6	54'.6	211° 08'.3	21'.1
08	57° 45'.7	306° 14'.8	30'.8	338° 08'.5	14'.5	21° 59'.8	54'.7	226° 10'.7	21'.1
09	72° 48'.2	321° 14'.0	30'.5	353° 09'.2	14'.6	37° 02'.0	54'.8	241° 13'.0	21'.2
10	87° 50'.6	336° 13'.1	30'.1	8° 09'.8	14'.8	52° 04'.1	54'.9	256° 15'.3	21'.3
11	102° 53'.1	351° 12'.3	29'.8	23° 10'.4	14'.9	67° 06'.3	55'.0	271° 17'.7	21'.3
12	117° 55'.5	6° 11'.5	22° 29'.4 N	38° 11'.0	23° 15'.1 N	82° 08'.5	12° 55'.1 N	286° 20'.0	2° 21'.4 S
13	132° 58'.0	21° 10'.6	29'.0	53° 11'.6	15'.2	97° 10'.6	55'.2	301° 22'.3	21'.5
14	148° 00'.5	36° 09'.8	28'.7	68° 12'.2	15'.4	112° 12'.8	55'.3	316° 24'.7	21'.5
15	163° 02'.9	51° 08'.9	28'.3	83° 12'.8	15'.5	127° 15'.0	55'.4	331° 27'.0	21'.6
16	178° 05'.4	66° 08'.1	28'.0	98° 13'.4	15'.7	142° 17'.1	55'.5	346° 29'.3	21'.7
17	193° 07'.9	81° 07'.3	27'.6	113° 14'.0	15'.8	157° 19'.3	55'.6	1° 31'.6	21'.7
18	208° 10'.3	96° 06'.4	27'.2	128° 14'.6	16'.0	172° 21'.5	55'.6	16° 34'.0	21'.8
19	223° 12'.8	111° 05'.6	26'.8	143° 15'.2	16'.1	187° 23'.6	55'.7	31° 36'.3	21'.9
20	238° 15'.3	126° 04'.8	26'.5	158° 15'.8	16'.3	202° 25'.8	55'.8	46° 38'.6	21'.9
21	253° 17'.7	141° 03'.9	26'.1	173° 16'.4	16'.4	217° 28'.0	55'.9	61° 41'.0	22'.0
22	268° 20'.2	156° 03'.1	25'.7	188° 17'.0	16'.6	232° 30'.1	56'.0	76° 43'.3	22'.1
23	283° 22'.7	171° 02'.3	25'.4	203° 17'.6	16'.7	247° 32'.3	56'.1	91° 45'.6	22'.1
	M.P. 04:10	v -0'.8	d 0'.3	v 0'.6	d 0'.2	v 2'.2	d 0'.1	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.5	40° 15'.2 S
Achernar	335° 27'.7	57° 10'.3 S
Acrux	173° 11'.1	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.2	16° 31'.9 N
Alioth	166° 21'.9	55° 54'.0 N
Alkaid	152° 59'.9	49° 15'.5 N
Alnair	27° 45'.0	46° 54'.0 S
Alnilam	275° 48'.0	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 11'.9	26° 40'.7 N
Alpheratz	357° 44'.8	29° 09'.3 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.8	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.3	69° 03'.0 S
Avior	234° 19'.3	59° 32'.9 S
Bellatrix	278° 33'.7	6° 21'.6 N
Betelgeuse	271° 03'.0	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.1 S
Capella	280° 36'.8	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.4 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.1	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.4 N
Elnath	278° 14'.6	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.4 N
Enif	33° 48'.1	9° 55'.8 N
Fomalhaut	15° 25'.2	29° 33'.3 S
Gacrux	172° 02'.6	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.8	60° 26'.0 S
Hamal	328° 02'.3	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.5	74° 06'.7 N
Markab	13° 39'.5	15° 16'.2 N
Menkar	314° 16'.6	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 46'.1 S
Mirfak	308° 42'.5	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.6 S
Polaris	318° 34'.1	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.6	8° 11'.3 S
Rigil Kent	139° 53'.4	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 42'.0	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.5 S

	SHA	Mer.Pass.
Venus	250° 14'.9	11:34
Mars	281° 22'.3	09:28
Jupiter	324° 23'.8	06:36
Saturn	168° 29'.1	16:58

SUN

GHA	Dec
178° 27'.3	21° 07'.1 N
193° 27'.2	06'.7
208° 27'.2	06'.2
223° 27'.1	05'.8
238° 27'.1	05'.4
253° 27'.0	05'.0
268° 27'.0	04'.5
283° 26'.9	04'.1
298° 26'.9	03'.6
313° 26'.8	03'.2
328° 26'.8	02'.8
343° 26'.7	02'.3
358° 26'.7	21° 01'.9 N
13° 26'.6	01'.5
28° 26'.6	01'.0
43° 26'.5	00'.6
58° 26'.5	00'.1
73° 26'.4	20° 59'.7 N
88° 26'.4	59'.3
103° 26'.3	58'.8
118° 26'.3	58'.4
133° 26'.3	57'.9
148° 26'.2	57'.5
163° 26'.2	57'.0
178° 26'.1	20° 56'.6 N
193° 26'.1	56'.2
208° 26'.0	55'.7
223° 26'.0	55'.3
238° 25'.9	54'.8
253° 25'.9	54'.4
268° 25'.9	53'.9
283° 25'.8	53'.5
298° 25'.8	53'.0
313° 25'.7	52'.6
328° 25'.7	52'.1
343° 25'.7	51'.7
358° 25'.6	20° 51'.2 N
13° 25'.6	50'.8
28° 25'.5	50'.3
43° 25'.5	49'.8
58° 25'.4	49'.4
73° 25'.4	48'.9
88° 25'.4	48'.5
103° 25'.3	48'.0
118° 25'.3	47'.6
133° 25'.2	47'.1
148° 25'.2	46'.7
163° 25'.2	46'.2
178° 25'.1	20° 45'.7 N
193° 25'.1	45'.3
208° 25'.1	44'.8
223° 25'.0	44'.4
238° 25'.0	43'.9
253° 24'.9	43'.4
268° 24'.9	43'.0
283° 24'.9	42'.5
298° 24'.8	42'.0
313° 24'.8	41'.6
328° 24'.8	41'.1
343° 24'.7	40'.6
358° 24'.7	20° 40'.2 N
13° 24'.6	39'.7
28° 24'.6	39'.2
43° 24'.6	38'.8
58° 24'.5	38'.3
73° 24'.5	37'.8
88° 24'.5	37'.4
103° 24'.4	36'.9
118° 24'.4	36'.4
133° 24'.4	35'.9
148° 24'.3	35'.5
163° 24'.3	35'.0
SD 15'.7	d 0'.5

MOON

GHA	v	Dec	d	HP
327° 34'.6	14'.4	8° 00'.6 S	11'.7	55'.4
342° 08'.0	14'.5	7° 48'.9 S	11'.7	55'.3
356° 41'.5	14'.5	37'.2	11'.7	
11° 15'.0	14'.6	25'.5	11'.7	
25° 48'.6	14'.6	13'.8	11'.7	
40° 22'.2	14'.6	02'.1	11'.8	
54° 55'.8	14'.7	6° 50'.3 S	11'.8	55'.2
69° 29'.5	14'.8	38'.5	11'.8	
84° 03'.3	14'.8	26'.7	11'.8	
98° 37'.1	14'.8	14'.9	11'.8	
113° 10'.9	14'.9	03'.1	11'.8	
127° 44'.8	14'.9	5° 51'.3 S	11'.9	55'.1
142° 18'.7	15'.0	5° 39'.4 S	11'.9	55'.1
156° 52'.7	15'.0	27'.5	11'.9	
171° 26'.7	15'.1	15'.6	11'.9	
186° 00'.8	15'.1	03'.7	11'.9	
200° 34'.9	15'.1	4° 51'.8 S	11'.9	55'.0
215° 09'.0	15'.2	39'.9	11'.9	
229° 43'.2	15'.2	28'.0	12'.0	
244° 17'.4	15'.2	16'.0	11'.9	
258° 51'.6	15'.3	04'.1	12'.0	
273° 25'.9	15'.3	3° 52'.1 S	11'.9	
288° 00'.2	15'.3	40'.2	12'.0	54'.9
302° 34'.5	15'.4	28'.2	11'.9	
317° 08'.9	15'.4	3° 16'.3 S	12'.0	54'.9
331° 43'.3	15'.5	04'.3	12'.0	
346° 17'.8	15'.4	2° 52'.3 S	12'.0	
0° 52'.2	15'.5	40'.3	12'.0	54'.8
15° 26'.7	15'.5	28'.3	11'.9	
30° 01'.2	15'.6	16'.4	12'.0	
44° 35'.8	15'.6	04'.4	12'.0	
59° 10'.4	15'.6	1° 52'.4 S	12'.0	
73° 45'.0	15'.6	40'.4	12'.0	
88° 19'.6	15'.7	28'.4	11'.9	54'.7
102° 54'.3	15'.6	16'.5	12'.0	
117° 28'.9	15'.7	04'.5	12'.0	
132° 03'.6	15'.7	0° 52'.5 S	12'.0	54'.7
146° 38'.3	15'.8	40'.5	11'.9	
161° 13'.1	15'.7	28'.6	12'.0	
175° 47'.8	15'.8	16'.6	11'.9	
190° 22'.6	15'.8	04'.7	12'.0	54'.6
204° 57'.4	15'.8	0° 07'.3 N	11'.9	
219° 32'.2	15'.8	19'.2	11'.9	
234° 07'.0	15'.8	31'.1	12'.0	
248° 41'.8	15'.9	43'.1	11'.9	
263° 16'.7	15'.8	55'.0	11'.9	
277° 51'.5	15'.9	1° 06'.9 N	11'.8	
292° 26'.4	15'.9	18'.7	11'.9	54'.5
307° 01'.3	15'.9	1° 30'.6 N	11'.9	54'.5
321° 36'.2	15'.9	42'.5	11'.8	
336° 11'.1	15'.9	54'.3	11'.9	
350° 46'.0	15'.9	2° 06'.2 N	11'.8	
5° 20'.9	15'.9	18'.0	11'.8	
19° 55'.8	16'.0	29'.8	11'.8	
34° 30'.8	15'.9	41'.6	11'.8	
49° 05'.7	15'.9	53'.4	11'.7	
63° 40'.6	16'.0	3° 05'.1 N	11'.8	54'.4
78° 15'.6	15'.9	16'.9	11'.7	
92° 50'.5	16'.0	28'.6	11'.7	
107° 25'.5	15'.9	40'.3	11'.7	
122° 00'.4	15'.9	3° 52'.0 N	11'.6	54'.4
136° 35'.3	16'.0	4° 03'.6 N	11'.7	
151° 10'.3	15'.9	15'.3	11'.6	
165° 45'.2	15'.9	26'.9	11'.6	
180° 20'.1	16'.0	38'.5	11'.6	
194° 55'.1	15'.9	50'.1	11'.5	
209° 30'.0	15'.9	5° 01'.6 N	11'.6	54'.3
224° 04'.9	15'.9	13'.2	11'.5	
238° 39'.8	15'.9	24'.7	11'.5	
253° 14'.7	15'.9	36'.2	11'.4	
267° 49'.6	15'.9	47'.6	11'.4	
282° 24'.5	15'.9	59'.0	11'.4	
SD 15'.0		14'.9	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 18	Moonrise 19	Moonrise 20
N 72°	-	-	-	21:35	21:17	20:58
N 70°	-	-	-	21:30	21:18	21:06
68°	-	-	00:41	21:26	21:19	21:12
66°	-	-	01:51	21:22	21:20	21:17
64°	-	-	02:26	21:19	21:20	21:21
62°	-	01:13	02:51	21:16	21:21	21:25
60°	-	01:57	03:11	21:14	21:21	21:29
N 58°	-	02:25	03:27	21:12	21:22	21:32
56°	01:07	02:46	03:40	21:10	21:22	21:35
54°	01:47	03:03	03:52	21:08	21:23	21:37
52°	02:13	03:18	04:02	21:07	21:23	21:39
50°	02:33	03:30	04:12	21:05	21:23	21:41
45°	03:10	03:55	04:31	21:02	21:24	21:46
N 40°	03:36	04:15	04:47	21:00	21:25	21:49
35°	03:56	04:31	05:00	20:58	21:25	21:53
30°	04:12	04:44	05:11	20:56	21:26	21:56
20°	04:38	05:06	05:30	20:52	21:27	22:01
N 10°	04:58	05:25	05:47	20:49	21:27	22:05
0°	05:15	05:41	06:03	20:46	21:28	22:09
S 10°	05:30	05:56	06:18	20:43	21:29	22:14
20°	05:44	06:11	06:34	20:40	21:30	22:18
30°	05:58	06:27	06:53	20:37	21:31	22:23
35°	06:05	06:36	07:04	20:35	21:31	22:26
40°	06:13	06:46	07:16	20:33	21:32	22:30
45°	06:22	06:58	07:31	20:30	21:32	22:34
S 50°	06:31	07:12	07:48	20:27	21:33	22:39
52°	06:35	07:18	07:57	20:25	21:34	22:41
54°	06:40	07:25	08:06	20:24	21:34	22:43
56°	06:45	07:32	08:16	20:22	21:35	22:46
58°	06:50	07:40	08:28	20:20	21:35	22:49
S 60°	06:56	07:50	08:42	20:18	21:36	22:53
S 62°	07:03	08:01	08:59	20:16	21:37	22:56

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 18	Moonset 19	Moonset 20
N 72°	-	-	-	06:56	08:46	10:33
N 70°	-	-	-	07:07	08:49	10:28
68°	23:21	-	-	07:15	08:50	10:24
66°	22:18	-	-	07:22	08:52	10:20
64°	21:44	-	-	07:27	08:53	10:17
62°	21:20	22:55	-	07:32	08:54	10:15
60°	21:00	22:13	-	07:37	08:55	10:13
N 58°	20:45	21:46	-	07:40	08:56	10:11
56°	20:31	21:25	23:01	07:44	08:57	10:09
54°	20:20	21:08	22:23	07:47	08:58	10:08
52°	20:09	20:54	21:58	07:49	08:58	10:06
50°	20:00	20:41	21:38	07:52	08:59	10:05
45°	19:41	20:16	21:02	07:57	09:00	10:02
N 40°	19:26	19:57	20:36	08:02	09:01	10:00
35°	19:13	19:41	20:16	08:05	09:02	09:58
30°	19:01	19:28	20:00	08:09	09:03	09:56
20°	18:42	19:06	19:34	08:14	09:04	09:53
N 10°	18:25	18:48	19:14	08:19	09:05	09:50
0°	18:10	18:32	18:58	08:24	09:06	09:48
S 10°	17:55	18:17	18:43	08:29	09:08	09:45
20°	17:38	18:02	18:29	08:34	09:09	09:43
30°	17:20	17:46	18:15	08:39	09:10	09:40
35°	17:09	17:37	18:08	08:42	09:11	09:38
40°	16:57	17:26	18:00	08:46	09:11	09:36
45°	16:42	17:15	17:51	08:50	09:12	09:34
S 50°	16:25	17:01	17:42	08:55	09:13	09:31
52°	16:16	16:55	17:38	08:57	09:14	09:30
54°	16:07	16:48	17:33	08:59	09:14	09:29
56°	15:57	16:41	17:28	09:02	09:15	09:27
58°	15:45	16:33	17:23	09:05	09:16	09:25
S 60°	15:31	16:23	17:17	09:08	09:16	09:24
S 62°	15:14	16:12	17:10	09:12	09:17	09:21

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
18	6 11	6 13	12:06	02:14	14:35	17d 89%
19	6 15	6 17	12:06	02:56	15:17	18d 83%
20	6 19	6 21	12:06	03:38	15:59	19d 75%

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2011 July 21, 22, 23 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.4		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
21 Thursday 00	298° 25'.1	186° 01'.4	22° 25'.0 N	218° 18'.3	23° 16'.9 N	262° 34'.5	12° 56'.2 N	106° 48'.0	2° 22'.2 S
01	313° 27'.6	201° 00'.6	24'.6	233° 18'.9	17'.0	277° 36'.6	56'.3	121° 50'.3	22'.3
02	328° 30'.0	215° 59'.8	24'.2	248° 19'.5	17'.2	292° 38'.8	56'.4	136° 52'.6	22'.3
03	343° 32'.5	230° 58'.9	23'.9	263° 20'.1	17'.3	307° 41'.0	56'.5	151° 55'.0	22'.4
04	358° 35'.0	245° 58'.1	23'.5	278° 20'.7	17'.5	322° 43'.1	56'.5	166° 57'.3	22'.5
05	13° 37'.4	260° 57'.3	23'.1	293° 21'.3	17'.6	337° 45'.3	56'.6	181° 59'.6	22'.5
06	28° 39'.9	275° 56'.4	22'.7	308° 21'.9	17'.8	352° 47'.5	56'.7	197° 01'.9	22'.6
07	43° 42'.4	290° 55'.6	22'.3	323° 22'.5	17'.9	7° 49'.7	56'.8	212° 04'.3	22'.7
08	58° 44'.8	305° 54'.8	21'.9	338° 23'.1	18'.0	22° 51'.8	56'.9	227° 06'.6	22'.7
09	73° 47'.3	320° 53'.9	21'.6	353° 23'.7	18'.2	37° 54'.0	57'.0	242° 08'.9	22'.8
10	88° 49'.8	335° 53'.1	21'.2	8° 24'.3	18'.3	52° 56'.2	57'.1	257° 11'.3	22'.9
11	103° 52'.2	350° 52'.3	20'.8	23° 24'.9	18'.5	67° 58'.3	57'.2	272° 13'.6	22'.9
12	118° 54'.7	5° 51'.4	22° 20'.4 N	38° 25'.5	23° 18'.6 N	83° 00'.5	12° 57'.3 N	287° 15'.9	2° 23'.0 S
13	133° 57'.2	20° 50'.6	20'.0	53° 26'.2	18'.8	98° 02'.7	57'.3	302° 18'.2	23'.1
14	148° 59'.6	35° 49'.8	19'.6	68° 26'.8	18'.9	113° 04'.9	57'.4	317° 20'.6	23'.1
15	164° 02'.1	50° 48'.9	19'.2	83° 27'.4	19'.1	128° 07'.0	57'.5	332° 22'.9	23'.2
16	179° 04'.5	65° 48'.1	18'.8	98° 28'.0	19'.2	143° 09'.2	57'.6	347° 25'.2	23'.3
17	194° 07'.0	80° 47'.3	18'.4	113° 28'.6	19'.3	158° 11'.4	57'.7	2° 27'.6	23'.3
18	209° 09'.5	95° 46'.4	18'.0	128° 29'.2	19'.5	173° 13'.5	57'.8	17° 29'.9	23'.4
19	224° 11'.9	110° 45'.6	17'.6	143° 29'.8	19'.6	188° 15'.7	57'.9	32° 32'.2	23'.5
20	239° 14'.4	125° 44'.8	17'.2	158° 30'.4	19'.8	203° 17'.9	58'.0	47° 34'.5	23'.5
21	254° 16'.9	140° 44'.0	16'.8	173° 31'.0	19'.9	218° 20'.1	58'.0	62° 36'.9	23'.6
22	269° 19'.3	155° 43'.1	16'.4	188° 31'.6	20'.0	233° 22'.2	58'.1	77° 39'.2	23'.7
23	284° 21'.8	170° 42'.3	16'.0	203° 32'.2	20'.2	248° 24'.4	58'.2	92° 41'.5	23'.7
22 Friday 00	299° 24'.3	185° 41'.5	22° 15'.6 N	218° 32'.8	23° 20'.3 N	263° 26'.6	12° 58'.3 N	107° 43'.8	2° 23'.8 S
01	314° 26'.7	200° 40'.6	15'.2	233° 33'.4	20'.5	278° 28'.8	58'.4	122° 46'.2	23'.9
02	329° 29'.2	215° 39'.8	14'.8	248° 34'.1	20'.6	293° 30'.9	58'.5	137° 48'.5	23'.9
03	344° 31'.6	230° 39'.0	14'.4	263° 34'.7	20'.7	308° 33'.1	58'.6	152° 50'.8	24'.0
04	359° 34'.1	245° 38'.2	14'.0	278° 35'.3	20'.9	323° 35'.3	58'.7	167° 53'.1	24'.1
05	14° 36'.6	260° 37'.3	13'.6	293° 35'.9	21'.0	338° 37'.5	58'.7	182° 55'.5	24'.1
06	29° 39'.0	275° 36'.5	13'.2	308° 36'.5	21'.1	353° 39'.6	58'.8	197° 57'.8	24'.2
07	44° 41'.5	290° 35'.7	12'.8	323° 37'.1	21'.3	8° 41'.8	58'.9	213° 00'.1	24'.3
08	59° 44'.0	305° 34'.8	12'.4	338° 37'.7	21'.4	23° 44'.0	59'.0	228° 02'.5	24'.4
09	74° 46'.4	320° 34'.0	12'.0	353° 38'.3	21'.6	38° 46'.2	59'.1	243° 04'.8	24'.4
10	89° 48'.9	335° 33'.2	11'.6	8° 38'.9	21'.7	53° 48'.3	59'.2	258° 07'.1	24'.5
11	104° 51'.4	350° 32'.4	11'.1	23° 39'.5	21'.8	68° 50'.5	59'.3	273° 09'.4	24'.6
12	119° 53'.8	5° 31'.5	22° 10'.7 N	38° 40'.1	23° 22'.0 N	83° 52'.7	12° 59'.4 N	288° 11'.8	2° 24'.6 S
13	134° 56'.3	20° 30'.7	10'.3	53° 40'.8	22'.1	98° 54'.9	59'.4	303° 14'.1	24'.7
14	149° 58'.8	35° 29'.9	09'.9	68° 41'.4	22'.2	113° 57'.1	59'.5	318° 16'.4	24'.8
15	165° 01'.2	50° 29'.1	09'.5	83° 42'.0	22'.4	128° 59'.2	59'.6	333° 18'.7	24'.8
16	180° 03'.7	65° 28'.3	09'.1	98° 42'.6	22'.5	144° 01'.4	59'.7	348° 21'.1	24'.9
17	195° 06'.1	80° 27'.4	08'.6	113° 43'.2	22'.6	159° 03'.6	59'.8	3° 23'.4	25'.0
18	210° 08'.6	95° 26'.6	08'.2	128° 43'.8	22'.8	174° 05'.8	59'.9	18° 25'.7	25'.0
19	225° 11'.1	110° 25'.8	07'.8	143° 44'.4	22'.9	189° 07'.9	13° 00'.0 N	33° 28'.0	25'.1
20	240° 13'.5	125° 25'.0	07'.4	158° 45'.0	23'.0	204° 10'.1	00'.0	48° 30'.4	25'.2
21	255° 16'.0	140° 24'.1	06'.9	173° 45'.6	23'.2	219° 12'.3	00'.1	63° 32'.7	25'.2
22	270° 18'.5	155° 23'.3	06'.5	188° 46'.2	23'.3	234° 14'.5	00'.2	78° 35'.0	25'.3
23	285° 20'.9	170° 22'.5	06'.1	203° 46'.8	23'.4	249° 16'.7	00'.3	93° 37'.3	25'.4
23 Saturday 00	300° 23'.4	185° 21'.7	22° 05'.6 N	218° 47'.5	23° 23'.5 N	264° 18'.8	13° 00'.4 N	108° 39'.6	2° 25'.5 S
01	315° 25'.9	200° 20'.9	05'.2	233° 48'.1	23'.7	279° 21'.0	00'.5	123° 42'.0	25'.5
02	330° 28'.3	215° 20'.0	04'.8	248° 48'.7	23'.8	294° 23'.2	00'.6	138° 44'.3	25'.6
03	345° 30'.8	230° 19'.2	04'.4	263° 49'.3	23'.9	309° 25'.4	00'.6	153° 46'.6	25'.7
04	0° 33'.3	245° 18'.4	03'.9	278° 49'.9	24'.1	324° 27'.6	00'.7	168° 48'.9	25'.7
05	15° 35'.7	260° 17'.6	03'.5	293° 50'.5	24'.2	339° 29'.7	00'.8	183° 51'.3	25'.8
06	30° 38'.2	275° 16'.8	03'.0	308° 51'.1	24'.3	354° 31'.9	00'.9	198° 53'.6	25'.9
07	45° 40'.6	290° 15'.9	02'.6	323° 51'.7	24'.5	9° 34'.1	01'.0	213° 55'.9	25'.9
08	60° 43'.1	305° 15'.1	02'.2	338° 52'.3	24'.6	24° 36'.3	01'.1	228° 58'.2	26'.0
09	75° 45'.6	320° 14'.3	01'.7	353° 52'.9	24'.7	39° 38'.5	01'.2	244° 00'.6	26'.1
10	90° 48'.0	335° 13'.5	01'.3	8° 53'.6	24'.8	54° 40'.7	01'.2	259° 02'.9	26'.1
11	105° 50'.5	350° 12'.7	00'.8	23° 54'.2	25'.0	69° 42'.8	01'.3	274° 05'.2	26'.2
12	120° 53'.0	5° 11'.8	22° 00'.4 N	38° 54'.8	23° 25'.1 N	84° 45'.0	13° 01'.4 N	289° 07'.5	2° 26'.3 S
13	135° 55'.4	20° 11'.0	00'.0	53° 55'.4	25'.2	99° 47'.2	01'.5	304° 09'.8	26'.4
14	150° 57'.9	35° 10'.2	21° 59'.5 N	68° 56'.0	25'.3	114° 49'.4	01'.6	319° 12'.2	26'.4
15	166° 00'.4	50° 09'.4	59'.1	83° 56'.6	25'.5	129° 51'.6	01'.7	334° 14'.5	26'.5
16	181° 02'.8	65° 08'.6	58'.6	98° 57'.2	25'.6	144° 53'.8	01'.7	349° 16'.8	26'.6
17	196° 05'.3	80° 07'.8	58'.2	113° 57'.8	25'.7	159° 55'.9	01'.8	4° 19'.1	26'.6
18	211° 07'.7	95° 06'.9	57'.7	128° 58'.4	25'.8	174° 58'.1	01'.9	19° 21'.4	26'.7
19	226° 10'.2	110° 06'.1	57'.3	143° 59'.1	26'.0	190° 00'.3	02'.0	34° 23'.8	26'.8
20	241° 12'.7	125° 05'.3	56'.8	158° 59'.7	26'.1	205° 02'.5	02'.1	49° 26'.1	26'.8
21	256° 15'.1	140° 04'.5	56'.4	174° 00'.3	26'.2	220° 04'.7	02'.2	64° 28'.4	26'.9
22	271° 17'.6	155° 03'.7	55'.9	189° 00'.9	26'.3	235° 06'.9	02'.2	79° 30'.7	27'.0
23	286° 20'.1	170° 02'.9	55'.5	204° 01'.5	26'.4	250° 09'.1	02'.3	94° 33'.1	27'.1
	M.P. 03:58	v -0'.8	d 0'.4	v 0'.6	d 0'.1	v 2'.2	d 0'.1	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.2 S
Achernar	335° 27'.7	57° 10'.3 S
Acrux	173° 11'.2	63° 10'.1 S
Adhara	255° 14'.0	28° 59'.3 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.9	55° 54'.0 N
Alkaid	152° 59'.9	49° 15'.6 N
Alnair	27° 44'.9	46° 54'.0 S
Alnilam	275° 48'.0	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.7 N
Alpheratz	357° 44'.7	29° 09'.3 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.8	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.3	69° 03'.0 S
Avior	234° 19'.3	59° 32'.9 S
Bellatrix	278° 33'.7	6° 21'.6 N
Betelgeuse	271° 03'.0	7° 24'.5 N
Canopus	263° 57'.3	52° 42'.0 S
Capella	280° 36'.8	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.4 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.1	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.4 N
Elnath	278° 14'.6	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.2	29° 33'.3 S
Gacrux	172° 02'.7	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.8	60° 26'.0 S
Hamal	328° 02'.3	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.5	74° 06'.7 N
Markab	13° 39'.4	15° 16'.2 N
Menkar	314° 16'.5	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 46'.1 S
Mirfak	308° 42'.5	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.7 S
Polaris	318° 32'.8	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.5	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.6	8° 11'.2 S
Rigil Kent	139° 53'.4	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.9	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	246° 17'.2	11:38
Mars	279° 08'.6	09:25
Jupiter	324° 02'.3	06:25
Saturn	168° 19'.6	16:46

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 24'.3	20° 34'.5 N	296° 59'.4	15'.8	6° 10'.4 N	11'.4	54'.3
193° 24'.2	34'.0	311° 34'.2	15'.9	21'.8	11'.4	
208° 24'.2	33'.6	326° 09'.1	15'.8	33'.2	11'.3	
223° 24'.2	33'.1	340° 43'.9	15'.8	44'.5	11'.3	
238° 24'.1	32'.6	355° 18'.7	15'.8	55'.8	11'.3	
253° 24'.1	32'.1	9° 53'.5	15'.8	7° 07'.1 N	11'.2	
268° 24'.1	31'.7	24° 28'.3	15'.8	18'.3	11'.2	
283° 24'.0	31'.2	39° 03'.1	15'.7	29'.5	11'.2	
298° 24'.0	30'.7	53° 37'.8	15'.8	40'.7	11'.1	
313° 24'.0	30'.2	68° 12'.6	15'.7	51'.8	11'.1	
328° 24'.0	29'.7	82° 47'.3	15'.7	8° 02'.9 N	11'.1	
343° 23'.9	29'.3	97° 22'.0	15'.7	14'.0	11'.0	54'.2
358° 23'.9	20° 28'.8 N	111° 56'.7	15'.6	8° 25'.0 N	11'.0	54'.2
13° 23'.9	28'.3	126° 31'.3	15'.6	36'.0	11'.0	
28° 23'.8	27'.8	141° 05'.9	15'.7	47'.0	10'.9	
43° 23'.8	27'.3	155° 40'.6	15'.5	57'.9	10'.9	
58° 23'.8	26'.8	170° 15'.1	15'.6	9° 08'.8 N	10'.9	
73° 23'.7	26'.4	184° 49'.7	15'.5	19'.7	10'.8	
88° 23'.7	25'.9	199° 24'.2	15'.5	30'.5	10'.8	
103° 23'.7	25'.4	213° 58'.7	15'.5	41'.3	10'.7	
118° 23'.7	24'.9	228° 33'.2	15'.5	52'.0	10'.7	
133° 23'.6	24'.4	243° 07'.7	15'.4	10° 02'.7 N	10'.7	
148° 23'.6	23'.9	257° 42'.1	15'.4	13'.4	10'.6	
163° 23'.6	23'.4	272° 16'.5	15'.3	24'.0	10'.6	
178° 23'.5	20° 23'.0 N	286° 50'.8	15'.4	10° 34'.6 N	10'.6	54'.2
193° 23'.5	22'.5	301° 25'.2	15'.3	45'.2	10'.5	
208° 23'.5	22'.0	315° 59'.5	15'.2	55'.7	10'.4	
223° 23'.5	21'.5	330° 33'.7	15'.3	11° 06'.1 N	10'.4	
238° 23'.4	21'.0	345° 08'.0	15'.2	16'.5	10'.4	
253° 23'.4	20'.5	359° 42'.2	15'.1	26'.9	10'.3	
268° 23'.4	20'.0	14° 16'.3	15'.1	37'.2	10'.3	
283° 23'.4	19'.5	28° 50'.4	15'.1	47'.5	10'.2	
298° 23'.3	19'.0	43° 24'.5	15'.1	57'.7	10'.2	
313° 23'.3	18'.5	57° 58'.6	15'.0	12° 07'.9 N	10'.2	
328° 23'.3	18'.0	72° 32'.6	14'.9	18'.1	10'.0	
343° 23'.3	17'.5	87° 06'.5	15'.0	28'.1	10'.1	54'.3
358° 23'.2	20° 17'.0 N	101° 40'.5	14'.9	12° 38'.2 N	10'.0	54'.3
13° 23'.2	16'.5	116° 14'.4	14'.8	48'.2	9'.9	
28° 23'.2	16'.0	130° 48'.2	14'.8	58'.1	9'.9	
43° 23'.2	15'.5	145° 22'.0	14'.8	13° 08'.0 N	9'.8	
58° 23'.1	15'.1	159° 55'.8	14'.7	17'.8	9'.8	
73° 23'.1	14'.6	174° 29'.5	14'.7	27'.6	9'.8	
88° 23'.1	14'.1	189° 03'.2	14'.6	37'.4	9'.7	
103° 23'.1	13'.6	203° 36'.8	14'.6	47'.1	9'.6	
118° 23'.0	13'.1	218° 10'.4	14'.5	56'.7	9'.6	
133° 23'.0	12'.6	232° 43'.9	14'.5	14° 06'.3 N	9'.5	
148° 23'.0	12'.0	247° 17'.4	14'.5	15'.8	9'.4	
163° 23'.0	11'.5	261° 50'.9	14'.3	25'.2	9'.4	
178° 23'.0	20° 11'.0 N	276° 24'.2	14'.4	14° 34'.6 N	9'.4	54'.3
193° 22'.9	10'.5	290° 57'.6	14'.3	44'.0	9'.3	
208° 22'.9	10'.0	305° 30'.9	14'.2	53'.3	9'.2	
223° 22'.9	09'.5	320° 04'.1	14'.2	15° 02'.5 N	9'.2	
238° 22'.9	09'.0	334° 37'.3	14'.2	11'.7	9'.1	54'.4
253° 22'.9	08'.5	349° 10'.5	14'.1	20'.8	9'.0	
268° 22'.8	08'.0	3° 43'.6	14'.0	29'.8	9'.0	
283° 22'.8	07'.5	18° 16'.6	14'.0	38'.8	8'.9	
298° 22'.8	07'.0	32° 49'.6	13'.9	47'.7	8'.9	
313° 22'.8	06'.5	47° 22'.5	13'.9	56'.6	8'.8	
328° 22'.8	06'.0	61° 55'.4	13'.8	16° 05'.4 N	8'.7	
343° 22'.7	05'.5	76° 28'.2	13'.8	14'.1	8'.7	
358° 22'.7	20° 05'.0 N	91° 01'.0	13'.7	16° 22'.8 N	8'.6	54'.4
13° 22'.7	04'.5	105° 33'.7	13'.6	31'.4	8'.5	
28° 22'.7	03'.9	120° 06'.3	13'.6	39'.9	8'.5	54'.5
43° 22'.7	03'.4	134° 38'.9	13'.5	48'.4	8'.4	
58° 22'.6	02'.9	149° 11'.4	13'.5	56'.8	8'.3	
73° 22'.6	02'.4	163° 43'.9	13'.4	17° 05'.1 N	8'.3	
88° 22'.6	01'.9	178° 16'.3	13'.4	13'.4	8'.2	
103° 22'.6	01'.4	192° 48'.7	13'.3	21'.6	8'.1	
118° 22'.6	00'.9	207° 21'.0	13'.2	29'.7	8'.1	
133° 22'.6	00'.3	221° 53'.2	13'.2	37'.8	7'.9	
148° 22'.5	19° 59'.8 N	236° 25'.4	13'.1	45'.7	7'.9	54'.6
163° 22'.5	59'.3	250° 57'.5	13'.1	53'.6	7'.9	
SD 15'.7	d 0'.5	SD	14'.8	14'.8	14'.8	

MOON						
GHA	v	Dec	d	HP
296° 59'.4	15'.8	6° 10'.4 N	11'.4	54'.3
311° 34'.2	15'.9	21'.8	11'.4	
326° 09'.1	15'.8	33'.2	11'.3	
340° 43'.9	15'.8	44'.5	11'.3	
355° 18'.7	15'.8	55'.8	11'.3	
9° 53'.5	15'.8	7° 07'.1 N	11'.2	
24° 28'.3	15'.8	18'.3	11'.2	
39° 03'.1	15'.7	29'.5	11'.2	
53° 37'.8	15'.8	40'.7	11'.1	
68° 12'.6	15'.7	51'.8	11'.1	
82° 47'.3	15'.7	8° 02'.9 N	11'.1	
97° 22'.0	15'.7	14'.0	11'.0	54'.2
111° 56'.7	15'.6	8° 25'.0 N	11'.0	54'.2
126° 31'.3	15'.6	36'.0	11'.0	
141° 05'.9	15'.7	47'.0	10'.9	
155° 40'.6	15'.5	57'.9	10'.9	
170° 15'.1	15'.6	9° 08'.8 N	10'.9	
184° 49'.7	15'.5	19'.7	10'.8	
199° 24'.2	15'.5	30'.5	10'.8	
213° 58'.7	15'.5	41'.3	10'.7	
228° 33'.2	15'.5	52'.0	10'.7	
243° 07'.7	15'.4	10° 02'.7 N	10'.7	
257° 42'.1	15'.4	13'.4	10'.6	
272° 16'.5	15'.3	24'.0	10'.6	
286° 50'.8	15'.4	10° 34'.6 N	10'.6	54'.2
301° 25'.2	15'.3	45'.2	10'.5	
315° 59'.5	15'.2	55'.7	10'.4	
330° 33'.7	15'.3	11° 06'.1 N	10'.4	
345° 08'.0	15'.2	16'.5	10'.4	
359° 42'.2	15'.1	26'.9	10'.3	
14° 16'.3	15'.1	37'.2	10'.3	
28° 50'.4	15'.1	47'.5	10'.2	
43° 24'.5	15'.1	57'.7	10'.2	
57° 58'.6	15'.0	12° 07'.9 N	10'.2	
72° 32'.6	14'.9	18'.1	10'.0	
87° 06'.5	15'.0	28'.1	10'.1	54'.3
101° 40'.5	14'.9	12° 38'.2 N	10'.0	54'.3
116° 14'.4	14'.8	48'.2	9'.9	
130° 48'.2	14'.8	58'.1	9'.9	
145° 22'.0	14'.8	13° 08'.0 N	9'.8	
159° 55'.8	14'.7	17'.8	9'.8	
174° 29'.5	14'.7	27'.6	9'.8	
189° 03'.2	14'.6	37'.4	9'.7	
203° 36'.8	14'.6	47'.1	9'.6	
218° 10'.4	14'.5	56'.7	9'.6	
232° 43'.9	14'.5	14° 06'.3 N	9'.5	
247° 17'.4	14'.5	15'.8	9'.4	
261° 50'.9	14'.3	25'.2	9'.4	
276° 24'.2	14'.4	14° 34'.6 N	9'.4	54'.3
290° 57'.6	14'.3	44'.0	9'.3	
305° 30'.9	14'.2	53'.3	9'.2	
320° 04'.1	14'.2	15° 02'.5 N	9'.2	
334° 37'.3	14'.2	11'.7	9'.1	54'.4
349° 10'.5	14'.1	20'.8	9'.0	
3° 43'.6	14'.0	29'.8	9'.0	
18° 16'.6	14'.0	38'.8	8'.9	
32° 49'.6	13'.9	47'.7	8'.9	
47° 22'.5	13'.9	56'.6	8'.8	
61° 55'.4	13'.8	16° 05'.4 N	8'.7	
76° 28'.2	13'.8	14'.1	8'.7	
91° 01'.0	13'.7	16° 22'.8 N	8'.6	54'.4
105° 33'.7	13'.6	31'.4	8'.5	
120° 06'.3	13'.6	39'.9	8'.5	54'.5
134° 38'.9	13'.5	48'.4	8'.4	
149° 11'.4	13'.5	56'.8	8'.3	
163° 43'.9	13'.4	17° 05'.1 N	8'.3	
178° 16'.3	13'.4	13'.4	8'.2	
192° 48'.7	13'.3	21'.6	8'.1	
207° 21'.0	13'.2	29'.7	8'.1	
221° 53'.2	13'.2	37'.8	7'.9	
236° 25'.4	13'.1	45'.7	7'.9	54'.6
250° 57'.5	13'.1	53'.6	7'.9	
SD	14'.8	14'.8	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 21	Moonrise 22	Moonrise 23
N 72°	-	-	-	20:37	20:10	19:15
N 70°	-	-	-	20:52	20:36	20:13
68°	-	-	01:11	21:05	20:57	20:47
66°	-	-	02:04	21:15	21:13	21:12
64°	-	-	02:35	21:23	21:26	21:31
62°	-	01:29	02:59	21:31	21:37	21:47
60°	-	02:06	03:17	21:37	21:47	22:00
N 58°	-	02:32	03:32	21:43	21:56	22:12
56°	01:21	02:52	03:45	21:48	22:03	22:22
54°	01:56	03:09	03:57	21:52	22:10	22:31
52°	02:20	03:22	04:06	21:56	22:16	22:39
50°	02:39	03:34	04:15	22:00	22:21	22:46
45°	03:14	03:59	04:34	22:08	22:33	23:01
N 40°	03:39	04:18	04:49	22:15	22:43	23:14
35°	03:58	04:33	05:02	22:21	22:51	23:25
30°	04:14	04:46	05:13	22:26	22:59	23:35
20°	04:39	05:08	05:32	22:35	23:12	23:51
N 10°	04:59	05:25	05:48	22:43	23:23	24:05
0°	05:15	05:41	06:03	22:51	23:34	24:19
S 10°	05:30	05:55	06:18	22:59	23:45	24:33
20°	05:43	06:10	06:34	23:07	23:56	24:47
30°	05:57	06:26	06:52	23:16	-	00:10
35°	06:04	06:35	07:02	23:22	-	00:17
40°	06:11	06:45	07:14	23:28	-	00:26
45°	06:20	06:56	07:28	23:35	-	00:37
S 50°	06:29	07:09	07:45	23:44	-	00:49
52°	06:33	07:15	07:53	23:48	-	00:55
54°	06:37	07:21	08:02	23:52	-	01:02
56°	06:42	07:28	08:12	23:57	-	01:09
58°	06:

2011 July 24, 25, 26 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.4		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
24 Sunday 00	301° 22'.5	185° 02'.1	21° 55'.0 N	219° 02'.1	23° 26'.6 N	265° 11'.2	13° 02'.4 N	109° 35'.4	2° 27'.1 S
01	316° 25'.0	200° 01'.2	54'.5	234° 02'.7	26'.7	280° 13'.4	02'.5	124° 37'.7	27'.2
02	331° 27'.5	215° 00'.4	54'.1	249° 03'.3	26'.8	295° 15'.6	02'.6	139° 40'.0	27'.3
03	346° 29'.9	229° 59'.6	53'.6	264° 03'.9	26'.9	310° 17'.8	02'.7	154° 42'.3	27'.3
04	1° 32'.4	244° 58'.8	53'.2	279° 04'.6	27'.1	325° 20'.0	02'.7	169° 44'.7	27'.4
05	16° 34'.9	259° 58'.0	52'.7	294° 05'.2	27'.2	340° 22'.2	02'.8	184° 47'.0	27'.5
06	31° 37'.3	274° 57'.2	52'.2	309° 05'.8	27'.3	355° 24'.4	02'.9	199° 49'.3	27'.6
07	46° 39'.8	289° 56'.4	51'.8	324° 06'.4	27'.4	10° 26'.6	03'.0	214° 51'.6	27'.6
08	61° 42'.2	304° 55'.6	51'.3	339° 07'.0	27'.5	25° 28'.7	03'.1	229° 53'.9	27'.7
09	76° 44'.7	319° 54'.7	50'.8	354° 07'.6	27'.6	40° 30'.9	03'.2	244° 56'.2	27'.8
10	91° 47'.2	334° 53'.9	50'.4	9° 08'.2	27'.8	55° 33'.1	03'.2	259° 58'.6	27'.8
11	106° 49'.6	349° 53'.1	49'.9	24° 08'.8	27'.9	70° 35'.3	03'.3	275° 00'.9	27'.9
12	121° 52'.1	4° 52'.3	21° 49'.4 N	39° 09'.4	23° 28'.0 N	85° 37'.5	13° 03'.4 N	290° 03'.2	2° 28'.0 S
13	136° 54'.6	19° 51'.5	49'.0	54° 10'.1	28'.1	100° 39'.7	03'.5	305° 05'.5	28'.1
14	151° 57'.0	34° 50'.7	48'.5	69° 10'.7	28'.2	115° 41'.9	03'.6	320° 07'.8	28'.1
15	166° 59'.5	49° 49'.9	48'.0	84° 11'.3	28'.3	130° 44'.1	03'.6	335° 10'.2	28'.2
16	182° 02'.0	64° 49'.1	47'.6	99° 11'.9	28'.5	145° 46'.3	03'.7	350° 12'.5	28'.3
17	197° 04'.4	79° 48'.3	47'.1	114° 12'.5	28'.6	160° 48'.5	03'.8	5° 14'.8	28'.3
18	212° 06'.9	94° 47'.5	46'.6	129° 13'.1	28'.7	175° 50'.6	03'.9	20° 17'.1	28'.4
19	227° 09'.4	109° 46'.6	46'.1	144° 13'.7	28'.8	190° 52'.8	04'.0	35° 19'.4	28'.5
20	242° 11'.8	124° 45'.8	45'.6	159° 14'.3	28'.9	205° 55'.0	04'.1	50° 21'.8	28'.6
21	257° 14'.3	139° 45'.0	45'.2	174° 15'.0	29'.0	220° 57'.2	04'.1	65° 24'.1	28'.6
22	272° 16'.7	154° 44'.2	44'.7	189° 15'.6	29'.2	235° 59'.4	04'.2	80° 26'.4	28'.7
23	287° 19'.2	169° 43'.4	44'.2	204° 16'.2	29'.3	251° 01'.6	04'.3	95° 28'.7	28'.8
25 Monday 00	302° 21'.7	184° 42'.6	21° 43'.7 N	219° 16'.8	23° 29'.4 N	266° 03'.8	13° 04'.4 N	110° 31'.0	2° 28'.8 S
01	317° 24'.1	199° 41'.8	43'.2	234° 17'.4	29'.5	281° 06'.0	04'.5	125° 33'.3	28'.9
02	332° 26'.6	214° 41'.0	42'.7	249° 18'.0	29'.6	296° 08'.2	04'.5	140° 35'.7	29'.0
03	347° 29'.1	229° 40'.2	42'.3	264° 18'.6	29'.7	311° 10'.4	04'.6	155° 38'.0	29'.1
04	2° 31'.5	244° 39'.4	41'.8	279° 19'.2	29'.8	326° 12'.6	04'.7	170° 40'.3	29'.1
05	17° 34'.0	259° 38'.6	41'.3	294° 19'.9	29'.9	341° 14'.8	04'.8	185° 42'.6	29'.2
06	32° 36'.5	274° 37'.8	40'.8	309° 20'.5	30'.0	356° 17'.0	04'.9	200° 44'.9	29'.3
07	47° 38'.9	289° 37'.0	40'.3	324° 21'.1	30'.2	11° 19'.2	04'.9	215° 47'.2	29'.3
08	62° 41'.4	304° 36'.2	39'.8	339° 21'.7	30'.3	26° 21'.3	05'.0	230° 49'.6	29'.4
09	77° 43'.8	319° 35'.4	39'.3	354° 22'.3	30'.4	41° 23'.5	05'.1	245° 51'.9	29'.5
10	92° 46'.3	334° 34'.6	38'.8	9° 22'.9	30'.5	56° 25'.7	05'.2	260° 54'.2	29'.6
11	107° 48'.8	349° 33'.8	38'.3	24° 23'.5	30'.6	71° 27'.9	05'.3	275° 56'.5	29'.6
12	122° 51'.2	4° 33'.0	21° 37'.8 N	39° 24'.1	23° 30'.7 N	86° 30'.1	13° 05'.3 N	290° 58'.8	2° 29'.7 S
13	137° 53'.7	19° 32'.2	37'.3	54° 24'.8	30'.8	101° 32'.3	05'.4	306° 01'.1	29'.8
14	152° 56'.2	34° 31'.4	36'.8	69° 25'.4	30'.9	116° 34'.5	05'.5	321° 03'.4	29'.8
15	167° 58'.6	49° 30'.6	36'.3	84° 26'.0	31'.0	131° 36'.7	05'.6	336° 05'.8	29'.9
16	183° 01'.1	64° 29'.8	35'.8	99° 26'.6	31'.1	146° 38'.9	05'.7	351° 08'.1	30'.0
17	198° 03'.6	79° 29'.0	35'.3	114° 27'.2	31'.2	161° 41'.1	05'.7	6° 10'.4	30'.1
18	213° 06'.0	94° 28'.2	34'.8	129° 27'.8	31'.3	176° 43'.3	05'.8	21° 12'.7	30'.1
19	228° 08'.5	109° 27'.4	34'.3	144° 28'.4	31'.5	191° 45'.5	05'.9	36° 15'.0	30'.2
20	243° 11'.0	124° 26'.6	33'.8	159° 29'.1	31'.6	206° 47'.7	06'.0	51° 17'.3	30'.3
21	258° 13'.4	139° 25'.8	33'.3	174° 29'.7	31'.7	221° 49'.9	06'.1	66° 19'.7	30'.4
22	273° 15'.9	154° 25'.0	32'.8	189° 30'.3	31'.8	236° 52'.1	06'.1	81° 22'.0	30'.4
23	288° 18'.3	169° 24'.2	32'.3	204° 30'.9	31'.9	251° 54'.3	06'.2	96° 24'.3	30'.5
26 Tuesday 00	303° 20'.8	184° 23'.4	21° 31'.8 N	219° 31'.5	23° 32'.0 N	266° 56'.5	13° 06'.3 N	111° 26'.6	2° 30'.6 S
01	318° 23'.3	199° 22'.6	31'.3	234° 32'.1	32'.1	281° 58'.7	06'.4	126° 28'.9	30'.6
02	333° 25'.7	214° 21'.8	30'.8	249° 32'.7	32'.2	297° 00'.9	06'.4	141° 31'.2	30'.7
03	348° 28'.2	229° 21'.0	30'.3	264° 33'.4	32'.3	312° 03'.1	06'.5	156° 33'.5	30'.8
04	3° 30'.7	244° 20'.2	29'.7	279° 34'.0	32'.4	327° 05'.3	06'.6	171° 35'.9	30'.9
05	18° 33'.1	259° 19'.4	29'.2	294° 34'.6	32'.5	342° 07'.5	06'.7	186° 38'.2	30'.9
06	33° 35'.6	274° 18'.6	28'.7	309° 35'.2	32'.6	357° 09'.7	06'.8	201° 40'.5	31'.0
07	48° 38'.1	289° 17'.8	28'.2	324° 35'.8	32'.7	12° 11'.9	06'.8	216° 42'.8	31'.1
08	63° 40'.5	304° 17'.0	27'.7	339° 36'.4	32'.8	27° 14'.1	06'.9	231° 45'.1	31'.2
09	78° 43'.0	319° 16'.2	27'.2	354° 37'.0	32'.9	42° 16'.3	07'.0	246° 47'.4	31'.2
10	93° 45'.5	334° 15'.4	26'.6	9° 37'.7	33'.0	57° 18'.5	07'.1	261° 49'.7	31'.3
11	108° 47'.9	349° 14'.6	26'.1	24° 38'.3	33'.1	72° 20'.7	07'.1	276° 52'.0	31'.4
12	123° 50'.4	4° 13'.8	21° 25'.6 N	39° 38'.9	23° 33'.2 N	87° 22'.9	13° 07'.2 N	291° 54'.4	2° 31'.5 S
13	138° 52'.8	19° 13'.0	25'.1	54° 39'.5	33'.3	102° 25'.1	07'.3	306° 56'.7	31'.5
14	153° 55'.3	34° 12'.2	24'.6	69° 40'.1	33'.4	117° 27'.3	07'.4	321° 59'.0	31'.6
15	168° 57'.8	49° 11'.4	24'.0	84° 40'.7	33'.5	132° 29'.5	07'.5	337° 01'.3	31'.7
16	184° 00'.2	64° 10'.7	23'.5	99° 41'.4	33'.6	147° 31'.7	07'.5	352° 03'.6	31'.7
17	199° 02'.7	79° 09'.9	23'.0	114° 42'.0	33'.7	162° 33'.9	07'.6	7° 05'.9	31'.8
18	214° 05'.2	94° 09'.1	22'.4	129° 42'.6	33'.8	177° 36'.1	07'.7	22° 08'.2	31'.9
19	229° 07'.6	109° 08'.3	21'.9	144° 43'.2	33'.9	192° 38'.3	07'.8	37° 10'.5	32'.0
20	244° 10'.1	124° 07'.5	21'.4	159° 43'.8	34'.0	207° 40'.5	07'.8	52° 12'.8	32'.0
21	259° 12'.6	139° 06'.7	20'.8	174° 44'.4	34'.1	222° 42'.7	07'.9	67° 15'.2	32'.1
22	274° 15'.0	154° 05'.9	20'.3	189° 45'.0	34'.2	237° 44'.9	08'.0	82° 17'.5	32'.2
23	289° 17'.5	169° 05'.1	19'.8	204° 45'.7	34'.3	252° 47'.1	08'.1	97° 19'.8	32'.3
	M.P. 03:46	v -0'.8	d 0'.5	v 0'.6	d 0'.1	v 2'.2	d 0'.1	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.2 S
Achernar	335° 27'.6	57° 10'.3 S
Acrux	173° 11'.2	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.3 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 21'.9	55° 54'.0 N
Alkaid	152° 59'.9	49° 15'.6 N
Alnair	27° 44'.9	46° 54'.0 S
Alnilam	275° 48'.0	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.7 N
Alpheratz	357° 44'.7	29° 09'.3 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.8	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.3	69° 03'.1 S
Avior	234° 19'.3	59° 32'.9 S
Bellatrix	278° 33'.7	6° 21'.6 N
Betelgeuse	271° 03'.0	7° 24'.5 N
Canopus	263° 57'.2	52° 42'.0 S
Capella	280° 36'.8	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.4 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.1	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.4 N
Elnath	278° 14'.6	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.1	29° 33'.3 S
Gacrux	172° 02'.7	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.8	60° 26'.0 S
Hamal	328° 02'.3	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.6	74° 06'.8 N
Markab	13° 39'.4	15° 16'.2 N
Menkar	314° 16'.5	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.1 S
Mirfak	308° 42'.5	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.7 S
Polaris	318° 31'.2	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.6	8° 11'.2 S
Rigil Kent	139° 53'.4	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.9	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	242° 20'.9	11:42
Mars	276° 55'.1	09:22
Jupiter	323° 42'.1	06:15
Saturn	168° 09'.3	16:35

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 22'.5	19° 58'.8 N	265° 29'.6	13'.0	18° 01'.5 N	7'.7	54'.6
193° 22'.5	58'.3	280° 01'.6	12'.9	09'.2	7'.7	
208° 22'.5	57'.8	294° 33'.5	12'.9	16'.9	7'.6	
223° 22'.5	57'.2	309° 05'.4	12'.8	24'.5	7'.5	
238° 22'.5	56'.7	323° 37'.2	12'.7	32'.0	7'.5	
253° 22'.4	56'.2	338° 08'.9	12'.7	39'.5	7'.3	54'.7
268° 22'.4	55'.7	352° 40'.6	12'.6	46'.8	7'.3	
283° 22'.4	55'.2	7° 12'.2	12'.6	54'.1	7'.2	
298° 22'.4	54'.6	21° 43'.8	12'.5	19° 01'.3 N	7'.2	
313° 22'.4	54'.1	36° 15'.3	12'.4	08'.5	7'.0	
328° 22'.4	53'.6	50° 46'.7	12'.3	15'.5	7'.0	
343° 22'.4	53'.1	65° 18'.0	12'.3	22'.5	6'.8	54'.8
358° 22'.3	19° 52'.5 N	79° 49'.3	12'.2	19° 29'.3 N	6'.8	54'.8
13° 22'.3	52'.0	94° 20'.5	12'.2	36'.1	6'.7	
28° 22'.3	51'.5	108° 51'.7	12'.1	42'.8	6'.7	
43° 22'.3	51'.0	123° 22'.8	12'.0	49'.5	6'.5	
58° 22'.3	50'.4	137° 53'.8	12'.0	56'.0	6'.5	54'.9
73° 22'.3	49'.9	152° 24'.8	11'.9	20° 02'.5 N	6'.3	
88° 22'.3	49'.4	166° 55'.7	11'.8	08'.8	6'.3	
103° 22'.3	48'.9	181° 26'.5	11'.8	15'.1	6'.2	
118° 22'.3	48'.3	195° 57'.3	11'.7	21'.3	6'.1	
133° 22'.2	47'.8	210° 28'.0	11'.6	27'.4	6'.0	55'.0
148° 22'.2	47'.3	224° 58'.6	11'.5	33'.4	5'.9	
163° 22'.2	46'.7	239° 29'.1	11'.5	39'.3	5'.8	
178° 22'.2	19° 46'.2 N	253° 59'.6	11'.5	20° 45'.1 N	5'.7	55'.0
193° 22'.2	45'.7	268° 30'.1	11'.3	50'.8	5'.6	
208° 22'.2	45'.2	283° 00'.4	11'.3	56'.4	5'.6	55'.1
223° 22'.2	44'.6	297° 30'.7	11'.2	21° 02'.0 N	5'.4	
238° 22'.2	44'.1	312° 00'.9	11'.2	07'.4	5'.3	
253° 22'.2	43'.6	326° 31'.1	11'.1	12'.7	5'.3	
268° 22'.2	43'.0	341° 01'.2	11'.0	18'.0	5'.1	
283° 22'.1	42'.5	355° 31'.2	11'.0	23'.1	5'.0	55'.2
298° 22'.1	42'.0	10° 01'.2	10'.9	28'.1	5'.0	
313° 22'.1	41'.4	24° 31'.1	10'.8	33'.1	4'.8	
328° 22'.1	40'.9	39° 00'.9	10'.8	37'.9	4'.8	
343° 22'.1	40'.3	53° 30'.7	10'.7	42'.7	4'.6	55'.3
358° 22'.1	19° 39'.8 N	68° 00'.4	10'.6	21° 47'.3 N	4'.5	55'.3
13° 22'.1	39'.3	82° 30'.0	10'.5	51'.8	4'.4	
28° 22'.1	38'.7	96° 59'.5	10'.5	56'.2	4'.4	
43° 22'.1	38'.2	111° 29'.0	10'.5	22° 00'.6 N	4'.2	55'.4
58° 22'.1	37'.6	125° 58'.5	10'.4	04'.8	4'.1	
73° 22'.1	37'.1	140° 27'.9	10'.3	08'.9	4'.0	
88° 22'.1	36'.6	154° 57'.2	10'.2	12'.9	3'.9	
103° 22'.1	36'.0	169° 26'.4	10'.2	16'.8	3'.8	55'.5
118° 22'.1	35'.5	183° 55'.6	10'.1	20'.6	3'.7	
133° 22'.1	34'.9	198° 24'.7	10'.1	24'.3	3'.5	
148° 22'.1	34'.4	212° 53'.8	9'.9	27'.8	3'.5	
163° 22'.1	33'.9	227° 22'.7	10'.0	31'.3	3'.3	55'.6
178° 22'.0	19° 33'.3 N	241° 51'.7	9'.8	22° 34'.6 N	3'.2	55'.6
193° 22'.0	32'.8	256° 20'.5	9'.8	37'.8	3'.2	
208° 22'.0	32'.2	270° 49'.3	9'.8	41'.0	3'.0	
223° 22'.0	31'.7	285° 18'.1	9'.7	44'.0	2'.8	55'.7
238° 22'.0	31'.1	299° 46'.8	9'.6	46'.8	2'.8	
253° 22'.0	30'.6	314° 15'.4	9'.6	49'.6	2'.7	
268° 22'.0	30'.0	328° 44'.0	9'.5	52'.3	2'.5	55'.8
283° 22'.0	29'.5	343° 12'.5	9'.5	54'.8	2'.4	
298° 22'.0	28'.9	357° 41'.0	9'.4	57'.2	2'.3	
313° 22'.0	28'.4	12° 09'.4	9'.3	59'.5	2'.2	
328° 22'.0	27'.8	26° 37'.7	9'.3	23° 01'.7 N	2'.1	55'.9
343° 22'.0	27'.3	41° 06'.0	9'.2	03'.8	1'.9	
358° 22'.0	19° 26'.7 N	55° 34'.2	9'.2	23° 05'.7 N	1'.8	55'.9
13° 22'.0	26'.2	70° 02'.4	9'.1	07'.5	1'.7	56'.0
28° 22'.0	25'.6	84° 30'.5	9'.1	09'.2	1'.6	
43° 22'.0	25'.1	98° 58'.6	9'.0	10'.8	1'.5	
58° 22'.0	24'.5	113° 26'.6	9'.0	12'.3	1'.3	
73° 22'.0	24'.0	127° 54'.6	8'.9	13'.6	1'.2	56'.1
88° 22'.0	23'.4	142° 22'.5	8'.9	14'.8	1'.1	
103° 22'.0	22'.9	156° 50'.4	8'.8	15'.9	1'.0	
118° 22'.0	22'.3	171° 18'.2	8'.8	16'.9	0'.8	56'.2
133° 22'.0	21'.7	185° 46'.0	8'.7	17'.7	0'.7	
148° 22'.0	21'.2	200° 13'.7	8'.7	18'.4	0'.6	
163° 22'.0	20'.6	214° 41'.4	8'.6	19'.0	0'.4	56'.3
SD 15'.7	d 0'.5	SD	14'.9	15'.1	15'.2	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	-	-	01:33	20:32	-	-
66°	-	-	02:16	21:12	21:18	21:42
64°	-	00:39	02:45	21:40	21:59	22:34
62°	-	01:43	03:06	22:02	22:26	23:07
60°	-	02:16	03:24	22:20	22:48	23:31
N 58°	00:36	02:40	03:38	22:34	23:05	23:50
56°	01:34	02:59	03:50	22:47	23:20	24:06
54°	02:05	03:14	04:01	22:58	23:33	24:20
52°	02:27	03:27	04:11	23:08	23:44	24:32
50°	02:45	03:39	04:19	23:16	23:54	24:42
45°	03:18	04:02	04:37	23:35	-	00:15
N 40°	03:42	04:21	04:52	23:50	-	00:33
35°	04:01	04:36	05:04	-	00:03	00:47
30°	04:16	04:48	05:15	-	00:14	00:59
20°	04:41	05:09	05:33	-	00:34	01:21
N 10°	05:00	05:26	05:48	00:05	00:51	01:40
0°	05:15	05:41	06:03	00:19	01:07	01:57
S 10°	05:29	05:55	06:17	00:33	01:23	02:15
20°	05:43	06:09	06:33	00:47	01:40	02:33
30°	05:55	06:25	06:50	01:04	02:00	02:55
35°	06:02	06:33	07:00	01:14	02:11	03:08
40°	06:09	06:42	07:12	01:25	02:24	03:23
45°	06:17	06:53	07:25	01:39	02:40	03:40
S 50°	06:26	07:05	07:42	01:55	03:00	04:02
52°	06:29	07:11	07:49	02:03	03:09	04:12
54°	06:33	07:17	07:58	02:11	03:20	04:24
56°	06:38	07:24	08:07	02:21	03:31	04:38
58°	06:43	07:32	08:18	02:32	03:45	04:53
S 60°	06:48	07:40	08:31	02:45	04:01	05:12
S 62°	06:53	07:50	08:46	03:00	04:21	05:36

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 24	Moonset 25	Moonset 26
N 72°	-	-	-	-	-	-
N 70°	-	-	-	-	-	-
68°	22:35	-	-	17:06	-	-
66°	21:54	-	-	16:26	18:04	19:29
64°	21:26	23:22	-	15:59	17:24	18:37
62°	21:05	22:26	-	15:38	16:56	18:04
60°	20:48	21:54	-	15:21	16:35	17:41
N 58°	20:34	21:31	23:27	15:07	16:18	17:21
56°	20:21	21:13	22:35	14:55	16:03	17:05
54°	20:11	20:57	22:06	14:44	15:51	16:52
52°	20:01	20:44	21:44	14:35	15:39	16:40
50°	19:53	20:33	21:27	14:26	15:30	16:29
45°	19:35	20:10	20:54	14:08	15:09	16:07
N 40°	19:21	19:52	20:30	13:54	14:52	15:49
35°	19:09	19:37	20:11	13:41	14:38	15:35
30°	18:58	19:24	19:56	13:31	14:26	15:22
20°	18:40	19:04	19:32	13:12	14:05	14:59
N 10°	18:25	18:47	19:13	12:56	13:47	14:40
0°	18:10	18:32	18:58	12:42	13:31	14:22
S 10°	17:56	18:18	18:44	12:27	13:14	14:04
20°	17:41	18:04	18:31	12:11	12:56	13:45
30°	17:23	17:49	18:18	11:53	12:35	13:23
35°	17:13	17:40	18:11	11:42	12:23	13:10
40°	17:02	17:31	18:04	11:30	12:09	12:55
45°	16:48	17:21	17:56	11:16	11:53	12:37
S 50°	16:32	17:08	17:48	10:59	11:33	12:15
52°	16:24	17:02	17:44	10:51	11:23	12:05
54°	16:16	16:56	17:40	10:42	11:12	11:53
56°	16:06	16:49	17:36	10:32	11:00	11:39
58°	15:55	16:42	17:31	10:20	10:46	11:23
S 60°	15:43	16:33	17:26	10:07	10:30	11:04
S 62°	15:28	16:24	17:20	09:51	10:10	10:41

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
24	6 30	6 31	12:07	06:30	18:54	23d 38%
25	6 31	6 32	12:07	07:19	19:44	24d 29%
26	6 32	6 32	12:07	08:10	20:36	25d 20%

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2011 July 27, 28, 29 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.4		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
27 00	304° 20'.0	184° 04'.3	21° 19'.2 N	219° 46'.3	23° 34'.4 N	267° 49'.3	13° 08'.2 N	112° 22'.1	2° 32'.3 S
01	319° 22'.4	199° 03'.5	18'.7	234° 46'.9	34'.5	282° 51'.5	08'.2	127° 24'.4	32'.4
02	334° 24'.9	214° 02'.8	18'.2	249° 47'.5	34'.6	297° 53'.8	08'.3	142° 26'.7	32'.5
03	349° 27'.3	229° 02'.0	17'.6	264° 48'.1	34'.7	312° 56'.0	08'.4	157° 29'.0	32'.6
04	4° 29'.8	244° 01'.2	17'.1	279° 48'.7	34'.7	327° 58'.2	08'.5	172° 31'.3	32'.6
05	19° 32'.3	259° 00'.4	16'.6	294° 49'.4	34'.8	343° 00'.4	08'.5	187° 33'.6	32'.7
06	34° 34'.7	273° 59'.6	16'.0	309° 50'.0	34'.9	358° 02'.6	08'.6	202° 36'.0	32'.8
07	49° 37'.2	288° 58'.8	15'.5	324° 50'.6	35'.0	13° 04'.8	08'.7	217° 38'.3	32'.9
08	64° 39'.7	303° 58'.0	14'.9	339° 51'.2	35'.1	28° 07'.0	08'.8	232° 40'.6	32'.9
09	79° 42'.1	318° 57'.2	14'.4	354° 51'.8	35'.2	43° 09'.2	08'.8	247° 42'.9	33'.0
10	94° 44'.6	333° 56'.5	13'.8	9° 52'.4	35'.3	58° 11'.4	08'.9	262° 45'.2	33'.1
11	109° 47'.1	348° 55'.7	13'.3	24° 53'.1	35'.4	73° 13'.6	09'.0	277° 47'.5	33'.2
12	124° 49'.5	3° 54'.9	21° 12'.7 N	39° 53'.7	23° 35'.5 N	88° 15'.8	13° 09'.1 N	292° 49'.8	2° 33'.2 S
13	139° 52'.0	18° 54'.1	12'.2	54° 54'.3	35'.6	103° 18'.0	09'.1	307° 52'.1	33'.3
14	154° 54'.5	33° 53'.3	11'.6	69° 54'.9	35'.7	118° 20'.2	09'.2	322° 54'.4	33'.4
15	169° 56'.9	48° 52'.5	11'.1	84° 55'.5	35'.8	133° 22'.5	09'.3	337° 56'.7	33'.5
16	184° 59'.4	63° 51'.8	10'.5	99° 56'.1	35'.8	148° 24'.7	09'.4	352° 59'.1	33'.5
17	200° 01'.8	78° 51'.0	10'.0	114° 56'.8	35'.9	163° 26'.9	09'.4	8° 01'.4	33'.6
18	215° 04'.3	93° 50'.2	09'.4	129° 57'.4	36'.0	178° 29'.1	09'.5	23° 03'.7	33'.7
19	230° 06'.8	108° 49'.4	08'.9	144° 58'.0	36'.1	193° 31'.3	09'.6	38° 06'.0	33'.8
20	245° 09'.2	123° 48'.6	08'.3	159° 58'.6	36'.2	208° 33'.5	09'.7	53° 08'.3	33'.8
21	260° 11'.7	138° 47'.8	07'.8	174° 59'.2	36'.3	223° 35'.7	09'.7	68° 10'.6	33'.9
22	275° 14'.2	153° 47'.1	07'.2	189° 59'.9	36'.4	238° 37'.9	09'.8	83° 12'.9	34'.0
23	290° 16'.6	168° 46'.3	06'.6	205° 00'.5	36'.5	253° 40'.1	09'.9	98° 15'.2	34'.1
28 00	305° 19'.1	183° 45'.5	21° 06'.1 N	220° 01'.1	23° 36'.6 N	268° 42'.3	13° 10'.0 N	113° 17'.5	2° 34'.1 S
01	320° 21'.6	198° 44'.7	05'.5	235° 01'.7	36'.6	283° 44'.6	10'.0	128° 19'.8	34'.2
02	335° 24'.0	213° 43'.9	05'.0	250° 02'.3	36'.7	298° 46'.8	10'.1	143° 22'.1	34'.3
03	350° 26'.5	228° 43'.2	04'.4	265° 02'.9	36'.8	313° 49'.0	10'.2	158° 24'.4	34'.4
04	5° 28'.9	243° 42'.4	03'.8	280° 03'.6	36'.9	328° 51'.2	10'.3	173° 26'.7	34'.4
05	20° 31'.4	258° 41'.6	03'.3	295° 04'.2	37'.0	343° 53'.4	10'.3	188° 29'.1	34'.5
06	35° 33'.9	273° 40'.8	02'.7	310° 04'.8	37'.1	358° 55'.6	10'.4	203° 31'.4	34'.6
07	50° 36'.3	288° 40'.0	02'.1	325° 05'.4	37'.1	13° 57'.8	10'.5	218° 33'.7	34'.7
08	65° 38'.8	303° 39'.3	01'.6	340° 06'.0	37'.2	29° 00'.0	10'.5	233° 36'.0	34'.7
09	80° 41'.3	318° 38'.5	01'.0	355° 06'.7	37'.3	44° 02'.3	10'.6	248° 38'.3	34'.8
10	95° 43'.7	333° 37'.7	00'.4	10° 07'.3	37'.4	59° 04'.5	10'.7	263° 40'.6	34'.9
11	110° 46'.2	348° 36'.9	20° 59'.8 N	25° 07'.9	37'.5	74° 06'.7	10'.8	278° 42'.9	35'.0
12	125° 48'.7	3° 36'.2	20° 59'.3 N	40° 08'.5	23° 37'.6 N	89° 08'.9	13° 10'.8 N	293° 45'.2	2° 35'.0 S
13	140° 51'.1	18° 35'.4	58'.7	55° 09'.1	37'.6	104° 11'.1	10'.9	308° 47'.5	35'.1
14	155° 53'.6	33° 34'.6	58'.1	70° 09'.8	37'.7	119° 13'.3	11'.0	323° 49'.8	35'.2
15	170° 56'.1	48° 33'.8	57'.5	85° 10'.4	37'.8	134° 15'.6	11'.1	338° 52'.1	35'.3
16	185° 58'.5	63° 33'.1	57'.0	100° 11'.0	37'.9	149° 17'.8	11'.1	353° 54'.4	35'.4
17	201° 01'.0	78° 32'.3	56'.4	115° 11'.6	38'.0	164° 20'.0	11'.2	8° 56'.7	35'.4
18	216° 03'.4	93° 31'.5	55'.8	130° 12'.2	38'.1	179° 22'.2	11'.3	23° 59'.0	35'.5
19	231° 05'.9	108° 30'.7	55'.2	145° 12'.8	38'.1	194° 24'.4	11'.3	39° 01'.3	35'.6
20	246° 08'.4	123° 30'.0	54'.6	160° 13'.5	38'.2	209° 26'.6	11'.4	54° 03'.6	35'.7
21	261° 10'.8	138° 29'.2	54'.1	175° 14'.1	38'.3	224° 28'.8	11'.5	69° 06'.0	35'.7
22	276° 13'.3	153° 28'.4	53'.5	190° 14'.7	38'.4	239° 31'.1	11'.6	84° 08'.3	35'.8
23	291° 15'.8	168° 27'.7	52'.9	205° 15'.3	38'.4	254° 33'.3	11'.6	99° 10'.6	35'.9
29 00	306° 18'.2	183° 26'.9	20° 52'.3 N	220° 15'.9	23° 38'.5 N	269° 35'.5	13° 11'.7 N	114° 12'.9	2° 36'.0 S
01	321° 20'.7	198° 26'.1	51'.7	235° 16'.6	38'.6	284° 37'.7	11'.8	129° 15'.2	36'.0
02	336° 23'.2	213° 25'.3	51'.1	250° 17'.2	38'.7	299° 39'.9	11'.8	144° 17'.5	36'.1
03	351° 25'.6	228° 24'.6	50'.5	265° 17'.8	38'.8	314° 42'.2	11'.9	159° 19'.8	36'.2
04	6° 28'.1	243° 23'.8	49'.9	280° 18'.4	38'.8	329° 44'.4	12'.0	174° 22'.1	36'.3
05	21° 30'.6	258° 23'.0	49'.3	295° 19'.1	38'.9	344° 46'.6	12'.1	189° 24'.4	36'.3
06	36° 33'.0	273° 22'.3	48'.8	310° 19'.7	39'.0	359° 48'.8	12'.1	204° 26'.7	36'.4
07	51° 35'.5	288° 21'.5	48'.2	325° 20'.3	39'.1	14° 51'.0	12'.2	219° 29'.0	36'.5
08	66° 37'.9	303° 20'.7	47'.6	340° 20'.9	39'.1	29° 53'.3	12'.3	234° 31'.3	36'.6
09	81° 40'.4	318° 20'.0	47'.0	355° 21'.5	39'.2	44° 55'.5	12'.3	249° 33'.6	36'.7
10	96° 42'.9	333° 19'.2	46'.4	10° 22'.2	39'.3	59° 57'.7	12'.4	264° 35'.9	36'.7
11	111° 45'.3	348° 18'.4	45'.8	25° 22'.8	39'.4	74° 59'.9	12'.5	279° 38'.2	36'.8
12	126° 47'.8	3° 17'.7	20° 45'.2 N	40° 23'.4	23° 39'.4 N	90° 02'.1	13° 12'.6 N	294° 40'.5	2° 36'.9 S
13	141° 50'.3	18° 16'.9	44'.6	55° 24'.0	39'.5	105° 04'.4	12'.6	309° 42'.8	37'.0
14	156° 52'.7	33° 16'.1	44'.0	70° 24'.6	39'.6	120° 06'.6	12'.7	324° 45'.1	37'.0
15	171° 55'.2	48° 15'.4	43'.4	85° 25'.3	39'.7	135° 08'.8	12'.8	339° 47'.4	37'.1
16	186° 57'.7	63° 14'.6	42'.8	100° 25'.9	39'.7	150° 11'.0	12'.8	354° 49'.7	37'.2
17	202° 00'.1	78° 13'.8	42'.2	115° 26'.5	39'.8	165° 13'.3	12'.9	9° 52'.0	37'.3
18	217° 02'.6	93° 13'.1	41'.6	130° 27'.1	39'.9	180° 15'.5	13'.0	24° 54'.3	37'.3
19	232° 05'.1	108° 12'.3	41'.0	145° 27'.7	39'.9	195° 17'.7	13'.1	39° 56'.6	37'.4
20	247° 07'.5	123° 11'.6	40'.3	160° 28'.4	40'.0	210° 19'.9	13'.1	54° 58'.9	37'.5
21	262° 10'.0	138° 10'.8	39'.7	175° 29'.0	40'.1	225° 22'.1	13'.2	70° 01'.2	37'.6
22	277° 12'.4	153° 10'.0	39'.1	190° 29'.6	40'.2	240° 24'.4	13'.3	85° 03'.5	37'.7
23	292° 14'.9	168° 09'.3	38'.5	205° 30'.2	40'.2	255° 26'.6	13'.3	100° 05'.8	37'.7
	M.P. 03:34	v -0'.8	d 0'.6	v 0'.6	d 0'.1	v 2'.2	d 0'.1	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.2 S
Achernar	335° 27'.6	57° 10'.3 S
Acrux	173° 11'.2	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.2 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.0	55° 54'.0 N
Alkaid	152° 59'.9	49° 15'.5 N
Alnair	27° 44'.9	46° 54'.0 S
Alnilam	275° 48'.0	1° 11'.7 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.7 N
Alpheratz	357° 44'.7	29° 09'.3 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.8	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.3	69° 03'.1 S
Avior	234° 19'.2	59° 32'.9 S
Bellatrix	278° 33'.7	6° 21'.6 N
Betelgeuse	271° 03'.0	7° 24'.5 N
Canopus	263° 57'.2	52° 42'.0 S
Capella	280° 36'.7	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.4 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.1	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.4 N
Elnath	278° 14'.6	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.1	29° 33'.3 S
Gacrux	172° 02'.7	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.9	60° 26'.0 S
Hamal	328° 02'.3	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.6	74° 06'.8 N
Markab	13° 39'.4	15° 16'.2 N
Menkar	314° 16'.5	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.1 S
Mirfak	308° 42'.4	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.7 S
Polaris	318° 29'.6	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.6	8° 11'.2 S
Rigil Kent	139° 53'.4	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.9	56° 35'.9 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	238° 26'.4	11:46
Mars	274° 42'.0	09:20
Jupiter	323° 23'.3	06:04
Saturn	167° 58'.4	16:24

SUN

GHA	Dec
178° 22'.0	19° 20'.1 N
193° 22'.0	19'.5
208° 22'.0	19'.0
223° 22'.0	18'.4
238° 22'.0	17'.8
253° 22'.0	17'.3
268° 22'.1	16'.7
283° 22'.1	16'.2
298° 22'.1	15'.6
313° 22'.1	15'.0
328° 22'.1	14'.5
343° 22'.1	13'.9
358° 22'.1	19° 13'.3 N
13° 22'.1	12'.8
28° 22'.1	12'.2
43° 22'.1	11'.6
58° 22'.1	11'.1
73° 22'.1	10'.5
88° 22'.1	09'.9
103° 22'.1	09'.4
118° 22'.1	08'.8
133° 22'.1	08'.2
148° 22'.1	07'.7
163° 22'.2	07'.1
178° 22'.2	19° 06'.5 N
193° 22'.2	05'.9
208° 22'.2	05'.4
223° 22'.2	04'.8
238° 22'.2	04'.2
253° 22'.2	03'.7
268° 22'.2	03'.1
283° 22'.2	02'.5
298° 22'.2	01'.9
313° 22'.3	01'.4
328° 22'.3	00'.8
343° 22'.3	00'.2
358° 22'.3	18° 59'.6 N
13° 22'.3	59'.0
28° 22'.3	58'.5
43° 22'.3	57'.9
58° 22'.3	57'.3
73° 22'.3	56'.7
88° 22'.4	56'.1
103° 22'.4	55'.6
118° 22'.4	55'.0
133° 22'.4	54'.4
148° 22'.4	53'.8
163° 22'.4	53'.2
178° 22'.4	18° 52'.6 N
193° 22'.5	52'.1
208° 22'.5	51'.5
223° 22'.5	50'.9
238° 22'.5	50'.3
253° 22'.5	49'.7
268° 22'.5	49'.1
283° 22'.6	48'.5
298° 22'.6	48'.0
313° 22'.6	47'.4
328° 22'.6	46'.8
343° 22'.6	46'.2
358° 22'.6	18° 45'.6 N
13° 22'.7	45'.0
28° 22'.7	44'.4
43° 22'.7	43'.8
58° 22'.7	43'.2
73° 22'.7	42'.6
88° 22'.7	42'.0
103° 22'.8	41'.4
118° 22'.8	40'.8
133° 22'.8	40'.3
148° 22'.8	39'.7
163° 22'.8	39'.1
SD 15'.7	d 0'.6

MOON

GHA	v	Dec	d	HP
229° 09'.0	8'.6	23° 19'.4 N	0'.4	56'.3
243° 36'.6	8'.6	19'.8	0'.2	
258° 04'.2	8'.5	20'.0	0'.0	
272° 31'.7	8'.5	20'.0	0'.0	56'.4
286° 59'.2	8'.4	20'.0	0'.2	
301° 26'.6	8'.4	19'.8	0'.4	
315° 54'.0	8'.3	19'.4	0'.4	56'.5
330° 21'.3	8'.3	19'.0	0'.6	
344° 48'.6	8'.3	18'.4	0'.7	
359° 15'.9	8'.3	17'.7	0'.8	56'.6
13° 43'.2	8'.2	16'.9	1'.0	
28° 10'.4	8'.1	15'.9	1'.1	
42° 37'.5	8'.2	23° 14'.8 N	1'.3	56'.7
57° 04'.7	8'.1	13'.5	1'.3	
71° 31'.8	8'.1	12'.2	1'.6	
85° 58'.9	8'.0	10'.6	1'.6	56'.8
100° 25'.9	8'.1	09'.0	1'.8	
114° 53'.0	8'.0	07'.2	1'.9	
129° 20'.0	7'.9	05'.3	2'.0	
143° 46'.9	8'.0	03'.3	2'.2	56'.9
158° 13'.9	7'.9	01'.1	2'.3	
172° 40'.8	7'.9	22° 58'.8 N	2'.5	
187° 07'.7	7'.9	56'.3	2'.5	57'.0
201° 34'.6	7'.9	53'.8	2'.8	
216° 01'.5	7'.8	22° 51'.0 N	2'.8	57'.0
230° 28'.3	7'.9	48'.2	3'.0	57'.1
244° 55'.2	7'.8	45'.2	3'.1	
259° 22'.0	7'.8	42'.1	3'.3	
273° 48'.8	7'.8	38'.8	3'.4	57'.2
288° 15'.6	7'.7	35'.4	3'.5	
302° 42'.3	7'.8	31'.9	3'.7	
317° 09'.1	7'.7	28'.2	3'.8	57'.3
331° 35'.8	7'.8	24'.4	3'.9	
346° 02'.6	7'.7	20'.5	4'.1	
0° 29'.3	7'.7	16'.4	4'.2	57'.4
14° 56'.0	7'.7	12'.2	4'.3	
29° 22'.7	7'.8	22° 07'.9 N	4'.5	57'.4
43° 49'.5	7'.7	03'.4	4'.6	57'.5
58° 16'.2	7'.7	21° 58'.8 N	4'.7	
72° 42'.9	7'.7	54'.1	4'.9	
87° 09'.6	7'.7	49'.2	5'.0	57'.6
101° 36'.3	7'.7	44'.2	5'.2	
116° 03'.0	7'.7	39'.0	5'.3	
130° 29'.7	7'.7	33'.7	5'.4	57'.7
144° 56'.4	7'.7	28'.3	5'.5	
159° 23'.1	7'.7	22'.8	5'.7	
173° 49'.8	7'.7	17'.1	5'.8	57'.8
188° 16'.5	7'.7	11'.3	5'.9	
202° 43'.2	7'.8	21° 05'.4 N	6'.1	57'.8
217° 10'.0	7'.7	20° 59'.3 N	6'.2	
231° 36'.7	7'.7	53'.1	6'.3	57'.9
246° 03'.4	7'.8	46'.8	6'.5	
260° 30'.2	7'.8	40'.3	6'.6	
274° 57'.0	7'.7	33'.7	6'.7	58'.0
289° 23'.7	7'.8	27'.0	6'.9	
303° 50'.5	7'.8	20'.1	7'.0	
318° 17'.3	7'.9	13'.1	7'.1	58'.1
332° 44'.2	7'.8	06'.0	7'.2	
347° 11'.0	7'.9	19° 58'.8 N	7'.4	
1° 37'.9	7'.8	51'.4	7'.4	58'.2
16° 04'.7	7'.9	19° 44'.0 N	7'.6	58'.2
30° 31'.6	7'.9	36'.4	7'.8	
44° 58'.5	7'.9	28'.6	7'.8	
59° 25'.4	8'.0	20'.8	8'.0	58'.3
73° 52'.4	7'.9	12'.8	8'.1	
88° 19'.3	8'.0	04'.7	8'.2	
102° 46'.3	8'.0	18° 56'.5 N	8'.4	58'.4
117° 13'.3	8'.0	48'.1	8'.5	
131° 40'.3	8'.1	39'.6	8'.5	
146° 07'.4	8'.1	31'.1	8'.7	58'.5
160° 34'.5	8'.1	22'.4	8'.9	
175° 01'.6	8'.1	13'.5	8'.9	
SD 15'.4		15'.6	15'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 29
N 72°	-	-	-	-	-	-
N 70°	-	-	00:25	-	-	25:19
68°	-	-	01:51	-	23:42	25:59
66°	-	-	02:28	22:51	-	00:34
64°	-	01:10	02:54	23:38	-	01:06
62°	-	01:57	03:14	-	00:09	01:30
60°	-	02:26	03:30	-	00:31	01:49
N 58°	01:03	02:48	03:44	-	00:50	02:05
56°	01:46	03:05	03:56	00:06	01:05	02:18
54°	02:13	03:20	04:06	00:20	01:19	02:29
52°	02:34	03:33	04:15	00:32	01:30	02:40
50°	02:51	03:44	04:23	00:42	01:41	02:49
45°	03:22	04:06	04:40	01:04	02:02	03:08
N 40°	03:45	04:24	04:54	01:22	02:19	03:23
35°	04:04	04:38	05:06	01:37	02:34	03:36
30°	04:19	04:50	05:16	01:50	02:47	03:48
20°	04:42	05:10	05:34	02:13	03:08	04:07
N 10°	05:00	05:27	05:49	02:32	03:27	04:24
0°	05:16	05:41	06:03	02:50	03:45	04:40
S 10°	05:29	05:55	06:17	03:08	04:02	04:56
20°	05:42	06:08	06:32	03:28	04:21	05:13
30°	05:54	06:23	06:48	03:50	04:43	05:32
35°	06:00	06:31	06:58	04:03	04:55	05:43
40°	06:07	06:40	07:09	04:18	05:10	05:56
45°	06:14	06:50	07:22	04:36	05:27	06:11
S 50°	06:22	07:02	07:38	04:59	05:48	06:30
52°	06:26	07:07	07:45	05:10	05:58	06:38
54°	06:30	07:13	07:53	05:22	06:10	06:48
56°	06:34	07:20	08:02	05:36	06:23	06:59
58°	06:38	07:27	08:13	05:52	06:38	07:12
S 60°	06:43	07:35	08:25	06:12	06:56	07:26
S 62°	06:48	07:44	08:39	06:36	07:18	07:44

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 27	Moonset 28	Moonset 29
N 72°	-	-	-	-	-	-
N 70°	23:26	-	-	-	-	21:38
68°	22:17	-	-	-	21:19	20:57
66°	21:42	-	-	20:13	20:26	20:28
64°	21:16	22:56	-	19:26	19:53	20:07
62°	20:57	22:13	-	18:56	19:29	19:49
60°	20:41	21:44	-	18:32	19:09	19:35
N 58°	20:28	21:23	23:03	18:14	18:53	19:22
56°	20:16	21:06	22:23	17:58	18:40	19:11
54°	20:06	20:52	21:57	17:45	18:28	19:02
52°	19:57	20:39	21:37	17:33	18:17	18:53
50°	19:49	20:28	21:21	17:23	18:08	18:46
45°	19:32	20:06	20:50	17:01	17:48	18:29
N 40°	19:18	19:49	20:27	16:43	17:32	18:15
35°	19:07	19:35	20:09	16:28	17:18	18:04
30°	18:56	19:22	19:54	16:15	17:06	17:54
20°	18:39	19:03	19:31	15:53	16:46	17:36
N 10°	18:24	18:46	19:12	15:34	16:28	17:21
0°	18:10	18:32	18:57	15:16	16:11	17:06
S 10°	17:56	18:18	18:44	14:58	15:54	16:52
20°	17:42	18:05	18:32	14:39	15:36	16:36
30°	17:25	17:50	18:19	14:17	15:15	16:18
35°	17:15	17:42	18:13	14:03	15:03	16:08
40°	17:04	17:33	18:06	13:48	14:49	15:55
45°	16:51	17:23	17:59	13:30	14:32	15:41
S 50°	16:36	17:12	17:51	13:08	14:11	15:24
52°	16:29	17:06	17:48	12:57	14:02	15:15
54°	16:20	17:00	17:44	12:45	13:50	15:06
56°	16:11	16:54	17:40	12:31	13:38	14:55
58°	16:01	16:47	17:36	12:15	13:23	14:43
S 60°	15:49	16:39	17:31	11:55	13:05	14:29
S 62°	15:35	16:30	17:26	11:31	12:43	14:12

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
27	6 32	6 32	12:07	09:03	21:30	26d 12%
28	6 31	6 31	12:07	09:58	22:26	27d 6%
29	6 30	6 29	12:06	10:53	23:21	28d 2%

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2011 Jul 30, 31, Aug. 1 (Sat, Sun, Monday)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.4		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
30 Saturday 00	307° 17'.4	183° 08'.5	20° 37'.9 N	220° 30'.9	23° 40'.3 N	270° 28'.8	13° 13'.4 N	115° 08'.1	2° 37'.8 S
01	322° 19'.8	198° 07'.7	37'.3	235° 31'.5	40'.4	285° 31'.0	13'.5	130° 10'.4	37'.9
02	337° 22'.3	213° 07'.0	36'.7	250° 32'.1	40'.4	300° 33'.3	13'.5	145° 12'.7	38'.0
03	352° 24'.8	228° 06'.2	36'.1	265° 32'.7	40'.5	315° 35'.5	13'.6	160° 15'.1	38'.0
04	7° 27'.2	243° 05'.5	35'.5	280° 33'.3	40'.6	330° 37'.7	13'.7	175° 17'.4	38'.1
05	22° 29'.7	258° 04'.7	34'.8	295° 34'.0	40'.6	345° 39'.9	13'.7	190° 19'.7	38'.2
06	37° 32'.2	273° 03'.9	34'.2	310° 34'.6	40'.7	0° 42'.2	13'.8	205° 22'.0	38'.3
07	52° 34'.6	288° 03'.2	33'.6	325° 35'.2	40'.8	15° 44'.4	13'.9	220° 24'.3	38'.4
08	67° 37'.1	303° 02'.4	33'.0	340° 35'.8	40'.8	30° 46'.6	14'.0	235° 26'.6	38'.4
09	82° 39'.6	318° 01'.7	32'.4	355° 36'.5	40'.9	45° 48'.9	14'.0	250° 28'.9	38'.5
10	97° 42'.0	333° 00'.9	31'.7	10° 37'.1	41'.0	60° 51'.1	14'.1	265° 31'.2	38'.6
11	112° 44'.5	348° 00'.2	31'.1	25° 37'.7	41'.0	75° 53'.3	14'.2	280° 33'.5	38'.7
12	127° 46'.9	2° 59'.4	20° 30'.5 N	40° 38'.3	23° 41'.1 N	90° 55'.5	13° 14'.2 N	295° 35'.8	2° 38'.8 S
13	142° 49'.4	17° 58'.6	29'.9	55° 39'.0	41'.2	105° 57'.8	14'.3	310° 38'.1	38'.8
14	157° 51'.9	32° 57'.9	29'.2	70° 39'.6	41'.2	121° 00'.0	14'.4	325° 40'.4	38'.9
15	172° 54'.3	47° 57'.1	28'.6	85° 40'.2	41'.3	136° 02'.2	14'.4	340° 42'.7	39'.0
16	187° 56'.8	62° 56'.4	28'.0	100° 40'.8	41'.4	151° 04'.4	14'.5	355° 45'.0	39'.1
17	202° 59'.3	77° 55'.6	27'.4	115° 41'.5	41'.4	166° 06'.7	14'.6	10° 47'.3	39'.1
18	218° 01'.7	92° 54'.9	26'.7	130° 42'.1	41'.5	181° 08'.9	14'.6	25° 49'.6	39'.2
19	233° 04'.2	107° 54'.1	26'.1	145° 42'.7	41'.5	196° 11'.1	14'.7	40° 51'.9	39'.3
20	248° 06'.7	122° 53'.4	25'.5	160° 43'.3	41'.6	211° 13'.4	14'.8	55° 54'.2	39'.4
21	263° 09'.1	137° 52'.6	24'.8	175° 43'.9	41'.7	226° 15'.6	14'.8	70° 56'.5	39'.5
22	278° 11'.6	152° 51'.9	24'.2	190° 44'.6	41'.7	241° 17'.8	14'.9	85° 58'.8	39'.5
23	293° 14'.0	167° 51'.1	23'.6	205° 45'.2	41'.8	256° 20'.1	15'.0	101° 01'.1	39'.6
31 Sunday 00	308° 16'.5	182° 50'.4	20° 22'.9 N	220° 45'.8	23° 41'.9 N	271° 22'.3	13° 15'.0 N	116° 03'.4	2° 39'.7 S
01	323° 19'.0	197° 49'.6	22'.3	235° 46'.4	41'.9	286° 24'.5	15'.1	131° 05'.7	39'.8
02	338° 21'.4	212° 48'.9	21'.7	250° 47'.1	42'.0	301° 26'.8	15'.2	146° 07'.9	39'.9
03	353° 23'.9	227° 48'.1	21'.0	265° 47'.7	42'.0	316° 29'.0	15'.2	161° 10'.2	39'.9
04	8° 26'.4	242° 47'.4	20'.4	280° 48'.3	42'.1	331° 31'.2	15'.3	176° 12'.5	40'.0
05	23° 28'.8	257° 46'.6	19'.7	295° 48'.9	42'.2	346° 33'.4	15'.4	191° 14'.8	40'.1
06	38° 31'.3	272° 45'.9	19'.1	310° 49'.6	42'.2	1° 35'.7	15'.4	206° 17'.1	40'.2
07	53° 33'.8	287° 45'.1	18'.4	325° 50'.2	42'.3	16° 37'.9	15'.5	221° 19'.4	40'.2
08	68° 36'.2	302° 44'.4	17'.8	340° 50'.8	42'.3	31° 40'.1	15'.6	236° 21'.7	40'.3
09	83° 38'.7	317° 43'.6	17'.2	355° 51'.4	42'.4	46° 42'.4	15'.6	251° 24'.0	40'.4
10	98° 41'.2	332° 42'.9	16'.5	10° 52'.1	42'.4	61° 44'.6	15'.7	266° 26'.3	40'.5
11	113° 43'.6	347° 42'.1	15'.9	25° 52'.7	42'.5	76° 46'.9	15'.8	281° 28'.6	40'.6
12	128° 46'.1	2° 41'.4	20° 15'.2 N	40° 53'.3	23° 42'.6 N	91° 49'.1	13° 15'.8 N	296° 30'.9	2° 40'.6 S
13	143° 48'.5	17° 40'.6	14'.6	55° 54'.0	42'.6	106° 51'.3	15'.9	311° 33'.2	40'.7
14	158° 51'.0	32° 39'.9	13'.9	70° 54'.6	42'.7	121° 53'.6	16'.0	326° 35'.5	40'.8
15	173° 53'.5	47° 39'.1	13'.3	85° 55'.2	42'.7	136° 55'.8	16'.0	341° 37'.8	40'.9
16	188° 55'.9	62° 38'.4	12'.6	100° 55'.8	42'.8	151° 58'.0	16'.1	356° 40'.1	41'.0
17	203° 58'.4	77° 37'.6	12'.0	115° 56'.5	42'.8	167° 00'.3	16'.2	11° 42'.4	41'.0
18	219° 00'.9	92° 36'.9	11'.3	130° 57'.1	42'.9	182° 02'.5	16'.2	26° 44'.7	41'.1
19	234° 03'.3	107° 36'.2	10'.7	145° 57'.7	42'.9	197° 04'.7	16'.3	41° 47'.0	41'.2
20	249° 05'.8	122° 35'.4	10'.0	160° 58'.3	43'.0	212° 07'.0	16'.4	56° 49'.3	41'.3
21	264° 08'.3	137° 34'.7	09'.3	175° 59'.0	43'.1	227° 09'.2	16'.4	71° 51'.6	41'.4
22	279° 10'.7	152° 33'.9	08'.7	190° 59'.6	43'.1	242° 11'.4	16'.5	86° 53'.9	41'.4
23	294° 13'.2	167° 33'.2	08'.0	206° 00'.2	43'.2	257° 13'.7	16'.6	101° 56'.2	41'.5
1 Monday 00	309° 15'.7	182° 32'.5	20° 07'.4 N	221° 00'.8	23° 43'.2 N	272° 15'.9	13° 16'.6 N	116° 58'.5	2° 41'.6 S
01	324° 18'.1	197° 31'.7	06'.7	236° 01'.5	43'.3	287° 18'.2	16'.7	132° 00'.8	41'.7
02	339° 20'.6	212° 31'.0	06'.0	251° 02'.1	43'.3	302° 20'.4	16'.7	147° 03'.1	41'.8
03	354° 23'.0	227° 30'.2	05'.4	266° 02'.7	43'.4	317° 22'.6	16'.8	162° 05'.4	41'.8
04	9° 25'.5	242° 29'.5	04'.7	281° 03'.4	43'.4	332° 24'.9	16'.9	177° 07'.7	41'.9
05	24° 28'.0	257° 28'.8	04'.0	296° 04'.0	43'.5	347° 27'.1	16'.9	192° 10'.0	42'.0
06	39° 30'.4	272° 28'.0	03'.4	311° 04'.6	43'.5	2° 29'.4	17'.0	207° 12'.3	42'.1
07	54° 32'.9	287° 27'.3	02'.7	326° 05'.2	43'.6	17° 31'.6	17'.1	222° 14'.6	42'.2
08	69° 35'.4	302° 26'.5	02'.0	341° 05'.9	43'.6	32° 33'.8	17'.1	237° 16'.8	42'.2
09	84° 37'.8	317° 25'.8	01'.4	356° 06'.5	43'.7	47° 36'.1	17'.2	252° 19'.1	42'.3
10	99° 40'.3	332° 25'.1	00'.7	11° 07'.1	43'.7	62° 38'.3	17'.3	267° 21'.4	42'.4
11	114° 42'.8	347° 24'.3	00'.0	26° 07'.7	43'.8	77° 40'.6	17'.3	282° 23'.7	42'.5
12	129° 45'.2	2° 23'.6	19° 59'.4 N	41° 08'.4	23° 43'.8 N	92° 42'.8	13° 17'.4 N	297° 26'.0	2° 42'.6 S
13	144° 47'.7	17° 22'.9	58'.7	56° 09'.0	43'.9	107° 45'.0	17'.5	312° 28'.3	42'.6
14	159° 50'.1	32° 22'.1	58'.0	71° 09'.6	43'.9	122° 47'.3	17'.5	327° 30'.6	42'.7
15	174° 52'.6	47° 21'.4	57'.3	86° 10'.3	44'.0	137° 49'.5	17'.6	342° 32'.9	42'.8
16	189° 55'.1	62° 20'.6	56'.7	101° 10'.9	44'.0	152° 51'.8	17'.6	357° 35'.2	42'.9
17	204° 57'.5	77° 19'.9	56'.0	116° 11'.5	44'.0	167° 54'.0	17'.7	12° 37'.5	43'.0
18	220° 00'.0	92° 19'.2	55'.3	131° 12'.1	44'.1	182° 56'.3	17'.8	27° 39'.8	43'.0
19	235° 02'.5	107° 18'.4	54'.6	146° 12'.8	44'.1	197° 58'.5	17'.8	42° 42'.1	43'.1
20	250° 04'.9	122° 17'.7	53'.9	161° 13'.4	44'.2	213° 00'.7	17'.9	57° 44'.4	43'.2
21	265° 07'.4	137° 17'.0	53'.3	176° 14'.0	44'.2	228° 03'.0	18'.0	72° 46'.7	43'.3
22	280° 09'.9	152° 16'.3	52'.6	191° 14'.7	44'.3	243° 05'.2	18'.0	87° 49'.0	43'.4
23	295° 12'.3	167° 15'.5	51'.9	206° 15'.3	44'.3	258° 07'.5	18'.1	102° 51'.3	43'.5
	M.P. 03:22	v -0'.7	d 0'.6	v 0'.6	d 0'.1	v 2'.2	d 0'.1	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.4	40° 15'.2 S
Achernar	335° 27'.6	57° 10'.3 S
Acrux	173° 11'.2	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.2 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.0	55° 54'.0 N
Alkaid	152° 59'.9	49° 15'.5 N
Alnair	27° 44'.9	46° 54'.0 S
Alnilam	275° 47'.9	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.7 N
Alpheratz	357° 44'.7	29° 09'.3 N
Altair	62° 09'.2	8° 54'.1 N
Ankaa	353° 16'.7	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.4 N
Atria	107° 30'.3	69° 03'.1 S
Avior	234° 19'.2	59° 32'.9 S
Bellatrix	278° 33'.6	6° 21'.6 N
Betelgeuse	271° 03'.0	7° 24'.5 N
Canopus	263° 57'.2	52° 42'.0 S
Capella	280° 36'.7	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.5 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.0	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.4 N
Elnath	278° 14'.5	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.1	29° 33'.3 S
Gacrux	172° 02'.7	57° 11'.0 S
Gienah	175° 53'.8	17° 36'.5 S
Hadar	148° 49'.9	60° 26'.0 S
Hamal	328° 02'.2	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.7	74° 06'.7 N
Markab	13° 39'.4	15° 16'.2 N
Menkar	314° 16'.5	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.0 S
Mirfak	308° 42'.4	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 28'.2	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.5	8° 11'.2 S
Rigil Kent	139° 53'.5	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.8	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	234° 33'.8	11:49
Mars	272° 29'.3	09:17
Jupiter	323° 05'.8	05:54
Saturn	167° 46'.8	16:13

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 22'.9	18° 38'.5 N	189° 28'.7	8'.1	18° 04'.6 N	9'.0	58'.5
193° 22'.9	37'.9	203° 55'.8	8'.2	17° 55'.6 N	9'.2	58'.6
208° 22'.9	37'.3	218° 23'.0	8'.2	46'.4	9'.3	
223° 22'.9	36'.7	232° 50'.2	8'.2	37'.1	9'.4	
238° 23'.0	36'.1	247° 17'.4	8'.3	27'.7	9'.5	
253° 23'.0	35'.5	261° 44'.7	8'.3	18'.2	9'.6	58'.7
268° 23'.0	34'.9	276° 12'.0	8'.3	08'.6	9'.7	
283° 23'.0	34'.3	290° 39'.3	8'.3	16° 58'.9 N	9'.9	
298° 23'.0	33'.7	305° 06'.6	8'.4	49'.0	9'.9	58'.8
313° 23'.1	33'.1	319° 34'.0	8'.4	39'.1	10'.1	
328° 23'.1	32'.5	334° 01'.4	8'.4	29'.0	10'.1	
343° 23'.1	31'.9	348° 28'.8	8'.5	18'.9	10'.3	
358° 23'.1	18° 31'.3 N	2° 56'.3	8'.4	16° 08'.6 N	10'.3	58'.9
13° 23'.2	30'.7	17° 23'.7	8'.6	15° 58'.3 N	10'.5	
28° 23'.2	30'.0	31° 51'.3	8'.5	47'.8	10'.6	
43° 23'.2	29'.4	46° 18'.8	8'.6	37'.2	10'.7	
58° 23'.2	28'.8	60° 46'.4	8'.6	26'.5	10'.7	59'.0
73° 23'.3	28'.2	75° 14'.0	8'.6	15'.8	10'.9	
88° 23'.3	27'.6	89° 41'.6	8'.7	04'.9	11'.0	
103° 23'.3	27'.0	104° 09'.3	8'.7	14° 53'.9 N	11'.0	
118° 23'.3	26'.4	118° 37'.0	8'.7	42'.9	11'.2	59'.1
133° 23'.4	25'.8	133° 04'.7	8'.8	31'.7	11'.2	
148° 23'.4	25'.2	147° 32'.5	8'.7	20'.5	11'.4	
163° 23'.4	24'.6	162° 00'.2	8'.9	09'.1	11'.4	
178° 23'.4	18° 24'.0 N	176° 28'.1	8'.8	13° 57'.7 N	11'.5	59'.2
193° 23'.5	23'.4	190° 55'.9	8'.9	46'.2	11'.7	
208° 23'.5	22'.8	205° 23'.8	8'.9	34'.5	11'.7	
223° 23'.5	22'.1	219° 51'.7	9'.0	22'.8	11'.7	
238° 23'.6	21'.5	234° 19'.7	8'.9	11'.1	11'.9	
253° 23'.6	20'.9	248° 47'.6	9'.1	12° 59'.2 N	12'.0	59'.3
268° 23'.6	20'.3	263° 15'.7	9'.0	47'.2	12'.0	
283° 23'.6	19'.7	277° 43'.7	9'.1	35'.2	12'.1	
298° 23'.7	19'.1	292° 11'.8	9'.1	23'.1	12'.2	
313° 23'.7	18'.5	306° 39'.9	9'.1	10'.9	12'.3	
328° 23'.7	17'.8	321° 08'.0	9'.1	11° 58'.6 N	12'.4	59'.4
343° 23'.8	17'.2	335° 36'.1	9'.2	46'.2	12'.4	
358° 23'.8	18° 16'.6 N	350° 04'.3	9'.3	11° 33'.8 N	12'.5	59'.4
13° 23'.8	16'.0	4° 32'.6	9'.2	21'.3	12'.6	
28° 23'.9	15'.4	19° 00'.8	9'.3	08'.7	12'.6	
43° 23'.9	14'.8	33° 29'.1	9'.3	10° 56'.1 N	12'.7	59'.5
58° 23'.9	14'.1	47° 57'.4	9'.3	43'.4	12'.8	
73° 23'.9	13'.5	62° 25'.7	9'.4	30'.6	12'.9	
88° 24'.0	12'.9	76° 54'.1	9'.4	17'.7	12'.9	
103° 24'.0	12'.3	91° 22'.5	9'.4	04'.8	13'.0	
118° 24'.0	11'.7	105° 50'.9	9'.4	9° 51'.8 N	13'.1	
133° 24'.1	11'.0	120° 19'.3	9'.5	38'.7	13'.1	59'.6
148° 24'.1	10'.4	134° 47'.8	9'.5	25'.6	13'.1	
163° 24'.1	09'.8	149° 16'.3	9'.5	12'.5	13'.3	
178° 24'.2	18° 09'.2 N	163° 44'.8	9'.6	8° 59'.2 N	13'.3	59'.6
193° 24'.2	08'.6	178° 13'.4	9'.5	45'.9	13'.3	
208° 24'.2	07'.9	192° 41'.9	9'.6	32'.6	13'.4	
223° 24'.3	07'.3	207° 10'.5	9'.7	19'.2	13'.5	59'.7
238° 24'.3	06'.7	221° 39'.2	9'.6	05'.7	13'.5	
253° 24'.3	06'.1	236° 07'.8	9'.7	7° 52'.2 N	13'.5	
268° 24'.4	05'.4	250° 36'.5	9'.7	38'.7	13'.6	
283° 24'.4	04'.8	265° 05'.2	9'.7	25'.1	13'.7	
298° 24'.5	04'.2	279° 33'.9	9'.7	11'.4	13'.7	
313° 24'.5	03'.6	294° 02'.6	9'.8	6° 57'.7 N	13'.7	
328° 24'.5	02'.9	308° 31'.4	9'.7	44'.0	13'.8	
343° 24'.6	02'.3	323° 00'.1	9'.8	30'.2	13'.9	59'.8
358° 24'.6	18° 01'.7 N	337° 28'.9	9'.8	6° 16'.3 N	13'.8	59'.8
13° 24'.6	01'.0	351° 57'.7	9'.9	02'.5	13'.9	
28° 24'.7	00'.4	6° 26'.6	9'.8	5° 48'.6 N	14'.0	
43° 24'.7	17° 59'.8 N	20° 55'.4	9'.9	34'.6	14'.0	
58° 24'.7	59'.2	35° 24'.3	9'.9	20'.6	14'.0	
73° 24'.8	58'.5	49° 53'.2	9'.9	06'.6	14'.0	
88° 24'.8	57'.9	64° 22'.1	9'.9	4° 52'.6 N	14'.1	
103° 24'.9	57'.3	78° 51'.0	9'.9	38'.5	14'.1	
118° 24'.9	56'.6	93° 19'.9	9'.9	24'.4	14'.1	
133° 24'.9	56'.0	107° 48'.8	10'.0	10'.3	14'.2	59'.9
148° 25'.0	55'.4	122° 17'.8	10'.0	3° 56'.1 N	14'.2	
163° 25'.0	54'.7	136° 46'.8	9'.9	41'.9	14'.2	
SD 15'.8	d 0'.6	SD	16'.0	16'.2	16'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 30	Moonrise 31	Moonrise 1
N 72°	-	-	-	-	03:17	05:41
N 70°	-	-	01:13	01:19	03:43	05:52
68°	-	-	02:08	01:59	04:03	06:02
66°	-	-	02:40	02:26	04:19	06:10
64°	-	01:31	03:04	02:47	04:32	06:16
62°	-	02:09	03:22	03:04	04:42	06:22
60°	-	02:36	03:37	03:18	04:51	06:27
N 58°	01:23	02:56	03:50	03:29	04:59	06:31
56°	01:58	03:12	04:01	03:40	05:06	06:35
54°	02:22	03:26	04:11	03:49	05:13	06:38
52°	02:41	03:38	04:20	03:57	05:18	06:41
50°	02:57	03:48	04:27	04:04	05:23	06:44
45°	03:27	04:10	04:44	04:19	05:34	06:50
N 40°	03:49	04:27	04:57	04:32	05:43	06:55
35°	04:06	04:40	05:08	04:43	05:51	06:59
30°	04:21	04:52	05:18	04:52	05:57	07:03
20°	04:44	05:11	05:35	05:08	06:09	07:10
N 10°	05:01	05:27	05:49	05:22	06:19	07:16
0°	05:16	05:41	06:03	05:35	06:29	07:21
S 10°	05:29	05:54	06:16	05:48	06:38	07:26
20°	05:41	06:07	06:30	06:02	06:48	07:32
30°	05:52	06:21	06:46	06:17	06:59	07:39
35°	05:58	06:29	06:56	06:27	07:06	07:42
40°	06:05	06:37	07:06	06:37	07:13	07:47
45°	06:11	06:47	07:19	06:49	07:22	07:51
S 50°	06:19	06:58	07:33	07:04	07:32	07:57
52°	06:22	07:03	07:40	07:11	07:37	08:00
54°	06:26	07:09	07:48	07:18	07:42	08:03
56°	06:29	07:15	07:57	07:27	07:48	08:06
58°	06:33	07:22	08:07	07:36	07:55	08:10
S 60°	06:38	07:29	08:18	07:47	08:02	08:14
S 62°	06:42	07:38	08:31	08:00	08:10	08:18

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 30	Moonset 31	Moonset 1
N 72°	-	-	-	21:35	21:02	20:39
N 70°	22:51	-	-	21:07	20:48	20:33
68°	22:01	-	-	20:45	20:36	20:29
66°	21:30	-	-	20:28	20:27	20:25
64°	21:07	22:36	-	20:14	20:19	20:22
62°	20:49	22:00	-	20:02	20:12	20:19
60°	20:34	21:35	-	19:52	20:05	20:16
N 58°	20:21	21:15	22:45	19:43	20:00	20:14
56°	20:10	20:59	22:12	19:36	19:55	20:12
54°	20:01	20:45	21:48	19:29	19:51	20:10
52°	19:52	20:34	21:30	19:22	19:47	20:08
50°	19:45	20:23	21:15	19:17	19:43	20:07
45°	19:28	20:02	20:45	19:04	19:35	20:04
N 40°	19:15	19:46	20:23	18:54	19:29	20:01
35°	19:04	19:32	20:06	18:45	19:23	19:58
30°	18:54	19:20	19:51	18:37	19:18	19:56
20°	18:38	19:01	19:29	18:24	19:09	19:52
N 10°	18:23	18:45	19:11	18:12	19:01	19:49
0°	18:10	18:32	18:57	18:01	18:54	19:46
S 10°	17:57	18:19	18:44	17:49	18:46	19:42
20°	17:43	18:06	18:32	17:37	18:38	19:39
30°	17:27	17:52	18:21	17:23	18:29	19:35
35°	17:17	17:44	18:15	17:15	18:23	19:32
40°	17:07	17:36	18:09	17:06	18:17	19:30
45°	16:55	17:26	18:02	16:55	18:10	19:26
S 50°	16:40	17:15	17:55	16:41	18:01	19:23
52°	16:33	17:10	17:51	16:35	17:57	19:21
54°	16:25	17:05	17:48	16:28	17:53	19:19
56°	16:17	16:59	17:44	16:20	17:48	19:17
58°	16:07	16:52	17:40	16:11	17:43	19:14
S 60°	15:56	16:44	17:36	16:01	17:36	19:12
S 62°	15:43	16:36	17:31	15:49	17:29	19:09

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
30	6 29	6 27	12:06	11:48	24:15	29d 0%
31	6 26	6 25	12:06	12:41	00:15	1d 1%
1	6 23	6 22	12:06	13:33	01:07	2d 4%

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2011 August 2, 3, 4 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.5		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
2 00	310° 14'.8	182° 14'.8	19° 51'.2 N	221° 15'.9	23° 44'.4 N	273° 09'.7	13° 18'.1 N	117° 53'.5	2° 43'.5 S
01	325° 17'.3	197° 14'.1	50'.5	236° 16'.6	44'.4	288° 12'.0	18'.2	132° 55'.8	43'.6
02	340° 19'.7	212° 13'.3	49'.8	251° 17'.2	44'.4	303° 14'.2	18'.3	147° 58'.1	43'.7
03	355° 22'.2	227° 12'.6	49'.2	266° 17'.8	44'.5	318° 16'.5	18'.3	163° 00'.4	43'.8
Tuesday 04	10° 24'.6	242° 11'.9	48'.5	281° 18'.4	44'.5	333° 18'.7	18'.4	178° 02'.7	43'.9
05	25° 27'.1	257° 11'.1	47'.8	296° 19'.1	44'.6	348° 20'.9	18'.5	193° 05'.0	43'.9
06	40° 29'.6	272° 10'.4	47'.1	311° 19'.7	44'.6	3° 23'.2	18'.5	208° 07'.3	44'.0
07	55° 32'.0	287° 09'.7	46'.4	326° 20'.3	44'.7	18° 25'.4	18'.6	223° 09'.6	44'.1
08	70° 34'.5	302° 09'.0	45'.7	341° 21'.0	44'.7	33° 27'.7	18'.6	238° 11'.9	44'.2
09	85° 37'.0	317° 08'.2	45'.0	356° 21'.6	44'.7	48° 29'.9	18'.7	253° 14'.2	44'.3
10	100° 39'.4	332° 07'.5	44'.3	11° 22'.2	44'.8	63° 32'.2	18'.8	268° 16'.5	44'.3
11	115° 41'.9	347° 06'.8	43'.6	26° 22'.9	44'.8	78° 34'.4	18'.8	283° 18'.8	44'.4
12	130° 44'.4	2° 06'.1	19° 42'.9 N	41° 23'.5	23° 44'.9 N	93° 36'.7	13° 18'.9 N	298° 21'.1	2° 44'.5 S
13	145° 46'.8	17° 05'.3	42'.2	56° 24'.1	44'.9	108° 38'.9	18'.9	313° 23'.3	44'.6
14	160° 49'.3	32° 04'.6	41'.5	71° 24'.8	44'.9	123° 41'.2	19'.0	328° 25'.6	44'.7
15	175° 51'.8	47° 03'.9	40'.8	86° 25'.4	45'.0	138° 43'.4	19'.1	343° 27'.9	44'.8
16	190° 54'.2	62° 03'.2	40'.1	101° 26'.0	45'.0	153° 45'.7	19'.1	358° 30'.2	44'.8
17	205° 56'.7	77° 02'.4	39'.4	116° 26'.6	45'.1	168° 47'.9	19'.2	13° 32'.5	44'.9
18	220° 59'.1	92° 01'.7	38'.7	131° 27'.3	45'.1	183° 50'.2	19'.3	28° 34'.8	45'.0
19	236° 01'.6	107° 01'.0	38'.0	146° 27'.9	45'.1	198° 52'.4	19'.3	43° 37'.1	45'.1
20	251° 04'.1	122° 00'.3	37'.3	161° 28'.5	45'.2	213° 54'.7	19'.4	58° 39'.4	45'.2
21	266° 06'.5	136° 59'.5	36'.6	176° 29'.2	45'.2	228° 56'.9	19'.4	73° 41'.7	45'.2
22	281° 09'.0	151° 58'.8	35'.9	191° 29'.8	45'.2	243° 59'.2	19'.5	88° 44'.0	45'.3
23	296° 11'.5	166° 58'.1	35'.2	206° 30'.4	45'.3	259° 01'.4	19'.6	103° 46'.3	45'.4
3 00	311° 13'.9	181° 57'.4	19° 34'.5 N	221° 31'.1	23° 45'.3 N	274° 03'.7	13° 19'.6 N	118° 48'.5	2° 45'.5 S
01	326° 16'.4	196° 56'.7	33'.8	236° 31'.7	45'.3	289° 05'.9	19'.7	133° 50'.8	45'.6
02	341° 18'.9	211° 55'.9	33'.1	251° 32'.3	45'.4	304° 08'.2	19'.7	148° 53'.1	45'.7
03	356° 21'.3	226° 55'.2	32'.4	266° 33'.0	45'.4	319° 10'.4	19'.8	163° 55'.4	45'.7
Wednesday 04	11° 23'.8	241° 54'.5	31'.7	281° 33'.6	45'.4	334° 12'.7	19'.9	178° 57'.7	45'.8
05	26° 26'.2	256° 53'.8	31'.0	296° 34'.2	45'.5	349° 14'.9	19'.9	194° 00'.0	45'.9
06	41° 28'.7	271° 53'.1	30'.2	311° 34'.9	45'.5	4° 17'.2	20'.0	209° 02'.3	46'.0
07	56° 31'.2	286° 52'.4	29'.5	326° 35'.5	45'.5	19° 19'.4	20'.0	224° 04'.6	46'.1
08	71° 33'.6	301° 51'.6	28'.8	341° 36'.1	45'.6	34° 21'.7	20'.1	239° 06'.9	46'.2
09	86° 36'.1	316° 50'.9	28'.1	356° 36'.8	45'.6	49° 24'.0	20'.1	254° 09'.1	46'.2
10	101° 38'.6	331° 50'.2	27'.4	11° 37'.4	45'.6	64° 26'.2	20'.2	269° 11'.4	46'.3
11	116° 41'.0	346° 49'.5	26'.7	26° 38'.0	45'.7	79° 28'.5	20'.3	284° 13'.7	46'.4
12	131° 43'.5	1° 48'.8	19° 25'.9 N	41° 38'.7	23° 45'.7 N	94° 30'.7	13° 20'.3 N	299° 16'.0	2° 46'.5 S
13	146° 46'.0	16° 48'.1	25'.2	56° 39'.3	45'.7	109° 33'.0	20'.4	314° 18'.3	46'.6
14	161° 48'.4	31° 47'.4	24'.5	71° 39'.9	45'.8	124° 35'.2	20'.4	329° 20'.6	46'.6
15	176° 50'.9	46° 46'.6	23'.8	86° 40'.6	45'.8	139° 37'.5	20'.5	344° 22'.9	46'.7
16	191° 53'.4	61° 45'.9	23'.1	101° 41'.2	45'.8	154° 39'.7	20'.6	359° 25'.2	46'.8
17	206° 55'.8	76° 45'.2	22'.3	116° 41'.8	45'.9	169° 42'.0	20'.6	14° 27'.5	46'.9
18	221° 58'.3	91° 44'.5	21'.6	131° 42'.5	45'.9	184° 44'.3	20'.7	29° 29'.7	47'.0
19	237° 00'.7	106° 43'.8	20'.9	146° 43'.1	45'.9	199° 46'.5	20'.7	44° 32'.0	47'.1
20	252° 03'.2	121° 43'.1	20'.2	161° 43'.7	45'.9	214° 48'.8	20'.8	59° 34'.3	47'.1
21	267° 05'.7	136° 42'.4	19'.4	176° 44'.4	46'.0	229° 51'.0	20'.8	74° 36'.6	47'.2
22	282° 08'.1	151° 41'.7	18'.7	191° 45'.0	46'.0	244° 53'.3	20'.9	89° 38'.9	47'.3
23	297° 10'.6	166° 40'.9	18'.0	206° 45'.6	46'.0	259° 55'.5	21'.0	104° 41'.2	47'.4
4 00	312° 13'.1	181° 40'.2	19° 17'.2 N	221° 46'.3	23° 46'.0 N	274° 57'.8	13° 21'.0 N	119° 43'.5	2° 47'.5 S
01	327° 15'.5	196° 39'.5	16'.5	236° 46'.9	46'.1	290° 00'.1	21'.1	134° 45'.8	47'.6
02	342° 18'.0	211° 38'.8	15'.8	251° 47'.6	46'.1	305° 02'.3	21'.1	149° 48'.0	47'.6
03	357° 20'.5	226° 38'.1	15'.0	266° 48'.2	46'.1	320° 04'.6	21'.2	164° 50'.3	47'.7
Thursday 04	12° 22'.9	241° 37'.4	14'.3	281° 48'.8	46'.2	335° 06'.8	21'.3	179° 52'.6	47'.8
05	27° 25'.4	256° 36'.7	13'.6	296° 49'.5	46'.2	350° 09'.1	21'.3	194° 54'.9	47'.9
06	42° 27'.8	271° 36'.0	12'.8	311° 50'.1	46'.2	5° 11'.4	21'.4	209° 57'.2	48'.0
07	57° 30'.3	286° 35'.3	12'.1	326° 50'.7	46'.2	20° 13'.6	21'.4	224° 59'.5	48'.1
08	72° 32'.8	301° 34'.6	11'.4	341° 51'.4	46'.3	35° 15'.9	21'.5	240° 01'.8	48'.1
09	87° 35'.2	316° 33'.9	10'.6	356° 52'.0	46'.3	50° 18'.1	21'.5	255° 04'.0	48'.2
10	102° 37'.7	331° 33'.2	09'.9	11° 52'.6	46'.3	65° 20'.4	21'.6	270° 06'.3	48'.3
11	117° 40'.2	346° 32'.5	09'.1	26° 53'.3	46'.3	80° 22'.7	21'.6	285° 08'.6	48'.4
12	132° 42'.6	1° 31'.8	19° 08'.4 N	41° 53'.9	23° 46'.3 N	95° 24'.9	13° 21'.7 N	300° 10'.9	2° 48'.5 S
13	147° 45'.1	16° 31'.1	07'.6	56° 54'.5	46'.4	110° 27'.2	21'.8	315° 13'.2	48'.6
14	162° 47'.6	31° 30'.4	06'.9	71° 55'.2	46'.4	125° 29'.5	21'.8	330° 15'.5	48'.6
15	177° 50'.0	46° 29'.7	06'.2	86° 55'.8	46'.4	140° 31'.7	21'.9	345° 17'.8	48'.7
16	192° 52'.5	61° 29'.0	05'.4	101° 56'.5	46'.4	155° 34'.0	21'.9	0° 20'.0	48'.8
17	207° 55'.0	76° 28'.3	04'.7	116° 57'.1	46'.5	170° 36'.2	22'.0	15° 22'.3	48'.9
18	222° 57'.4	91° 27'.6	03'.9	131° 57'.7	46'.5	185° 38'.5	22'.0	30° 24'.6	49'.0
19	237° 59'.9	106° 26'.9	03'.2	146° 58'.4	46'.5	200° 40'.8	22'.1	45° 26'.9	49'.1
20	253° 02'.3	121° 26'.2	02'.4	161° 59'.0	46'.5	215° 43'.0	22'.2	60° 29'.2	49'.2
21	268° 04'.8	136° 25'.5	01'.7	176° 59'.6	46'.5	230° 45'.3	22'.2	75° 31'.5	49'.2
22	283° 07'.3	151° 24'.8	00'.9	192° 00'.3	46'.6	245° 47'.6	22'.3	90° 33'.8	49'.3
23	298° 09'.7	166° 24'.1	00'.2	207° 00'.9	46'.6	260° 49'.8	22'.3	105° 36'.0	49'.4
	M.P. 03:11	v -0'.7	d 0'.7	v 0'.6	d 0'.0	v 2'.3	d 0'.1	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.3	40° 15'.2 S
Achernar	335° 27'.5	57° 10'.3 S
Acrux	173° 11'.3	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.2 S
Aldebaran	290° 51'.1	16° 31'.9 N
Alioth	166° 22'.0	55° 54'.0 N
Alkaid	153° 00'.0	49° 15'.5 N
Alnair	27° 44'.9	46° 54'.0 S
Alnilam	275° 47'.9	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.7 N
Alpheratz	357° 44'.7	29° 09'.3 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.7	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.5 N
Atria	107° 30'.4	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.6 N
Betelgeuse	271° 03'.0	7° 24'.5 N
Canopus	263° 57'.2	52° 42'.0 S
Capella	280° 36'.7	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.5 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.0	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.4 N
Elnath	278° 14'.5	28° 36'.9 N
Eltanin	90° 46'.3	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.1	29° 33'.3 S
Gacrux	172° 02'.7	57° 11'.0 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 49'.9	60° 26'.0 S
Hamal	328° 02'.2	23° 31'.0 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.8	74° 06'.7 N
Markab	13° 39'.4	15° 16'.2 N
Menkar	314° 16'.5	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.0 S
Mirfak	308° 42'.4	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 26'.9	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.5	8° 11'.2 S
Rigil Kent	139° 53'.5	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.8	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.9 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	230° 43'.5	11:53
Mars	270° 17'.1	09:14
Jupiter	322° 49'.8	05:43
Saturn	167° 34'.6	16:02

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 25'.1	17° 54'.1 N	151° 15'.7	10'.0	3° 27'.7 N	14'.2	59'.9
193° 25'.1	53'.5	165° 44'.7	10'.0	13'.5	14'.3	
208° 25'.1	52'.8	180° 13'.7	10'.0	2° 59'.2 N	14'.2	
223° 25'.2	52'.2	194° 42'.7	10'.0	45'.0	14'.3	
238° 25'.2	51'.6	209° 11'.7	10'.1	30'.7	14'.3	
253° 25'.3	50'.9	223° 40'.8	10'.0	16'.4	14'.3	
268° 25'.3	50'.3	238° 09'.8	10'.0	02'.1	14'.4	
283° 25'.3	49'.6	252° 38'.8	10'.1	1° 47'.7 N	14'.3	
298° 25'.4	49'.0	267° 07'.9	10'.0	33'.4	14'.4	
313° 25'.4	48'.4	281° 36'.9	10'.1	19'.0	14'.3	
328° 25'.5	47'.7	296° 06'.0	10'.0	04'.7	14'.4	
343° 25'.5	47'.1	310° 35'.0	10'.1	0° 50'.3 N	14'.4	
358° 25'.6	17° 46'.4 N	325° 04'.1	10'.0	0° 35'.9 N	14'.3	59'.9
13° 25'.6	45'.8	339° 33'.1	10'.1	21'.6	14'.4	
28° 25'.6	45'.2	354° 02'.2	10'.1	07'.2	14'.4	
43° 25'.7	44'.5	8° 31'.3	10'.0	0° 07'.2 S	14'.4	
58° 25'.7	43'.9	23° 00'.3	10'.1	21'.6	14'.3	
73° 25'.8	43'.2	37° 29'.4	10'.0	35'.9	14'.4	
88° 25'.8	42'.6	51° 58'.4	10'.1	50'.3	14'.4	
103° 25'.9	41'.9	66° 27'.5	10'.0	1° 04'.7 S	14'.3	
118° 25'.9	41'.3	80° 56'.5	10'.1	19'.0	14'.4	60'.0
133° 26'.0	40'.7	95° 25'.6	10'.0	33'.4	14'.3	
148° 26'.0	40'.0	109° 54'.6	10'.1	47'.7	14'.3	
163° 26'.1	39'.4	124° 23'.7	10'.0	2° 02'.0 S	14'.4	59'.9
178° 26'.1	17° 38'.7 N	138° 52'.7	10'.0	2° 16'.4 S	14'.3	59'.9
193° 26'.1	38'.1	153° 21'.7	10'.0	30'.7	14'.2	
208° 26'.2	37'.4	167° 50'.7	10'.0	44'.9	14'.3	
223° 26'.2	36'.8	182° 19'.7	10'.0	59'.2	14'.2	
238° 26'.3	36'.1	196° 48'.7	10'.0	3° 13'.4 S	14'.3	
253° 26'.3	35'.5	211° 17'.7	9'.9	27'.7	14'.2	
268° 26'.4	34'.8	225° 46'.6	10'.0	41'.9	14'.2	
283° 26'.4	34'.2	240° 15'.6	9'.9	56'.1	14'.1	
298° 26'.5	33'.5	254° 44'.5	10'.0	4° 10'.2 S	14'.1	
313° 26'.5	32'.9	269° 13'.5	9'.9	24'.3	14'.1	
328° 26'.6	32'.2	283° 42'.4	9'.9	38'.4	14'.1	
343° 26'.6	31'.6	298° 11'.3	9'.9	52'.5	14'.1	
358° 26'.7	17° 30'.9 N	312° 40'.2	9'.8	5° 06'.6 S	14'.0	59'.9
13° 26'.7	30'.3	327° 09'.0	9'.9	20'.6	13'.9	
28° 26'.8	29'.6	341° 37'.9	9'.8	34'.5	14'.0	
43° 26'.8	29'.0	356° 06'.7	9'.8	48'.5	13'.9	
58° 26'.9	28'.3	10° 35'.5	9'.8	6° 02'.4 S	13'.8	
73° 26'.9	27'.7	25° 04'.3	9'.7	16'.2	13'.9	
88° 27'.0	27'.0	39° 33'.0	9'.8	30'.1	13'.8	
103° 27'.0	26'.3	54° 01'.8	9'.7	43'.9	13'.7	
118° 27'.1	25'.7	68° 30'.5	9'.7	57'.6	13'.7	
133° 27'.1	25'.0	82° 59'.2	9'.7	7° 11'.3 S	13'.6	
148° 27'.2	24'.4	97° 27'.9	9'.6	24'.9	13'.6	
163° 27'.2	23'.7	111° 56'.5	9'.7	38'.5	13'.6	59'.8
178° 27'.3	17° 23'.1 N	126° 25'.2	9'.6	7° 52'.1 S	13'.5	59'.8
193° 27'.3	22'.4	140° 53'.8	9'.5	8° 05'.6 S	13'.5	
208° 27'.4	21'.7	155° 22'.3	9'.6	19'.1	13'.4	
223° 27'.5	21'.1	169° 50'.9	9'.5	32'.5	13'.3	
238° 27'.5	20'.4	184° 19'.4	9'.5	45'.8	13'.3	
253° 27'.6	19'.8	198° 47'.9	9'.4	59'.1	13'.2	
268° 27'.6	19'.1	213° 16'.3	9'.5	9° 12'.3 S	13'.2	
283° 27'.7	18'.4	227° 44'.8	9'.4	25'.5	13'.1	
298° 27'.7	17'.8	242° 13'.2	9'.3	38'.6	13'.1	
313° 27'.8	17'.1	256° 41'.5	9'.4	51'.7	13'.0	
328° 27'.8	16'.5	271° 09'.9	9'.3	10° 04'.7 S	12'.9	
343° 27'.9	15'.8	285° 38'.2	9'.2	17'.6	12'.9	59'.7
358° 27'.9	17° 15'.1 N	300° 06'.4	9'.3	10° 30'.5 S	12'.8	59'.7
13° 28'.0	14'.5	314° 34'.7	9'.2	43'.3	12'.7	
28° 28'.1	13'.8	329° 02'.9	9'.1	56'.0	12'.7	
43° 28'.1	13'.1	343° 31'.0	9'.2	11° 08'.7 S	12'.6	
58° 28'.2	12'.5	357° 59'.2	9'.1	21'.3	12'.5	
73° 28'.2	11'.8	12° 27'.3	9'.0	33'.8	12'.4	
88° 28'.3	11'.1	26° 55'.3	9'.1	46'.2	12'.4	
103° 28'.3	10'.5	41° 23'.4	9'.0	58'.6	12'.3	
118° 28'.4	09'.8	55° 51'.4	8'.9	12° 10'.9 S	12'.2	59'.6
133° 28'.5	09'.1	70° 19'.3	8'.9	23'.1	12'.2	
148° 28'.5	08'.5	84° 47'.2	8'.9	35'.3	12'.0	
163° 28'.6	07'.8	99° 15'.1	8'.8	47'.3	12'.0	
SD 15'.8	d 0'.7	SD	16'.3	16'.3	16'.3	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 2	Moonrise 3	Moonrise 4
N 72°	-	-	-	07:54	10:06	12:23
N 70°	-	-	01:40	07:56	09:59	12:05
68°	-	-	02:23	07:58	09:53	11:50
66°	-	00:48	02:52	07:59	09:48	11:38
64°	-	01:49	03:13	08:00	09:44	11:28
62°	-	02:21	03:30	08:01	09:40	11:20
60°	00:43	02:45	03:44	08:02	09:37	11:13
N 58°	01:38	03:04	03:56	08:03	09:35	11:07
56°	02:09	03:19	04:07	08:04	09:32	11:01
54°	02:31	03:32	04:16	08:04	09:30	10:56
52°	02:48	03:43	04:24	08:05	09:28	10:52
50°	03:03	03:53	04:32	08:05	09:27	10:48
45°	03:31	04:14	04:47	08:06	09:23	10:39
N 40°	03:53	04:30	05:00	08:07	09:20	10:32
35°	04:09	04:43	05:11	08:08	09:17	10:26
30°	04:23	04:54	05:20	08:09	09:15	10:21
20°	04:45	05:13	05:36	08:10	09:11	10:11
N 10°	05:02	05:28	05:50	08:11	09:07	10:03
0°	05:16	05:41	06:03	08:13	09:04	09:56
S 10°	05:28	05:54	06:15	08:14	09:01	09:48
20°	05:39	06:06	06:29	08:15	08:57	09:41
30°	05:50	06:19	06:44	08:16	08:53	09:32
35°	05:56	06:26	06:53	08:17	08:51	09:27
40°	06:02	06:34	07:03	08:18	08:49	09:21
45°	06:08	06:43	07:15	08:19	08:46	09:14
S 50°	06:15	06:54	07:29	08:20	08:43	09:07
52°	06:18	06:59	07:36	08:21	08:41	09:03
54°	06:21	07:04	07:43	08:21	08:40	08:59
56°	06:25	07:10	07:51	08:22	08:38	08:55
58°	06:28	07:16	08:00	08:23	08:36	08:50
S 60°	06:32	07:23	08:11	08:24	08:34	08:44
S 62°	06:36	07:31	08:23	08:25	08:31	08:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 2	Moonset 3	Moonset 4
N 72°	-	-	-	20:18	19:56	19:28
N 70°	22:26	-	-	20:20	20:06	19:49
68°	21:45	-	-	20:21	20:14	20:05
66°	21:18	23:13	-	20:23	20:21	20:19
64°	20:57	22:19	-	20:24	20:27	20:30
62°	20:40	21:48	-	20:25	20:32	20:40
60°	20:26	21:25	23:18	20:26	20:36	20:48
N 58°	20:15	21:07	22:30	20:27	20:40	20:55
56°	20:04	20:52	22:01	20:28	20:44	21:02
54°	19:55	20:39	21:40	20:28	20:47	21:07
52°	19:47	20:28	21:22	20:29	20:50	21:13
50°	19:40	20:18	21:08	20:29	20:52	21:17
45°	19:25	19:58	20:40	20:31	20:58	21:28
N 40°	19:12	19:42	20:19	20:32	21:03	21:36
35°	19:01	19:29	20:02	20:33	21:07	21:44
30°	18:52	19:18	19:49	20:33	21:11	21:50
20°	18:36	19:00	19:27	20:35	21:17	22:02
N 10°	18:22	18:45	19:10	20:36	21:23	22:12
0°	18:10	18:31	18:57	20:37	21:28	22:21
S 10°	17:57	18:19	18:44	20:38	21:34	22:30
20°	17:44	18:07	18:33	20:39	21:39	22:40
30°	17:28	17:54	18:22	20:40	21:46	22:52
35°	17:20	17:46	18:17	20:41	21:50	22:59
40°	17:10	17:38	18:11	20:42	21:54	23:06
45°	16:58	17:29	18:05	20:43	21:59	23:15
S 50°	16:44	17:19	17:58	20:44	22:05	23:26
52°	16:37	17:14	17:55	20:44	22:08	23:31
54°	16:30	17:09	17:52	20:45	22:11	23:37
56°	16:22	17:03	17:49	20:46	22:14	23:43
58°	16:13	16:57	17:45	20:46	22:18	23:50
S 60°	16:02	16:50	17:41	20:47	22:22	23:58
S 62°	15:50	16:42	17:37	20:48	22:27	24:07

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
2	6 20	6 18	12:06	14:25	01:59	3d 10%
3	6 16	6 13	12:06	15:16	02:50	4d 18%
4	6 11	6 08	12:06	16:08	03:42	5d 28%

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2011 August 5, 6, 7 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.5		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
5 00	313° 12'.2	181° 23'.4	18° 59'.4 N	222° 01'.6	23° 46'.6 N	275° 52'.1	13° 22'.4 N	120° 38'.3	2° 49'.5 S
01	328° 14'.7	196° 22'.7	58'.7	237° 02'.2	46'.6	290° 54'.4	22'.4	135° 40'.6	49'.6
02	343° 17'.1	211° 22'.0	57'.9	252° 02'.8	46'.6	305° 56'.6	22'.5	150° 42'.9	49'.7
03	358° 19'.6	226° 21'.3	57'.1	267° 03'.5	46'.6	320° 58'.9	22'.5	165° 45'.2	49'.7
04	13° 22'.1	241° 20'.6	56'.4	282° 04'.1	46'.7	336° 01'.2	22'.6	180° 47'.5	49'.8
05	28° 24'.5	256° 19'.9	55'.6	297° 04'.7	46'.7	351° 03'.4	22'.6	195° 49'.7	49'.9
06	43° 27'.0	271° 19'.2	54'.9	312° 05'.4	46'.7	6° 05'.7	22'.7	210° 52'.0	50'.0
07	58° 29'.5	286° 18'.5	54'.1	327° 06'.0	46'.7	21° 08'.0	22'.8	225° 54'.3	50'.1
08	73° 31'.9	301° 17'.8	53'.4	342° 06'.7	46'.7	36° 10'.2	22'.8	240° 56'.6	50'.2
09	88° 34'.4	316° 17'.1	52'.6	357° 07'.3	46'.7	51° 12'.5	22'.9	255° 58'.9	50'.3
10	103° 36'.8	331° 16'.4	51'.8	12° 07'.9	46'.8	66° 14'.8	22'.9	271° 01'.2	50'.3
11	118° 39'.3	346° 15'.7	51'.1	27° 08'.6	46'.8	81° 17'.0	23'.0	286° 03'.4	50'.4
12	133° 41'.8	1° 15'.0	18° 50'.3 N	42° 09'.2	23° 46'.8 N	96° 19'.3	13° 23'.0 N	301° 05'.7	2° 50'.5 S
13	148° 44'.2	16° 14'.3	49'.5	57° 09'.9	46'.8	111° 21'.6	23'.1	316° 08'.0	50'.6
14	163° 46'.7	31° 13'.6	48'.8	72° 10'.5	46'.8	126° 23'.8	23'.1	331° 10'.3	50'.7
15	178° 49'.2	46° 12'.9	48'.0	87° 11'.1	46'.8	141° 26'.1	23'.2	346° 12'.6	50'.8
16	193° 51'.6	61° 12'.2	47'.2	102° 11'.8	46'.8	156° 28'.4	23'.2	1° 14'.9	50'.8
17	208° 54'.1	76° 11'.6	46'.5	117° 12'.4	46'.8	171° 30'.7	23'.3	16° 17'.1	50'.9
18	223° 56'.6	91° 10'.9	45'.7	132° 13'.1	46'.9	186° 32'.9	23'.4	31° 19'.4	51'.0
19	238° 59'.0	106° 10'.2	44'.9	147° 13'.7	46'.9	201° 35'.2	23'.4	46° 21'.7	51'.1
20	254° 01'.5	121° 09'.5	44'.2	162° 14'.3	46'.9	216° 37'.5	23'.5	61° 24'.0	51'.2
21	269° 03'.9	136° 08'.8	43'.4	177° 15'.0	46'.9	231° 39'.7	23'.5	76° 26'.3	51'.3
22	284° 06'.4	151° 08'.1	42'.6	192° 15'.6	46'.9	246° 42'.0	23'.6	91° 28'.5	51'.4
23	299° 08'.9	166° 07'.4	41'.8	207° 16'.3	46'.9	261° 44'.3	23'.6	106° 30'.8	51'.4
6 00	314° 11'.3	181° 06'.7	18° 41'.1 N	222° 16'.9	23° 46'.9 N	276° 46'.6	13° 23'.7 N	121° 33'.1	2° 51'.5 S
01	329° 13'.8	196° 06'.1	40'.3	237° 17'.5	46'.9	291° 48'.8	23'.7	136° 35'.4	51'.6
02	344° 16'.3	211° 05'.4	39'.5	252° 18'.2	46'.9	306° 51'.1	23'.8	151° 37'.7	51'.7
03	359° 18'.7	226° 04'.7	38'.7	267° 18'.8	47'.0	321° 53'.4	23'.8	166° 40'.0	51'.8
04	14° 21'.2	241° 04'.0	37'.9	282° 19'.5	47'.0	336° 55'.6	23'.9	181° 42'.2	51'.9
05	29° 23'.7	256° 03'.3	37'.2	297° 20'.1	47'.0	351° 57'.9	23'.9	196° 44'.5	52'.0
06	44° 26'.1	271° 02'.6	36'.4	312° 20'.8	47'.0	7° 00'.2	24'.0	211° 46'.8	52'.0
07	59° 28'.6	286° 01'.9	35'.6	327° 21'.4	47'.0	22° 02'.5	24'.0	226° 49'.1	52'.1
08	74° 31'.1	301° 01'.3	34'.8	342° 22'.0	47'.0	37° 04'.7	24'.1	241° 51'.4	52'.2
09	89° 33'.5	316° 00'.6	34'.0	357° 22'.7	47'.0	52° 07'.0	24'.1	256° 53'.6	52'.3
10	104° 36'.0	330° 59'.9	33'.3	12° 23'.3	47'.0	67° 09'.3	24'.2	271° 55'.9	52'.4
11	119° 38'.4	345° 59'.2	32'.5	27° 24'.0	47'.0	82° 11'.6	24'.2	286° 58'.2	52'.5
12	134° 40'.9	0° 58'.5	18° 31'.7 N	42° 24'.6	23° 47'.0 N	97° 13'.8	13° 24'.3 N	302° 00'.5	2° 52'.6 S
13	149° 43'.4	15° 57'.8	30'.9	57° 25'.3	47'.0	112° 16'.1	24'.3	317° 02'.8	52'.6
14	164° 45'.8	30° 57'.2	30'.1	72° 25'.9	47'.0	127° 18'.4	24'.4	332° 05'.0	52'.7
15	179° 48'.3	45° 56'.5	29'.3	87° 26'.5	47'.0	142° 20'.7	24'.5	347° 07'.3	52'.8
16	194° 50'.8	60° 55'.8	28'.5	102° 27'.2	47'.0	157° 23'.0	24'.5	2° 09'.6	52'.9
17	209° 53'.2	75° 55'.1	27'.7	117° 27'.8	47'.0	172° 25'.2	24'.6	17° 11'.9	53'.0
18	224° 55'.7	90° 54'.4	26'.9	132° 28'.5	47'.1	187° 27'.5	24'.6	32° 14'.2	53'.1
19	239° 58'.2	105° 53'.8	26'.1	147° 29'.1	47'.1	202° 29'.8	24'.7	47° 16'.4	53'.2
20	255° 00'.6	120° 53'.1	25'.4	162° 29'.8	47'.1	217° 32'.1	24'.7	62° 18'.7	53'.2
21	270° 03'.1	135° 52'.4	24'.6	177° 30'.4	47'.1	232° 34'.3	24'.8	77° 21'.0	53'.3
22	285° 05'.6	150° 51'.7	23'.8	192° 31'.0	47'.1	247° 36'.6	24'.8	92° 23'.3	53'.4
23	300° 08'.0	165° 51'.1	23'.0	207° 31'.7	47'.1	262° 38'.9	24'.9	107° 25'.6	53'.5
7 00	315° 10'.5	180° 50'.4	18° 22'.2 N	222° 32'.3	23° 47'.1 N	277° 41'.2	13° 24'.9 N	122° 27'.8	2° 53'.6 S
01	330° 12'.9	195° 49'.7	21'.4	237° 33'.0	47'.1	292° 43'.5	25'.0	137° 30'.1	53'.7
02	345° 15'.4	210° 49'.0	20'.6	252° 33'.6	47'.1	307° 45'.7	25'.0	152° 32'.4	53'.8
03	0° 17'.9	225° 48'.4	19'.8	267° 34'.3	47'.1	322° 48'.0	25'.1	167° 34'.7	53'.8
04	15° 20'.3	240° 47'.7	19'.0	282° 34'.9	47'.1	337° 50'.3	25'.1	182° 36'.9	53'.9
05	30° 22'.8	255° 47'.0	18'.2	297° 35'.6	47'.1	352° 52'.6	25'.2	197° 39'.2	54'.0
06	45° 25'.3	270° 46'.3	17'.4	312° 36'.2	47'.1	7° 54'.9	25'.2	212° 41'.5	54'.1
07	60° 27'.7	285° 45'.7	16'.6	327° 36'.8	47'.1	22° 57'.1	25'.3	227° 43'.8	54'.2
08	75° 30'.2	300° 45'.0	15'.8	342° 37'.5	47'.1	37° 59'.4	25'.3	242° 46'.1	54'.3
09	90° 32'.7	315° 44'.3	15'.0	357° 38'.1	47'.1	53° 01'.7	25'.4	257° 48'.3	54'.4
10	105° 35'.1	330° 43'.7	14'.1	12° 38'.8	47'.1	68° 04'.0	25'.4	272° 50'.6	54'.5
11	120° 37'.6	345° 43'.0	13'.3	27° 39'.4	47'.1	83° 06'.3	25'.5	287° 52'.9	54'.5
12	135° 40'.0	0° 42'.3	18° 12'.5 N	42° 40'.1	23° 47'.1 N	98° 08'.6	13° 25'.5 N	302° 55'.2	2° 54'.6 S
13	150° 42'.5	15° 41'.6	11'.7	57° 40'.7	47'.1	113° 10'.8	25'.6	317° 57'.4	54'.7
14	165° 45'.0	30° 41'.0	10'.9	72° 41'.4	47'.1	128° 13'.1	25'.6	332° 59'.7	54'.8
15	180° 47'.4	45° 40'.3	10'.1	87° 42'.0	47'.1	143° 15'.4	25'.7	348° 02'.0	54'.9
16	195° 49'.9	60° 39'.6	09'.3	102° 42'.7	47'.0	158° 17'.7	25'.7	3° 04'.3	55'.0
17	210° 52'.4	75° 39'.0	08'.5	117° 43'.3	47'.0	173° 20'.0	25'.8	18° 06'.6	55'.1
18	225° 54'.8	90° 38'.3	07'.7	132° 43'.9	47'.0	188° 22'.3	25'.8	33° 08'.8	55'.1
19	240° 57'.3	105° 37'.6	06'.9	147° 44'.6	47'.0	203° 24'.6	25'.8	48° 11'.1	55'.2
20	255° 59'.8	120° 37'.0	06'.0	162° 45'.2	47'.0	218° 26'.8	25'.9	63° 13'.4	55'.3
21	271° 02'.2	135° 36'.3	05'.2	177° 45'.9	47'.0	233° 29'.1	25'.9	78° 15'.7	55'.4
22	286° 04'.7	150° 35'.6	04'.4	192° 46'.5	47'.0	248° 31'.4	26'.0	93° 17'.9	55'.5
23	301° 07'.2	165° 35'.0	03'.6	207° 47'.2	47'.0	263° 33'.7	26'.0	108° 20'.2	55'.6
	M.P. 02:59	v -0'.7	d 0'.8	v 0'.6	d 0'.0	v 2'.3	d 0'.1	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.3	40° 15'.2 S
Achernar	335° 27'.5	57° 10'.3 S
Acrux	173° 11'.3	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.2 S
Aldebaran	290° 51'.0	16° 31'.9 N
Alioth	166° 22'.0	55° 54'.0 N
Alkaid	153° 00'.0	49° 15'.5 N
Alnair	27° 44'.9	46° 54'.0 S
Alnilam	275° 47'.9	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.7 N
Alpheratz	357° 44'.6	29° 09'.3 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.7	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 56'.9	19° 07'.5 N
Atria	107° 30'.4	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.6 N
Betelgeuse	271° 02'.9	7° 24'.5 N
Canopus	263° 57'.2	52° 42'.0 S
Capella	280° 36'.7	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.5 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.0	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.4 N
Elnath	278° 14'.5	28° 36'.9 N
Eltanin	90° 46'.4	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.1	29° 33'.3 S
Gacrux	172° 02'.8	57° 11'.0 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 49'.9	60° 26'.0 S
Hamal	328° 02'.2	23° 31'.1 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.8	74° 06'.7 N
Markab	13° 39'.4	15° 16'.2 N
Menkar	314° 16'.4	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.0 S
Mirfak	308° 42'.3	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 25'.3	89° 18'.6 N
Pollux	243° 29'.7	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.5	8° 11'.2 S
Rigil Kent	139° 53'.5	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.8	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.2	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.8 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	226° 55'.4	11:56
Mars	268° 05'.6	09:10
Jupiter	322° 35'.2	05:32
Saturn	167° 21'.8	15:51

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 28'.6	17° 07'.1 N	113° 42'.9	8'.8	12° 59'.3 S	11'.9	59'.6
193° 28'.7	06'.4	128° 10'.7	8'.8	13° 11'.2 S	11'.8	
208° 28'.8	05'.8	142° 38'.5	8'.7	23'.0	11'.8	
223° 28'.8	05'.1	157° 06'.2	8'.7	34'.8	11'.6	59'.5
238° 28'.9	04'.4	171° 33'.9	8'.6	46'.4	11'.6	
253° 28'.9	03'.8	186° 01'.5	8'.6	58'.0	11'.4	
268° 29'.0	03'.1	200° 29'.1	8'.6	14° 09'.4 S	11'.4	
283° 29'.1	02'.4	214° 56'.7	8'.5	20'.8	11'.3	
298° 29'.1	01'.7	229° 24'.2	8'.5	32'.1	11'.2	
313° 29'.2	01'.1	243° 51'.7	8'.4	43'.3	11'.1	
328° 29'.3	00'.4	258° 19'.1	8'.4	54'.4	11'.0	59'.4
343° 29'.3	16° 59'.7 N	272° 46'.5	8'.4	15° 05'.4 S	10'.9	
358° 29'.4	16° 59'.0 N	287° 13'.9	8'.3	15° 16'.3 S	10'.8	59'.4
13° 29'.4	58'.4	301° 41'.2	8'.3	27'.1	10'.7	
28° 29'.5	57'.7	316° 08'.5	8'.2	37'.8	10'.6	
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58° 29'.6	56'.3	345° 02'.9	8'.1	59'.0	10'.4	
73° 29'.7	55'.7	359° 30'.0	8'.1	16° 09'.4 S	10'.3	59'.3
88° 29'.8	55'.0	13° 57'.1	8'.1	19'.7	10'.2	
103° 29'.8	54'.3	28° 24'.2	8'.0	29'.9	10'.1	
118° 29'.9	53'.6	42° 51'.2	8'.0	40'.0	10'.0	
133° 30'.0	52'.9	57° 18'.2	7'.9	50'.0	9'.9	
148° 30'.0	52'.3	71° 45'.1	7'.9	59'.9	9'.7	
163° 30'.1	51'.6	86° 12'.0	7'.9	17° 09'.6 S	9'.7	59'.2
178° 30'.1	16° 50'.9 N	100° 38'.9	7'.8	17° 19'.3 S	9'.6	59'.2
193° 30'.2	50'.2	115° 05'.7	7'.7	28'.9	9'.4	
208° 30'.3	49'.5	129° 32'.4	7'.8	38'.3	9'.3	
223° 30'.3	48'.9	143° 59'.2	7'.6	47'.6	9'.3	
238° 30'.4	48'.2	158° 25'.8	7'.7	56'.9	9'.1	
253° 30'.5	47'.5	172° 52'.5	7'.6	18° 06'.0 S	9'.0	59'.1
268° 30'.5	46'.8	187° 19'.1	7'.6	15'.0	8'.8	
283° 30'.6	46'.1	201° 45'.7	7'.5	23'.8	8'.8	
298° 30'.7	45'.4	216° 12'.2	7'.5	32'.6	8'.6	
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328° 30'.8	44'.1	245° 05'.1	7'.4	49'.7	8'.4	
343° 30'.9	43'.4	259° 31'.5	7'.4	58'.1	8'.3	59'.0
358° 31'.0	16° 42'.7 N	273° 57'.9	7'.3	19° 06'.4 S	8'.2	59'.0
13° 31'.0	42'.0	288° 24'.2	7'.3	14'.6	8'.0	
28° 31'.1	41'.3	302° 50'.5	7'.3	22'.6	7'.9	
43° 31'.2	40'.6	317° 16'.8	7'.2	30'.5	7'.8	
58° 31'.2	39'.9	331° 43'.0	7'.2	38'.3	7'.6	58'.9
73° 31'.3	39'.2	346° 09'.2	7'.1	45'.9	7'.6	
88° 31'.4	38'.6	0° 35'.3	7'.1	53'.5	7'.4	
103° 31'.4	37'.9	15° 01'.4	7'.1	20° 00'.9 S	7'.2	
118° 31'.5	37'.2	29° 27'.5	7'.1	08'.1	7'.2	
133° 31'.6	36'.5	43° 53'.6	7'.0	15'.3	7'.0	
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163° 31'.7	35'.1	72° 45'.6	6'.9	29'.2	6'.7	
178° 31'.8	16° 34'.4 N	87° 11'.5	6'.9	20° 35'.9 S	6'.6	58'.8
193° 31'.9	33'.7	101° 37'.4	6'.9	42'.5	6'.5	
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238° 32'.1	31'.6	144° 55'.0	6'.9	21° 01'.6 S	6'.1	
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283° 32'.3	29'.6	188° 12'.4	6'.7	19'.5	5'.6	
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343° 32'.6	26'.8	245° 55'.2	6'.6	41'.3	5'.2	
358° 32'.7	16° 26'.1 N	260° 20'.8	6'.7	21° 46'.5 S	5'.0	58'.6
13° 32'.8	25'.4	274° 46'.5	6'.6	51'.5	4'.8	58'.5
28° 32'.8	24'.7	289° 12'.1	6'.5	56'.3	4'.7	
43° 32'.9	24'.0	303° 37'.6	6'.6	22° 01'.0 S	4'.6	
58° 33'.0	23'.3	318° 03'.2	6'.6	05'.6	4'.4	
73° 33'.1	22'.6	332° 28'.8	6'.5	10'.0	4'.3	
88° 33'.2	21'.9	346° 54'.3	6'.5	14'.3	4'.1	58'.4
103° 33'.2	21'.2	1° 19'.8	6'.6	18'.4	4'.0	
118° 33'.3	20'.5	15° 45'.4	6'.5	22'.4	3'.9	
133° 33'.4	19'.8	30° 10'.9	6'.5	26'.3	3'.7	
148° 33'.5	19'.1	44° 36'.4	6'.5	30'.0	3'.6	
163° 33'.5	18'.4	59° 01'.9	6'.4	33'.6	3'.4	58'.3
SD 15'.8	d 0'.7	SD	16'.2	16'.1	16'.0	

MOON						
GHA	v	Dec	d	HP
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128° 10'.7	8'.8	13° 11'.2 S	11'.8	
142° 38'.5	8'.7	23'.0	11'.8	
157° 06'.2	8'.7	34'.8	11'.6	59'.5
171° 33'.9	8'.6	46'.4	11'.6	
186° 01'.5	8'.6	58'.0	11'.4	
200° 29'.1	8'.6	14° 09'.4 S	11'.4	
214° 56'.7	8'.5	20'.8	11'.3	
229° 24'.2	8'.5	32'.1	11'.2	
243° 51'.7	8'.4	43'.3	11'.1	
258° 19'.1	8'.4	54'.4	11'.0	59'.4
272° 46'.5	8'.4	15° 05'.4 S	10'.9	
287° 13'.9	8'.3	15° 16'.3 S	10'.8	59'.4
301° 41'.2	8'.3	27'.1	10'.7	
316° 08'.5	8'.2	37'.8	10'.6	
330° 35'.7	8'.2	48'.4	10'.6	
345° 02'.9	8'.1	59'.0	10'.4	
359° 30'.0	8'.1	16° 09'.4 S	10'.3	59'.3
13° 57'.1	8'.1	19'.7	10'.2	
28° 24'.2	8'.0	29'.9	10'.1	
42° 51'.2	8'.0	40'.0	10'.0	
57° 18'.2	7'.9	50'.0	9'.9	
71° 45'.1	7'.9	59'.9	9'.7	
86° 12'.0	7'.9	17° 09'.6 S	9'.7	59'.2
100° 38'.9	7'.8	17° 19'.3 S	9'.6	59'.2
115° 05'.7	7'.7	28'.9	9'.4	
129° 32'.4	7'.8	38'.3	9'.3	
143° 59'.2	7'.6	47'.6	9'.3	
158° 25'.8	7'.7	56'.9	9'.1	
172° 52'.5	7'.6	18° 06'.0 S	9'.0	59'.1
187° 19'.1	7'.6	15'.0	8'.8	
201° 45'.7	7'.5	23'.8	8'.8	
216° 12'.2	7'.5	32'.6	8'.6	
230° 38'.7	7'.4	41'.2	8'.5	
245° 05'.1	7'.4	49'.7	8'.4	
259° 31'.5	7'.4	58'.1	8'.3	59'.0
273° 57'.9	7'.3	19° 06'.4 S	8'.2	59'.0
288° 24'.2	7'.3	14'.6	8'.0	
302° 50'.5	7'.3	22'.6	7'.9	
317° 16'.8	7'.2	30'.5	7'.8	
331° 43'.0	7'.2	38'.3	7'.6	58'.9
346° 09'.2	7'.1	45'.9	7'.6	
0° 35'.3	7'.1	53'.5	7'.4	
15° 01'.4	7'.1	20° 00'.9 S	7'.2	
29° 27'.5	7'.1	08'.1	7'.2	
43° 53'.6	7'.0	15'.3	7'.0	
58° 19'.6	7'.0	22'.3	6'.9	58'.8
72° 45'.6	6'.9	29'.2	6'.7	
87° 11'.5	6'.9	20° 35'.9 S	6'.6	58'.8
101° 37'.4	6'.9	42'.5	6'.5	
116° 03'.3	6'.9	49'.0	6'.4	
130° 29'.2	6'.8	55'.4	6'.2	58'.7
144° 55'.0	6'.9	21° 01'.6 S	6'.1	
159° 20'.9	6'.7	07'.7	5'.9	
173° 46'.6	6'.8	13'.6	5'.9	
188° 12'.4	6'.7	19'.5	5'.6	
202° 38'.1	6'.7	25'.1	5'.6	58'.6
217° 03'.8	6'.7	30'.7	5'.4	
231° 29'.5	6'.7	36'.1	5'.2	
245° 55'.2	6'.6	41'.3	5'.2	
260° 20'.8	6'.7	21° 46'.5 S	5'.0	58'.6
274° 46'.5	6'.6	51'.5	4'.8	58'.5
289° 12'.1	6'.5	56'.3	4'.7	
303° 37'.6	6'.6	22° 01'.0 S	4'.6	
318° 03'.2	6'.6	05'.6	4'.4	
332° 28'.8	6'.5	10'.0	4'.3	
346° 54'.3	6'.5	14'.3	4'.1	58'.4
1° 19'.8	6'.6	18'.4	4'.0	
15° 45'.4	6'.5	22'.4	3'.9	
30° 10'.9	6'.5	26'.3	3'.7	
44° 36'.4	6'.5	30'.0	3'.6	
59° 01'.9	6'.4	33'.6	3'.4	58'.3
SD	16'.2	16'.1	16'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 5	Moonrise 6	Moonrise 7
N 72°	-	-	00:51	15:05	-	-
N 70°	-	-	02:02	14:21	-	-
68°	-	-	02:38	13:53	16:05	-
66°	-	01:20	03:03	13:31	15:26	17:20
64°	-	02:05	03:23	13:14	14:59	16:38
62°	-	02:33	03:38	13:00	14:38	16:09
60°	01:12	02:54	03:52	12:48	14:22	15:48
N 58°	01:53	03:12	04:03	12:38	14:08	15:30
56°	02:19	03:26	04:13	12:30	13:55	15:15
54°	02:39	03:38	04:21	12:22	13:45	15:02
52°	02:55	03:49	04:29	12:15	13:36	14:51
50°	03:09	03:58	04:36	12:09	13:27	14:41
45°	03:36	04:17	04:51	11:55	13:10	14:20
N 40°	03:56	04:33	05:03	11:44	12:55	14:03
35°	04:12	04:45	05:13	11:35	12:43	13:49
30°	04:25	04:56	05:22	11:27	12:32	13:37
20°	04:46	05:14	05:37	11:13	12:14	13:16
N 10°	05:02	05:28	05:50	11:00	11:59	12:58
0°	05:16	05:41	06:02	10:49	11:44	12:41
S 10°	05:27	05:53	06:15	10:38	11:30	12:24
20°	05:38	06:04	06:27	10:26	11:14	12:06
30°	05:48	06:17	06:42	10:12	10:57	11:46
35°	05:54	06:24	06:50	10:05	10:47	11:34
40°	05:59	06:31	07:00	09:56	10:35	11:20
45°	06:05	06:40	07:11	09:46	10:21	11:04
S 50°	06:11	06:50	07:24	09:33	10:05	10:44
52°	06:14	06:54	07:31	09:28	09:57	10:34

2011 August 8, 9, 10 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.5		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
8 00	316° 09'.6	180° 34'.3	18° 02'.8 N	222° 47'.8	23° 47'.0 N	278° 36'.0	13° 26'.1 N	123° 22'.5	2° 55'.7 S
01	331° 12'.1	195° 33'.6	01'.9	237° 48'.5	47'.0	293° 38'.3	26'.1	138° 24'.8	55'.8
02	346° 14'.5	210° 33'.0	01'.1	252° 49'.1	47'.0	308° 40'.6	26'.2	153° 27'.0	55'.8
03	1° 17'.0	225° 32'.3	00'.3	267° 49'.8	47'.0	323° 42'.8	26'.2	168° 29'.3	55'.9
04	16° 19'.5	240° 31'.7	17° 59'.5 N	282° 50'.4	47'.0	338° 45'.1	26'.3	183° 31'.6	56'.0
05	31° 21'.9	255° 31'.0	58'.7	297° 51'.1	47'.0	353° 47'.4	26'.3	198° 33'.9	56'.1
06	46° 24'.4	270° 30'.3	57'.8	312° 51'.7	47'.0	8° 49'.7	26'.4	213° 36'.1	56'.2
07	61° 26'.9	285° 29'.7	57'.0	327° 52'.4	47'.0	23° 52'.0	26'.4	228° 38'.4	56'.3
08	76° 29'.3	300° 29'.0	56'.2	342° 53'.0	46'.9	38° 54'.3	26'.5	243° 40'.7	56'.4
09	91° 31'.8	315° 28'.4	55'.4	357° 53'.7	46'.9	53° 56'.6	26'.5	258° 43'.0	56'.5
10	106° 34'.3	330° 27'.7	54'.5	12° 54'.3	46'.9	68° 58'.9	26'.6	273° 45'.2	56'.5
11	121° 36'.7	345° 27'.0	53'.7	27° 55'.0	46'.9	84° 01'.2	26'.6	288° 47'.5	56'.6
12	136° 39'.2	0° 26'.4	17° 52'.9 N	42° 55'.6	23° 46'.9 N	99° 03'.4	13° 26'.7 N	303° 49'.8	2° 56'.7 S
13	151° 41'.7	15° 25'.7	52'.0	57° 56'.3	46'.9	114° 05'.7	26'.7	318° 52'.1	56'.8
14	166° 44'.1	30° 25'.1	51'.2	72° 56'.9	46'.9	129° 08'.0	26'.8	333° 54'.3	56'.9
15	181° 46'.6	45° 24'.4	50'.4	87° 57'.5	46'.9	144° 10'.3	26'.8	348° 56'.6	57'.0
16	196° 49'.0	60° 23'.7	49'.6	102° 58'.2	46'.9	159° 12'.6	26'.8	3° 58'.9	57'.1
17	211° 51'.5	75° 23'.1	48'.7	117° 58'.8	46'.8	174° 14'.9	26'.9	19° 01'.2	57'.2
18	226° 54'.0	90° 22'.4	47'.9	132° 59'.5	46'.8	189° 17'.2	26'.9	34° 03'.4	57'.3
19	241° 56'.4	105° 21'.8	47'.0	148° 00'.1	46'.8	204° 19'.5	27'.0	49° 05'.7	57'.3
20	256° 58'.9	120° 21'.1	46'.2	163° 00'.8	46'.8	219° 21'.8	27'.0	64° 08'.0	57'.4
21	272° 01'.4	135° 20'.5	45'.4	178° 01'.4	46'.8	234° 24'.1	27'.1	79° 10'.3	57'.5
22	287° 03'.8	150° 19'.8	44'.5	193° 02'.1	46'.8	249° 26'.4	27'.1	94° 12'.5	57'.6
23	302° 06'.3	165° 19'.2	43'.7	208° 02'.7	46'.8	264° 28'.7	27'.2	109° 14'.8	57'.7
9 00	317° 08'.8	180° 18'.5	17° 42'.9 N	223° 03'.4	23° 46'.7 N	279° 31'.0	13° 27'.2 N	124° 17'.1	2° 57'.8 S
01	332° 11'.2	195° 17'.9	42'.0	238° 04'.0	46'.7	294° 33'.3	27'.3	139° 19'.4	57'.9
02	347° 13'.7	210° 17'.2	41'.2	253° 04'.7	46'.7	309° 35'.5	27'.3	154° 21'.6	58'.0
03	2° 16'.2	225° 16'.5	40'.3	268° 05'.4	46'.7	324° 37'.8	27'.4	169° 23'.9	58'.0
04	17° 18'.6	240° 15'.9	39'.5	283° 06'.0	46'.7	339° 40'.1	27'.4	184° 26'.2	58'.1
05	32° 21'.1	255° 15'.2	38'.6	298° 06'.7	46'.7	354° 42'.4	27'.4	199° 28'.5	58'.2
06	47° 23'.5	270° 14'.6	37'.8	313° 07'.3	46'.7	9° 44'.7	27'.5	214° 30'.7	58'.3
07	62° 26'.0	285° 13'.9	37'.0	328° 08'.0	46'.6	24° 47'.0	27'.5	229° 33'.0	58'.4
08	77° 28'.5	300° 13'.3	36'.1	343° 08'.6	46'.6	39° 49'.3	27'.6	244° 35'.3	58'.5
09	92° 30'.9	315° 12'.6	35'.3	358° 09'.3	46'.6	54° 51'.6	27'.6	259° 37'.5	58'.6
10	107° 33'.4	330° 12'.0	34'.4	13° 09'.9	46'.6	69° 53'.9	27'.7	274° 39'.8	58'.7
11	122° 35'.9	345° 11'.3	33'.6	28° 10'.6	46'.6	84° 56'.2	27'.7	289° 42'.1	58'.8
12	137° 38'.3	0° 10'.7	17° 32'.7 N	43° 11'.2	23° 46'.5 N	99° 58'.5	13° 27'.8 N	304° 44'.4	2° 58'.8 S
13	152° 40'.8	15° 10'.1	31'.9	58° 11'.9	46'.5	115° 00'.8	27'.8	319° 46'.6	58'.9
14	167° 43'.3	30° 09'.4	31'.0	73° 12'.5	46'.5	130° 03'.1	27'.8	334° 48'.9	59'.0
15	182° 45'.7	45° 08'.8	30'.2	88° 13'.2	46'.5	145° 05'.4	27'.9	349° 51'.2	59'.1
16	197° 48'.2	60° 08'.1	29'.3	103° 13'.8	46'.5	160° 07'.7	27'.9	4° 53'.4	59'.2
17	212° 50'.7	75° 07'.5	28'.5	118° 14'.5	46'.4	175° 10'.0	28'.0	19° 55'.7	59'.3
18	227° 53'.1	90° 06'.8	27'.6	133° 15'.1	46'.4	190° 12'.3	28'.0	34° 58'.0	59'.4
19	242° 55'.6	105° 06'.2	26'.7	148° 15'.8	46'.4	205° 14'.6	28'.1	50° 00'.3	59'.5
20	257° 58'.0	120° 05'.5	25'.9	163° 16'.4	46'.4	220° 16'.9	28'.1	65° 02'.5	59'.6
21	273° 00'.5	135° 04'.9	25'.0	178° 17'.1	46'.4	235° 19'.2	28'.1	80° 04'.8	59'.6
22	288° 03'.0	150° 04'.3	24'.2	193° 17'.7	46'.3	250° 21'.5	28'.2	95° 07'.1	59'.7
23	303° 05'.4	165° 03'.6	23'.3	208° 18'.4	46'.3	265° 23'.8	28'.2	110° 09'.3	59'.8
10 00	318° 07'.9	180° 03'.0	17° 22'.5 N	223° 19'.1	23° 46'.3 N	280° 26'.1	13° 28'.3 N	125° 11'.6	2° 59'.9 S
01	333° 10'.4	195° 02'.3	21'.6	238° 19'.7	46'.3	295° 28'.4	28'.3	140° 13'.9	3° 00'.0 S
02	348° 12'.8	210° 01'.7	20'.7	253° 20'.4	46'.2	310° 30'.7	28'.4	155° 16'.2	00'.1
03	3° 15'.3	225° 01'.0	19'.9	268° 21'.0	46'.2	325° 33'.0	28'.4	170° 18'.4	00'.2
04	18° 17'.8	240° 00'.4	19'.0	283° 21'.7	46'.2	340° 35'.3	28'.5	185° 20'.7	00'.3
05	33° 20'.2	254° 59'.8	18'.1	298° 22'.3	46'.2	355° 37'.6	28'.5	200° 23'.0	00'.4
06	48° 22'.7	269° 59'.1	17'.3	313° 23'.0	46'.2	10° 39'.9	28'.5	215° 25'.2	00'.5
07	63° 25'.1	284° 58'.5	16'.4	328° 23'.6	46'.1	25° 42'.2	28'.6	230° 27'.5	00'.5
08	78° 27'.6	299° 57'.9	15'.5	343° 24'.3	46'.1	40° 44'.5	28'.6	245° 29'.8	00'.6
09	93° 30'.1	314° 57'.2	14'.7	358° 24'.9	46'.1	55° 46'.8	28'.7	260° 32'.1	00'.7
10	108° 32'.5	329° 56'.6	13'.8	13° 25'.6	46'.0	70° 49'.1	28'.7	275° 34'.3	00'.8
11	123° 35'.0	344° 55'.9	12'.9	28° 26'.3	46'.0	85° 51'.4	28'.7	290° 36'.6	00'.9
12	138° 37'.5	359° 55'.3	17° 12'.1 N	43° 26'.9	23° 46'.0 N	100° 53'.7	13° 28'.8 N	305° 38'.9	3° 01'.0 S
13	153° 39'.9	14° 54'.7	11'.2	58° 27'.6	46'.0	115° 56'.0	28'.8	320° 41'.1	01'.1
14	168° 42'.4	29° 54'.0	10'.3	73° 28'.2	45'.9	130° 58'.4	28'.9	335° 43'.4	01'.2
15	183° 44'.9	44° 53'.4	09'.5	88° 28'.9	45'.9	146° 00'.7	28'.9	350° 45'.7	01'.3
16	198° 47'.3	59° 52'.8	08'.6	103° 29'.5	45'.9	161° 03'.0	29'.0	5° 47'.9	01'.4
17	213° 49'.8	74° 52'.1	07'.7	118° 30'.2	45'.9	176° 05'.3	29'.0	20° 50'.2	01'.4
18	228° 52'.3	89° 51'.5	06'.8	133° 30'.8	45'.8	191° 07'.6	29'.0	35° 52'.5	01'.5
19	243° 54'.7	104° 50'.9	06'.0	148° 31'.5	45'.8	206° 09'.9	29'.1	50° 54'.7	01'.6
20	258° 57'.2	119° 50'.2	05'.1	163° 32'.2	45'.8	221° 12'.2	29'.1	65° 57'.0	01'.7
21	273° 59'.6	134° 49'.6	04'.2	178° 32'.8	45'.7	236° 14'.5	29'.2	80° 59'.3	01'.8
22	289° 02'.1	149° 49'.0	03'.3	193° 33'.5	45'.7	251° 16'.8	29'.2	96° 01'.6	01'.9
23	304° 04'.6	164° 48'.3	02'.4	208° 34'.1	45'.7	266° 19'.1	29'.2	111° 03'.8	02'.0
	M.P. 02:47	v -0'.6	d 0'.9	v 0'.7	d 0'.0	v 2'.3	d 0'.0	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.3	40° 15'.2 S
Achernar	335° 27'.5	57° 10'.3 S
Acrux	173° 11'.3	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.2 S
Aldebaran	290° 51'.0	16° 31'.9 N
Alioth	166° 22'.0	55° 54'.0 N
Alkaid	153° 00'.0	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.9	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.8 N
Alpheratz	357° 44'.6	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.7	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.5 N
Atria	107° 30'.4	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.6 N
Betelgeuse	271° 02'.9	7° 24'.5 N
Canopus	263° 57'.1	52° 42'.0 S
Capella	280° 36'.6	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.5 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.0	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.4 N
Elnath	278° 14'.5	28° 36'.9 N
Eltanin	90° 46'.4	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.1	29° 33'.3 S
Gacrux	172° 02'.8	57° 11'.0 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 49'.9	60° 26'.0 S
Hamal	328° 02'.2	23° 31'.1 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.9	74° 06'.7 N
Markab	13° 39'.3	15° 16'.2 N
Menkar	314° 16'.4	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.0 S
Mirfak	308° 42'.3	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 23'.6	89° 18'.6 N
Pollux	243° 29'.6	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.5	8° 11'.2 S
Rigil Kent	139° 53'.5	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.7	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.1	16° 43'.9 S
Spica	158° 32'.8	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.8 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	223° 09'.7	11:59
Mars	265° 54'.6	09:07
Jupiter	322° 22'.2	05:21
Saturn	167° 08'.3	15:40

SUN				MOON					
GHA	Dec			GHA	v	Dec	d	HP	
178° 33'.6	16° 17'.7 N			73° 27'.3	6'.5	22° 37'.0 S	3'.3	58'.3	
193° 33'.7	17'.0			87° 52'.8	6'.5	40'.3	3'.1		
208° 33'.8	16'.3			102° 18'.3	6'.4	43'.4	3'.0		
223° 33'.9	15'.5			116° 43'.7	6'.5	46'.4	2'.9		
238° 33'.9	14'.8			131° 09'.2	6'.5	49'.3	2'.7	58'.2	
253° 34'.0	14'.1			145° 34'.7	6'.4	52'.0	2'.6		
268° 34'.1	13'.4			160° 00'.1	6'.5	54'.6	2'.4		
283° 34'.2	12'.7			174° 25'.6	6'.5	57'.0	2'.3		
298° 34'.3	12'.0			188° 51'.1	6'.4	59'.3	2'.1		
313° 34'.3	11'.3			203° 16'.5	6'.5	23° 01'.4 S	2'.0	58'.1	
328° 34'.4	10'.6			217° 42'.0	6'.5	03'.4	1'.9		
343° 34'.5	09'.9			232° 07'.5	6'.5	05'.3	1'.7		
358° 34'.6	16° 09'.2 N			246° 33'.0	6'.5	23° 07'.0 S	1'.5	58'.1	
13° 34'.7	08'.5			260° 58'.5	6'.5	08'.5	1'.4		
28° 34'.7	07'.8			275° 24'.0	6'.5	09'.9	1'.3	58'.0	
43° 34'.8	07'.1			289° 49'.5	6'.5	11'.2	1'.1		
58° 34'.9	06'.3			304° 15'.0	6'.6	12'.3	1'.0		
73° 35'.0	05'.6			318° 40'.6	6'.5	13'.3	0'.8		
88° 35'.1	04'.9			333° 06'.1	6'.6	14'.1	0'.7		
103° 35'.2	04'.2			347° 31'.7	6'.6	14'.8	0'.6	57'.9	
118° 35'.2	03'.5			1° 57'.3	6'.6	15'.4	0'.4		
133° 35'.3	02'.8			16° 22'.9	6'.7	15'.8	0'.2		
148° 35'.4	02'.1			30° 48'.6	6'.6	16'.0	0'.2		
163° 35'.5	01'.4			45° 14'.2	6'.7	16'.2	0'.1	57'.8	
178° 35'.6	16° 00'.6 N			59° 39'.9	6'.7	23° 16'.1 S	0'.1	57'.8	
193° 35'.7	15° 59'.9 N			74° 05'.6	6'.8	16'.0	0'.3		
208° 35'.8	59'.2			88° 31'.4	6'.7	15'.7	0'.5		
223° 35'.8	58'.5			102° 57'.1	6'.8	15'.2	0'.6		
238° 35'.9	57'.8			117° 22'.9	6'.9	14'.6	0'.7	57'.7	
253° 36'.0	57'.1			131° 48'.8	6'.8	13'.9	0'.9		
268° 36'.1	56'.4			146° 14'.6	6'.9	13'.0	1'.0		
283° 36'.2	55'.6			160° 40'.5	6'.9	12'.0	1'.2		
298° 36'.3	54'.9			175° 06'.4	7'.0	10'.8	1'.3		
313° 36'.4	54'.2			189° 32'.4	7'.0	09'.5	1'.4	57'.6	
328° 36'.4	53'.5			203° 58'.4	7'.0	08'.1	1'.6		
343° 36'.5	52'.8			218° 24'.4	7'.1	06'.5	1'.7		
358° 36'.6	15° 52'.0 N			232° 50'.5	7'.1	23° 04'.8 S	1'.8	57'.6	
13° 36'.7	51'.3			247° 16'.6	7'.1	03'.0	2'.0		
28° 36'.8	50'.6			261° 42'.7	7'.2	01'.0	2'.1	57'.5	
43° 36'.9	49'.9			276° 08'.9	7'.3	22° 58'.9 S	2'.3		
58° 37'.0	49'.2			290° 35'.2	7'.2	56'.6	2'.4		
73° 37'.1	48'.4			305° 01'.4	7'.4	54'.2	2'.5		
88° 37'.2	47'.7			319° 27'.8	7'.3	51'.7	2'.6		
103° 37'.2	47'.0			333° 54'.1	7'.5	49'.1	2'.8	57'.4	
118° 37'.3	46'.3			348° 20'.6	7'.4	46'.3	3'.0		
133° 37'.4	45'.5			2° 47'.0	7'.5	43'.3	3'.0		
148° 37'.5	44'.8			17° 13'.5	7'.6	40'.3	3'.2		
163° 37'.6	44'.1			31° 40'.1	7'.6	37'.1	3'.3	57'.3	
178° 37'.7	15° 43'.4 N			46° 06'.7	7'.7	22° 33'.8 S	3'.5	57'.3	
193° 37'.8	42'.7			60° 33'.4	7'.7	30'.3	3'.5		
208° 37'.9	41'.9			75° 00'.1	7'.8	26'.8	3'.7		
223° 38'.0	41'.2			89° 26'.9	7'.9	23'.1	3'.9		
238° 38'.1	40'.5			103° 53'.8	7'.9	19'.2	3'.9	57'.2	
253° 38'.2	39'.7			118° 20'.7	7'.9	15'.3	4'.1		
268° 38'.2	39'.0			132° 47'.6	8'.0	11'.2	4'.2		
283° 38'.3	38'.3			147° 14'.6	8'.1	07'.0	4'.4		
298° 38'.4	37'.6			161° 41'.7	8'.1	02'.6	4'.4		
313° 38'.5	36'.8			176° 08'.8	8'.2	21° 58'.2 S	4'.6	57'.1	
328° 38'.6	36'.1			190° 36'.0	8'.3	53'.6	4'.7		
343° 38'.7	35'.4			205° 03'.3	8'.3	48'.9	4'.8		
358° 38'.8	15° 34'.6 N			219° 30'.6	8'.4	21° 44'.1 S	5'.0	57'.1	
13° 38'.9	33'.9			233° 58'.0	8'.4	39'.1	5'.0		
28° 39'.0	33'.2			248° 25'.4	8'.5	34'.1	5'.2	57'.0	
43° 39'.1	32'.5			262° 52'.9	8'.6	28'.9	5'.3		
58° 39'.2	31'.7			277° 20'.5	8'.6	23'.6	5'.4		
73° 39'.3	31'.0			291° 48'.1	8'.7	18'.2	5'.5		
88° 39'.4	30'.3			306° 15'.8	8'.8	12'.7	5'.7	56'.9	
103° 39'.5	29'.5			320° 43'.6	8'.8	07'.0	5'.7		
118° 39'.6	28'.8			335° 11'.4	8'.9	01'.3	5'.9		
133° 39'.7	28'.1			349° 39'.3	9'.0	20° 55'.4 S	6'.0		
148° 39'.8	27'.3			4° 07'.3	9'.1	49'.4	6'.1		
163° 39'.9	26'.6			18° 35'.4	9'.1	43'.3	6'.2	56'.8	
SD 15'.8	d 0'.7			SD 15'.8		15'.7		15'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 8	Moonrise 9	Moonrise 10
N 72°	-	-	01:31	-	-	-
N 70°	-	-	02:21	-	-	-
68°	-	-	02:52	-	-	20:31
66°	-	01:43	03:14	18:54	19:33	19:40
64°	-	02:19	03:32	17:57	18:45	19:09
62°	-	02:44	03:47	17:24	18:14	18:45
60°	01:33	03:04	03:59	16:59	17:51	18:26
N 58°	02:05	03:19	04:09	16:39	17:33	18:10
56°	02:29	03:33	04:18	16:23	17:17	17:57
54°	02:47	03:44	04:26	16:09	17:03	17:45
52°	03:02	03:54	04:34	15:57	16:52	17:34
50°	03:15	04:03	04:40	15:46	16:41	17:25
45°	03:40	04:21	04:54	15:24	16:19	17:06
N 40°	04:00	04:36	05:05	15:06	16:02	16:50
35°	04:15	04:48	05:15	14:51	15:47	16:36
30°	04:28	04:58	05:24	14:38	15:34	16:24
20°	04:48	05:15	05:38	14:15	15:12	16:04
N 10°	05:03	05:29	05:51	13:56	14:53	15:47
0°	05:16	05:41	06:02	13:38	14:35	15:30
S 10°	05:27	05:52	06:14	13:20	14:17	15:14
20°	05:37	06:03	06:26	13:01	13:58	14:56
30°	05:46	06:15	06:39	12:39	13:36	14:36
35°	05:51	06:21	06:47	12:26	13:23	14:24
40°	05:56	06:28	06:56	12:11	13:08	14:10
45°	06:01	06:36	07:07	11:53	12:51	13:54
S 50°	06:07	06:45	07:19	11:32	12:29	13:34
52°	06:09	06:49	07:25	11:21	12:18	13:24
54°	06:11	06:54	07:32	11:09	12:06	13:13
56°	06:14	06:58	07:39	10:56	11:53	13:01
58°	06:17	07:04	07:47	10:40	11:37	12:47
S 60°	06:20	07:10	07:56	10:22	11:18	12:30
S 62°	06:23	07:17	08:07	09:59	10:55	12:10

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 8	Moonset 9	Moonset 10
N 72°	22:31	-	-	-	-	-
N 70°	21:45	-	-	-	-	-
68°	21:16	23:28	-	-	-	23:04
66°	20:54	22:22	-	20:49	22:09	23:54
64°	20:37	21:48	-	21:46	22:56	24:26
62°	20:23	21:24	23:33	22:19	23:26	24:49
60°	20:11	21:05	22:33	22:44	23:49	25:07
N 58°	20:00	20:50	22:02	23:04	-	00:08
56°	19:51	20:37	21:40	23:20	-	00:23
54°	19:43	20:25	21:22	23:34	-	00:36
52°	19:36	20:16	21:07	23:46	-	00:48
50°	19:30	20:07	20:55	23:57	-	00:58
45°	19:16	19:49	20:30	-	00:19	01:20
N 40°	19:05	19:35	20:11	-	00:37	01:37
35°	18:56	19:23	19:55	-	00:53	01:52
30°	18:47	19:13	19:43	00:10	01:06	02:04
20°	18:33	18:56	19:23	00:32	01:28	02:26
N 10°	18:20	18:42	19:08	00:51	01:47	02:44
0°	18:09	18:30	18:55	01:08	02:06	03:02
S 10°	17:58	18:19	18:45	01:26	02:24	03:19
20°	17:46	18:08	18:35	01:45	02:43	03:37
30°	17:32	17:57	18:25	02:06	03:05	03:59
35°	17:24	17:51	18:21	02:19	03:18	04:11
40°	17:15	17:44	18:16	02:34	03:33	04:25
45°	17:05	17:36	18:11	02:51	03:51	04:42
S 50°	16:52	17:27	18:05	03:13	04:13	05:02
52°	16:47	17:23	18:03	03:23	04:24	05:12
54°	16:40	17:18	18:01	03:35	04:35	05:23
56°	16:33	17:13	17:58	03:48	04:49	05:36
58°	16:25	17:08	17:55	04:03	05:05	05:50
S 60°	16:16	17:02	17:52	04:22	05:24	06:07
S 62°	16:05	16:55	17:49	04:45	05:48	06:28

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
8	5 46	5 42	12:06	19:52	07:23	9d 72%
9	5 38	5 34	12:06	20:48	08:20	10d 81%
10	5 29	5 25	12:05	21:43	09:16	11d 89%

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2011 August 11, 12, 13 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.5		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
11 Thursday 00	319° 07'.0	179° 47'.7	17° 01'.6 N	223° 34'.8	23° 45'.6 N	281° 21'.4	13° 29'.3 N	126° 06'.1	3° 02'.1 S
01	334° 09'.5	194° 47'.1	00'.7	238° 35'.4	45'.6	296° 23'.7	29'.3	141° 08'.4	02'.2
02	349° 12'.0	209° 46'.4	16° 59'.8 N	253° 36'.1	45'.6	311° 26'.0	29'.4	156° 10'.6	02'.3
03	4° 14'.4	224° 45'.8	58'.9	268° 36'.8	45'.6	326° 28'.4	29'.4	171° 12'.9	02'.3
04	19° 16'.9	239° 45'.2	58'.0	283° 37'.4	45'.5	341° 30'.7	29'.4	186° 15'.2	02'.4
05	34° 19'.4	254° 44'.6	57'.2	298° 38'.1	45'.5	356° 33'.0	29'.5	201° 17'.4	02'.5
06	49° 21'.8	269° 43'.9	56'.3	313° 38'.7	45'.5	11° 35'.3	29'.5	216° 19'.7	02'.6
07	64° 24'.3	284° 43'.3	55'.4	328° 39'.4	45'.4	26° 37'.6	29'.6	231° 22'.0	02'.7
08	79° 26'.8	299° 42'.7	54'.5	343° 40'.0	45'.4	41° 39'.9	29'.6	246° 24'.2	02'.8
09	94° 29'.2	314° 42'.1	53'.6	358° 40'.7	45'.4	56° 42'.2	29'.6	261° 26'.5	02'.9
10	109° 31'.7	329° 41'.4	52'.7	13° 41'.4	45'.3	71° 44'.5	29'.7	276° 28'.8	03'.0
11	124° 34'.1	344° 40'.8	51'.8	28° 42'.0	45'.3	86° 46'.8	29'.7	291° 31'.0	03'.1
12	139° 36'.6	359° 40'.2	16° 50'.9 N	43° 42'.7	23° 45'.2 N	101° 49'.2	13° 29'.8 N	306° 33'.3	3° 03'.2 S
13	154° 39'.1	14° 39'.6	50'.1	58° 43'.3	45'.2	116° 51'.5	29'.8	321° 35'.6	03'.2
14	169° 41'.5	29° 38'.9	49'.2	73° 44'.0	45'.2	131° 53'.8	29'.8	336° 37'.8	03'.3
15	184° 44'.0	44° 38'.3	48'.3	88° 44'.7	45'.1	146° 56'.1	29'.9	351° 40'.1	03'.4
16	199° 46'.5	59° 37'.7	47'.4	103° 45'.3	45'.1	161° 58'.4	29'.9	6° 42'.4	03'.5
17	214° 48'.9	74° 37'.1	46'.5	118° 46'.0	45'.1	177° 00'.7	30'.0	21° 44'.6	03'.6
18	229° 51'.4	89° 36'.4	45'.6	133° 46'.6	45'.0	192° 03'.0	30'.0	36° 46'.9	03'.7
19	244° 53'.9	104° 35'.8	44'.7	148° 47'.3	45'.0	207° 05'.3	30'.0	51° 49'.2	03'.8
20	259° 56'.3	119° 35'.2	43'.8	163° 48'.0	45'.0	222° 07'.7	30'.1	66° 51'.4	03'.9
21	274° 58'.8	134° 34'.6	42'.9	178° 48'.6	44'.9	237° 10'.0	30'.1	81° 53'.7	04'.0
22	290° 01'.3	149° 34'.0	42'.0	193° 49'.3	44'.9	252° 12'.3	30'.2	96° 56'.0	04'.1
23	305° 03'.7	164° 33'.3	41'.1	208° 49'.9	44'.8	267° 14'.6	30'.2	111° 58'.2	04'.2
12 Friday 00	320° 06'.2	179° 32'.7	16° 40'.2 N	223° 50'.6	23° 44'.8 N	282° 16'.9	13° 30'.2 N	127° 00'.5	3° 04'.2 S
01	335° 08'.6	194° 32'.1	39'.3	238° 51'.3	44'.8	297° 19'.2	30'.3	142° 02'.8	04'.3
02	350° 11'.1	209° 31'.5	38'.4	253° 51'.9	44'.7	312° 21'.6	30'.3	157° 05'.0	04'.4
03	5° 13'.6	224° 30'.9	37'.5	268° 52'.6	44'.7	327° 23'.9	30'.4	172° 07'.3	04'.5
04	20° 16'.0	239° 30'.2	36'.6	283° 53'.2	44'.6	342° 26'.2	30'.4	187° 09'.6	04'.6
05	35° 18'.5	254° 29'.6	35'.7	298° 53'.9	44'.6	357° 28'.5	30'.4	202° 11'.8	04'.7
06	50° 21'.0	269° 29'.0	34'.8	313° 54'.6	44'.6	12° 30'.8	30'.5	217° 14'.1	04'.8
07	65° 23'.4	284° 28'.4	33'.9	328° 55'.2	44'.5	27° 33'.1	30'.5	232° 16'.4	04'.9
08	80° 25'.9	299° 27'.8	33'.0	343° 55'.9	44'.5	42° 35'.5	30'.5	247° 18'.6	05'.0
09	95° 28'.4	314° 27'.2	32'.1	358° 56'.5	44'.4	57° 37'.8	30'.6	262° 20'.9	05'.1
10	110° 30'.8	329° 26'.6	31'.2	13° 57'.2	44'.4	72° 40'.1	30'.6	277° 23'.1	05'.2
11	125° 33'.3	344° 25'.9	30'.3	28° 57'.9	44'.4	87° 42'.4	30'.7	292° 25'.4	05'.3
12	140° 35'.7	359° 25'.3	16° 29'.3 N	43° 58'.5	23° 44'.3 N	102° 44'.7	13° 30'.7 N	307° 27'.7	3° 05'.3 S
13	155° 38'.2	14° 24'.7	28'.4	58° 59'.2	44'.3	117° 47'.1	30'.7	322° 29'.9	05'.4
14	170° 40'.7	29° 24'.1	27'.5	73° 59'.9	44'.2	132° 49'.4	30'.8	337° 32'.2	05'.5
15	185° 43'.1	44° 23'.5	26'.6	89° 00'.5	44'.2	147° 51'.7	30'.8	352° 34'.5	05'.6
16	200° 45'.6	59° 22'.9	25'.7	104° 01'.2	44'.1	162° 54'.0	30'.8	7° 36'.7	05'.7
17	215° 48'.1	74° 22'.3	24'.8	119° 01'.8	44'.1	177° 56'.3	30'.9	22° 39'.0	05'.8
18	230° 50'.5	89° 21'.7	23'.9	134° 02'.5	44'.0	192° 58'.7	30'.9	37° 41'.3	05'.9
19	245° 53'.0	104° 21'.0	23'.0	149° 03'.2	44'.0	208° 01'.0	30'.9	52° 43'.5	06'.0
20	260° 55'.5	119° 20'.4	22'.0	164° 03'.8	44'.0	223° 03'.3	31'.0	67° 45'.8	06'.1
21	275° 57'.9	134° 19'.8	21'.1	179° 04'.5	43'.9	238° 05'.6	31'.0	82° 48'.0	06'.2
22	291° 00'.4	149° 19'.2	20'.2	194° 05'.2	43'.9	253° 08'.0	31'.1	97° 50'.3	06'.3
23	306° 02'.9	164° 18'.6	19'.3	209° 05'.8	43'.8	268° 10'.3	31'.1	112° 52'.6	06'.4
13 Saturday 00	321° 05'.3	179° 18'.0	16° 18'.4 N	224° 06'.5	23° 43'.8 N	283° 12'.6	13° 31'.1 N	127° 54'.8	3° 06'.4 S
01	336° 07'.8	194° 17'.4	17'.5	239° 07'.2	43'.7	298° 14'.9	31'.2	142° 57'.1	06'.5
02	351° 10'.2	209° 16'.8	16'.5	254° 07'.8	43'.7	313° 17'.2	31'.2	157° 59'.4	06'.6
03	6° 12'.7	224° 16'.2	15'.6	269° 08'.5	43'.6	328° 19'.6	31'.2	173° 01'.6	06'.7
04	21° 15'.2	239° 15'.6	14'.7	284° 09'.2	43'.6	343° 21'.9	31'.3	188° 03'.9	06'.8
05	36° 17'.6	254° 15'.0	13'.8	299° 09'.8	43'.5	358° 24'.2	31'.3	203° 06'.2	06'.9
06	51° 20'.1	269° 14'.4	12'.8	314° 10'.5	43'.5	13° 26'.5	31'.3	218° 08'.4	07'.0
07	66° 22'.6	284° 13'.8	11'.9	329° 11'.1	43'.4	28° 28'.9	31'.4	233° 10'.7	07'.1
08	81° 25'.0	299° 13'.2	11'.0	344° 11'.8	43'.4	43° 31'.2	31'.4	248° 12'.9	07'.2
09	96° 27'.5	314° 12'.6	10'.1	359° 12'.5	43'.3	58° 33'.5	31'.4	263° 15'.2	07'.3
10	111° 30'.0	329° 11'.9	09'.1	14° 13'.1	43'.3	73° 35'.8	31'.5	278° 17'.5	07'.4
11	126° 32'.4	344° 11'.3	08'.2	29° 13'.8	43'.2	88° 38'.2	31'.5	293° 19'.7	07'.5
12	141° 34'.9	359° 10'.7	16° 07'.3 N	44° 14'.5	23° 43'.2 N	103° 40'.5	13° 31'.5 N	308° 22'.0	3° 07'.6 S
13	156° 37'.4	14° 10'.1	06'.4	59° 15'.1	43'.1	118° 42'.8	31'.6	323° 24'.3	07'.6
14	171° 39'.8	29° 09'.5	05'.4	74° 15'.8	43'.1	133° 45'.2	31'.6	338° 26'.5	07'.7
15	186° 42'.3	44° 08'.9	04'.5	89° 16'.5	43'.0	148° 47'.5	31'.7	353° 28'.8	07'.8
16	201° 44'.7	59° 08'.3	03'.6	104° 17'.1	43'.0	163° 49'.8	31'.7	8° 31'.0	07'.9
17	216° 47'.2	74° 07'.7	02'.6	119° 17'.8	42'.9	178° 52'.1	31'.7	23° 33'.3	08'.0
18	231° 49'.7	89° 07'.1	01'.7	134° 18'.5	42'.9	193° 54'.5	31'.8	38° 35'.6	08'.1
19	246° 52'.1	104° 06'.5	00'.8	149° 19'.1	42'.8	208° 56'.8	31'.8	53° 37'.8	08'.2
20	261° 54'.6	119° 05'.9	15° 59'.8 N	164° 19'.8	42'.8	223° 59'.1	31'.8	68° 40'.1	08'.3
21	276° 57'.1	134° 05'.3	58'.9	179° 20'.5	42'.7	239° 01'.5	31'.9	83° 42'.3	08'.4
22	291° 59'.5	149° 04'.7	58'.0	194° 21'.1	42'.6	254° 03'.8	31'.9	98° 44'.6	08'.5
23	307° 02'.0	164° 04'.1	57'.0	209° 21'.8	42'.6	269° 06'.1	31'.9	113° 46'.9	08'.6
	M.P. 02:35	v -0'.6	d 0'.9	v 0'.7	d 0'.0	v 2'.3	d 0'.0	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.3	40° 15'.2 S
Achernar	335° 27'.4	57° 10'.3 S
Acrux	173° 11'.3	63° 10'.1 S
Adhara	255° 13'.9	28° 59'.2 S
Aldebaran	290° 51'.0	16° 31'.9 N
Alioth	166° 22'.1	55° 54'.0 N
Alkaid	153° 00'.0	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.9	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.0	26° 40'.8 N
Alpheratz	357° 44'.6	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.5 N
Atria	107° 30'.5	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.6	6° 21'.6 N
Betelgeuse	271° 02'.9	7° 24'.6 N
Canopus	263° 57'.1	52° 41'.9 S
Capella	280° 36'.6	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.5 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 57'.0	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.4 N
Elnath	278° 14'.5	28° 36'.9 N
Eltanin	90° 46'.4	51° 29'.5 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.0	29° 33'.3 S
Gacrux	172° 02'.8	57° 11'.0 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 50'.0	60° 26'.0 S
Hamal	328° 02'.1	23° 31'.1 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 19'.9	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.4	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.0 S
Mirfak	308° 42'.3	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 22'.2	89° 18'.6 N
Pollux	243° 29'.6	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.4	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.5	8° 11'.2 S
Rigil Kent	139° 53'.6	60° 53'.2 S
Sabik	102° 13'.8	15° 44'.3 S
Schedar	349° 41'.7	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.1	16° 43'.9 S
Spica	158° 32'.8	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.8 S
Vega	80° 39'.5	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	219° 26'.5	12:02
Mars	263° 44'.4	09:04
Jupiter	322° 10'.7	05:10
Saturn	166° 54'.3	15:30

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 40'.0	15° 25'.9 N	33° 03'.5	9'.2	20° 37'.1 S	6'.3	56'.8
193° 40'.1	25'.1	47° 31'.7	9'.2	30'.8	6'.4	
208° 40'.2	24'.4	61° 59'.9	9'.3	24'.4	6'.5	
223° 40'.3	23'.7	76° 28'.2	9'.4	17'.9	6'.6	
238° 40'.4	22'.9	90° 56'.6	9'.5	11'.3	6'.8	56'.7
253° 40'.4	22'.2	105° 25'.1	9'.5	04'.5	6'.8	
268° 40'.5	21'.4	119° 53'.6	9'.6	19° 57'.7 S	6'.9	
283° 40'.6	20'.7	134° 22'.2	9'.7	50'.8	7'.1	
298° 40'.7	20'.0	148° 50'.9	9'.8	43'.7	7'.1	56'.6
313° 40'.8	19'.2	163° 19'.7	9'.8	36'.6	7'.2	
328° 40'.9	18'.5	177° 48'.5	9'.9	29'.4	7'.4	
343° 41'.0	17'.7	192° 17'.4	10'.0	22'.0	7'.4	
358° 41'.1	15° 17'.0 N	206° 46'.4	10'.0	19° 14'.6 S	7'.5	56'.6
13° 41'.2	16'.3	221° 15'.4	10'.2	07'.1	7'.7	56'.5
28° 41'.3	15'.5	235° 44'.6	10'.2	18° 59'.4 S	7'.7	
43° 41'.4	14'.8	250° 13'.8	10'.2	51'.7	7'.8	
58° 41'.5	14'.0	264° 43'.0	10'.4	43'.9	7'.9	
73° 41'.6	13'.3	279° 12'.4	10'.4	36'.0	8'.0	
88° 41'.8	12'.6	293° 41'.8	10'.5	28'.0	8'.1	56'.4
103° 41'.9	11'.8	308° 11'.3	10'.6	19'.9	8'.1	
118° 42'.0	11'.1	322° 40'.9	10'.6	11'.8	8'.3	
133° 42'.1	10'.3	337° 10'.5	10'.7	03'.5	8'.3	
148° 42'.2	09'.6	351° 40'.2	10'.8	17° 55'.2 S	8'.4	
163° 42'.3	08'.8	6° 10'.0	10'.9	46'.8	8'.6	56'.3
178° 42'.4	15° 08'.1 N	20° 39'.9	10'.9	17° 38'.2 S	8'.5	56'.3
193° 42'.5	07'.3	35° 09'.8	11'.0	29'.7	8'.7	
208° 42'.6	06'.6	49° 39'.8	11'.1	21'.0	8'.8	
223° 42'.7	05'.9	64° 09'.9	11'.1	12'.2	8'.8	
238° 42'.8	05'.1	78° 40'.0	11'.3	03'.4	8'.9	56'.2
253° 42'.9	04'.4	93° 10'.3	11'.3	16° 54'.5 S	9'.0	
268° 43'.0	03'.6	107° 40'.6	11'.3	45'.5	9'.1	
283° 43'.1	02'.9	122° 10'.9	11'.5	36'.4	9'.1	
298° 43'.2	02'.1	136° 41'.4	11'.5	27'.3	9'.2	
313° 43'.3	01'.4	151° 11'.9	11'.6	18'.1	9'.3	56'.1
328° 43'.4	00'.6	165° 42'.5	11'.7	08'.8	9'.4	
343° 43'.5	14° 59'.9 N	180° 13'.2	11'.7	15° 59'.4 S	9'.4	
358° 43'.6	14° 59'.1 N	194° 43'.9	11'.8	15° 50'.0 S	9'.5	56'.1
13° 43'.7	58'.4	209° 14'.7	11'.9	40'.5	9'.6	56'.0
28° 43'.8	57'.6	223° 45'.6	11'.9	30'.9	9'.6	
43° 43'.9	56'.9	238° 16'.5	12'.0	21'.3	9'.8	
58° 44'.1	56'.1	252° 47'.5	12'.1	11'.5	9'.7	
73° 44'.2	55'.4	267° 18'.6	12'.2	01'.8	9'.9	
88° 44'.3	54'.6	281° 49'.8	12'.2	14° 51'.9 S	9'.9	55'.9
103° 44'.4	53'.9	296° 21'.0	12'.3	42'.0	9'.9	
118° 44'.5	53'.1	310° 52'.3	12'.4	32'.1	10'.0	
133° 44'.6	52'.4	325° 23'.7	12'.4	22'.1	10'.1	
148° 44'.7	51'.6	339° 55'.1	12'.5	12'.0	10'.2	
163° 44'.8	50'.8	354° 26'.6	12'.6	01'.8	10'.2	55'.8
178° 44'.9	14° 50'.1 N	8° 58'.2	12'.6	13° 51'.6 S	10'.2	55'.8
193° 45'.0	49'.3	23° 29'.8	12'.7	41'.4	10'.3	
208° 45'.1	48'.6	38° 01'.5	12'.8	31'.1	10'.4	
223° 45'.2	47'.8	52° 33'.3	12'.8	20'.7	10'.4	
238° 45'.4	47'.1	67° 05'.1	12'.9	10'.3	10'.5	55'.7
253° 45'.5	46'.3	81° 37'.0	12'.9	12° 59'.8 S	10'.5	
268° 45'.6	45'.5	96° 08'.9	13'.1	49'.3	10'.6	
283° 45'.7	44'.8	110° 41'.0	13'.0	38'.7	10'.6	
298° 45'.8	44'.0	125° 13'.0	13'.2	28'.1	10'.7	
313° 45'.9	43'.3	139° 45'.2	13'.2	17'.4	10'.7	55'.6
328° 46'.0	42'.5	154° 17'.4	13'.3	06'.7	10'.8	
343° 46'.1	41'.8	168° 49'.7	13'.3	11° 55'.9 S	10'.8	
358° 46'.2	14° 41'.0 N	183° 22'.0	13'.4	11° 45'.1 S	10'.9	55'.6
13° 46'.4	40'.2	197° 54'.4	13'.4	34'.2	10'.9	
28° 46'.5	39'.5	212° 26'.8	13'.5	23'.3	10'.9	
43° 46'.6	38'.7	226° 59'.3	13'.6	12'.4	11'.0	55'.5
58° 46'.7	38'.0	241° 31'.9	13'.6	01'.4	11'.1	
73° 46'.8	37'.2	256° 04'.5	13'.7	10° 50'.3 S	11'.0	
88° 46'.9	36'.4	270° 37'.2	13'.8	39'.3	11'.1	
103° 47'.0	35'.7	285° 10'.0	13'.7	28'.2	11'.2	
118° 47'.1	34'.9	299° 42'.7	13'.9	17'.0	11'.2	55'.4
133° 47'.3	34'.1	314° 15'.6	13'.9	05'.8	11'.2	
148° 47'.4	33'.4	328° 48'.5	14'.0	9° 54'.6 S	11'.2	
163° 47'.5	32'.6	343° 21'.5	14'.0	43'.4	11'.3	
SD 15'.8	d 0'.8	SD	15'.4	15'.3	15'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 11	Moonrise 12	Moonrise 13
N 72°	-	-	01:59	22:23	20:49	20:18
N 70°	-	-	02:38	20:49	20:20	20:02
68°	-	01:12	03:05	20:09	19:58	19:49
66°	-	02:02	03:25	19:41	19:40	19:39
64°	-	02:33	03:41	19:20	19:26	19:30
62°	01:04	02:55	03:55	19:03	19:14	19:22
60°	01:49	03:13	04:06	18:48	19:04	19:15
N 58°	02:17	03:27	04:16	18:36	18:55	19:09
56°	02:38	03:40	04:24	18:25	18:47	19:04
54°	02:55	03:50	04:32	18:16	18:40	18:59
52°	03:09	04:00	04:38	18:07	18:33	18:55
50°	03:21	04:08	04:45	18:00	18:28	18:51
45°	03:45	04:25	04:58	17:44	18:15	18:42
N 40°	04:03	04:39	05:08	17:30	18:05	18:35
35°	04:18	04:50	05:17	17:19	17:56	18:29
30°	04:30	05:00	05:25	17:09	17:48	18:23
20°	04:49	05:16	05:39	16:52	17:35	18:14
N 10°	05:03	05:29	05:51	16:37	17:23	18:06
0°	05:15	05:40	06:02	16:22	17:12	17:58
S 10°	05:26	05:51	06:13	16:08	17:00	17:50
20°	05:35	06:01	06:24	15:53	16:48	17:42
30°	05:44	06:12	06:37	15:36	16:35	17:32
35°	05:48	06:18	06:44	15:25	16:27	17:26
40°	05:52	06:25	06:53	15:14	16:18	17:20
45°	05:57	06:32	07:02	15:00	16:07	17:13
S 50°	06:02	06:40	07:14	14:43	15:54	17:04
52°	06:04	06:44	07:20	14:35	15:48	17:00
54°	06:06	06:48	07:26	14:26	15:41	16:55
56°	06:08	06:52	07:32	14:16	15:33	16:50
58°	06:11	06:57	07:40	14:05	15:25	16:44
S 60°	06:13	07:03	07:48	13:51	15:15	16:38
S 62°	06:16	07:09	07:58	13:36	15:04	16:31

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 11	Moonset 12	Moonset 13
N 72°	22:05	-	-	23:01	-	02:16
N 70°	21:28	-	-	-	00:34	02:44
68°	21:02	22:49	-	-	01:13	03:05
66°	20:42	22:03	-	-	01:40	03:21
64°	20:27	21:34	-	00:26	02:01	03:34
62°	20:14	21:12	22:57	00:49	02:17	03:45
60°	20:03	20:55	22:16	01:07	02:31	03:55
N 58°	19:53	20:41	21:50	01:23	02:43	04:03
56°	19:45	20:29	21:29	01:36	02:53	04:10
54°	19:37	20:18	21:13	01:47	03:02	04:17
52°	19:31	20:09	20:59	01:57	03:10	04:22
50°	19:25	20:01	20:48	02:06	03:17	04:27
45°	19:12	19:44	20:24	02:25	03:32	04:39
N 40°	19:01	19:31	20:06	02:40	03:44	04:48
35°	18:52	19:19	19:52	02:53	03:55	04:56
30°	18:44	19:10	19:40	03:04	04:04	05:02
20°	18:31	18:54	19:21	03:24	04:20	05:14
N 10°	18:19	18:41	19:07	03:40	04:34	05:25
0°	18:09	18:30	18:55	03:56	04:46	05:34
S 10°	17:58	18:19	18:45	04:11	04:59	05:44
20°	17:46	18:09	18:35	04:27	05:13	05:54
30°	17:34	17:58	18:27	04:46	05:28	06:05
35°	17:26	17:53	18:23	04:57	05:37	06:12
40°	17:18	17:46	18:18	05:09	05:47	06:19
45°	17:08	17:39	18:14	05:24	05:59	06:28
S 50°	16:57	17:31	18:09	05:42	06:13	06:38
52°	16:51	17:27	18:07	05:50	06:19	06:43
54°	16:45	17:23	18:05	05:59	06:27	06:48
56°	16:39	17:19	18:03	06:10	06:35	06:54
58°	16:31	17:14	18:00	06:22	06:44	07:01
S 60°	16:23	17:08	17:58	06:36	06:55	07:08
S 62°	16:13	17:02	17:55	06:52	07:07	07:16

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
11	5 20	5 16	12:05	22:34	10:09	12d 95%
12	5 11	5 06	12:05	23:23	10:59	13d 98%
13	5 01	4 55	12:05	24:09	11:46	14d Full

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2011 August 14, 15, 16 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.5		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
14 00	322° 04'.5	179° 03'.6	15° 56'.1 N	224° 22'.5	23° 42'.5 N	284° 08'.5	13° 32'.0 N	128° 49'.1	3° 08'.7 S
01	337° 06'.9	194° 03'.0	55'.2	239° 23'.1	42'.5	299° 10'.8	32'.0	143° 51'.4	08'.8
02	352° 09'.4	209° 02'.4	54'.2	254° 23'.8	42'.4	314° 13'.1	32'.0	158° 53'.6	08'.9
03	7° 11'.8	224° 01'.8	53'.3	269° 24'.5	42'.4	329° 15'.4	32'.1	173° 55'.9	08'.9
04	22° 14'.3	239° 01'.2	52'.3	284° 25'.2	42'.3	344° 17'.8	32'.1	188° 58'.2	09'.0
05	37° 16'.8	254° 00'.6	51'.4	299° 25'.8	42'.3	359° 20'.1	32'.1	204° 00'.4	09'.1
06	52° 19'.2	269° 00'.0	50'.5	314° 26'.5	42'.2	14° 22'.4	32'.2	219° 02'.7	09'.2
07	67° 21'.7	283° 59'.4	49'.5	329° 27'.2	42'.1	29° 24'.8	32'.2	234° 04'.9	09'.3
08	82° 24'.2	298° 58'.8	48'.6	344° 27'.8	42'.1	44° 27'.1	32'.2	249° 07'.2	09'.4
09	97° 26'.6	313° 58'.2	47'.6	359° 28'.5	42'.0	59° 29'.4	32'.3	264° 09'.5	09'.5
10	112° 29'.1	328° 57'.6	46'.7	14° 29'.2	42'.0	74° 31'.8	32'.3	279° 11'.7	09'.6
11	127° 31'.6	343° 57'.0	45'.7	29° 29'.8	41'.9	89° 34'.1	32'.3	294° 14'.0	09'.7
12	142° 34'.0	358° 56'.4	15° 44'.8 N	44° 30'.5	23° 41'.9 N	104° 36'.4	13° 32'.3 N	309° 16'.2	3° 09'.8 S
13	157° 36'.5	13° 55'.8	43'.8	59° 31'.2	41'.8	119° 38'.8	32'.4	324° 18'.5	09'.9
14	172° 39'.0	28° 55'.2	42'.9	74° 31'.8	41'.7	134° 41'.1	32'.4	339° 20'.8	10'.0
15	187° 41'.4	43° 54'.7	41'.9	89° 32'.5	41'.7	149° 43'.5	32'.4	354° 23'.0	10'.1
16	202° 43'.9	58° 54'.1	41'.0	104° 33'.2	41'.6	164° 45'.8	32'.5	9° 25'.3	10'.2
17	217° 46'.3	73° 53'.5	40'.0	119° 33'.9	41'.6	179° 48'.1	32'.5	24° 27'.5	10'.3
18	232° 48'.8	88° 52'.9	39'.1	134° 34'.5	41'.5	194° 50'.5	32'.5	39° 29'.8	10'.4
19	247° 51'.3	103° 52'.3	38'.1	149° 35'.2	41'.4	209° 52'.8	32'.6	54° 32'.1	10'.4
20	262° 53'.7	118° 51'.7	37'.2	164° 35'.9	41'.4	224° 55'.1	32'.6	69° 34'.3	10'.5
21	277° 56'.2	133° 51'.1	36'.2	179° 36'.5	41'.3	239° 57'.5	32'.6	84° 36'.6	10'.6
22	292° 58'.7	148° 50'.5	35'.3	194° 37'.2	41'.2	254° 59'.8	32'.7	99° 38'.8	10'.7
23	308° 01'.1	163° 50'.0	34'.3	209° 37'.9	41'.2	270° 02'.2	32'.7	114° 41'.1	10'.8
15 00	323° 03'.6	178° 49'.4	15° 33'.4 N	224° 38'.6	23° 41'.1 N	285° 04'.5	13° 32'.7 N	129° 43'.4	3° 10'.9 S
01	338° 06'.1	193° 48'.8	32'.4	239° 39'.2	41'.1	300° 06'.8	32'.8	144° 45'.6	11'.0
02	353° 08'.5	208° 48'.2	31'.5	254° 39'.9	41'.0	315° 09'.2	32'.8	159° 47'.9	11'.1
03	8° 11'.0	223° 47'.6	30'.5	269° 40'.6	40'.9	330° 11'.5	32'.8	174° 50'.1	11'.2
04	23° 13'.5	238° 47'.0	29'.5	284° 41'.2	40'.9	345° 13'.8	32'.8	189° 52'.4	11'.3
05	38° 15'.9	253° 46'.4	28'.6	299° 41'.9	40'.8	0° 16'.2	32'.9	204° 54'.6	11'.4
06	53° 18'.4	268° 45'.9	27'.6	314° 42'.6	40'.7	15° 18'.5	32'.9	219° 56'.9	11'.5
07	68° 20'.8	283° 45'.3	26'.7	329° 43'.3	40'.7	30° 20'.9	32'.9	234° 59'.2	11'.6
08	83° 23'.3	298° 44'.7	25'.7	344° 43'.9	40'.6	45° 23'.2	33'.0	250° 01'.4	11'.7
09	98° 25'.8	313° 44'.1	24'.7	359° 44'.6	40'.5	60° 25'.5	33'.0	265° 03'.7	11'.8
10	113° 28'.2	328° 43'.5	23'.8	14° 45'.3	40'.5	75° 27'.9	33'.0	280° 05'.9	11'.9
11	128° 30'.7	343° 43'.0	22'.8	29° 45'.9	40'.4	90° 30'.2	33'.1	295° 08'.2	11'.9
12	143° 33'.2	358° 42'.4	15° 21'.9 N	44° 46'.6	23° 40'.3 N	105° 32'.6	13° 33'.1 N	310° 10'.4	3° 12'.0 S
13	158° 35'.6	13° 41'.8	20'.9	59° 47'.3	40'.3	120° 34'.9	33'.1	325° 12'.7	12'.1
14	173° 38'.1	28° 41'.2	19'.9	74° 48'.0	40'.2	135° 37'.3	33'.1	340° 15'.0	12'.2
15	188° 40'.6	43° 40'.6	19'.0	89° 48'.6	40'.1	150° 39'.6	33'.2	355° 17'.2	12'.3
16	203° 43'.0	58° 40'.1	18'.0	104° 49'.3	40'.1	165° 41'.9	33'.2	10° 19'.5	12'.4
17	218° 45'.5	73° 39'.5	17'.0	119° 50'.0	40'.0	180° 44'.3	33'.2	25° 21'.7	12'.5
18	233° 47'.9	88° 38'.9	16'.1	134° 50'.7	39'.9	195° 46'.6	33'.3	40° 24'.0	12'.6
19	248° 50'.4	103° 38'.3	15'.1	149° 51'.3	39'.9	210° 49'.0	33'.3	55° 26'.2	12'.7
20	263° 52'.9	118° 37'.8	14'.1	164° 52'.0	39'.8	225° 51'.3	33'.3	70° 28'.5	12'.8
21	278° 55'.3	133° 37'.2	13'.1	179° 52'.7	39'.7	240° 53'.7	33'.4	85° 30'.8	12'.9
22	293° 57'.8	148° 36'.6	12'.2	194° 53'.4	39'.7	255° 56'.0	33'.4	100° 33'.0	13'.0
23	309° 00'.3	163° 36'.0	11'.2	209° 54'.0	39'.6	270° 58'.4	33'.4	115° 35'.3	13'.1
16 00	324° 02'.7	178° 35'.5	15° 10'.2 N	224° 54'.7	23° 39'.5 N	286° 00'.7	13° 33'.4 N	130° 37'.5	3° 13'.2 S
01	339° 05'.2	193° 34'.9	09'.3	239° 55'.4	39'.4	301° 03'.1	33'.5	145° 39'.8	13'.3
02	354° 07'.7	208° 34'.3	08'.3	254° 56'.1	39'.4	316° 05'.4	33'.5	160° 42'.0	13'.4
03	9° 10'.1	223° 33'.7	07'.3	269° 56'.7	39'.3	331° 07'.7	33'.5	175° 44'.3	13'.5
04	24° 12'.6	238° 33'.2	06'.3	284° 57'.4	39'.2	346° 10'.1	33'.5	190° 46'.5	13'.6
05	39° 15'.1	253° 32'.6	05'.3	299° 58'.1	39'.2	1° 12'.4	33'.6	205° 48'.8	13'.6
06	54° 17'.5	268° 32'.0	04'.4	314° 58'.8	39'.1	16° 14'.8	33'.6	220° 51'.1	13'.7
07	69° 20'.0	283° 31'.4	03'.4	329° 59'.4	39'.0	31° 17'.1	33'.6	235° 53'.3	13'.8
08	84° 22'.4	298° 30'.9	02'.4	345° 00'.1	38'.9	46° 19'.5	33'.7	250° 55'.6	13'.9
09	99° 24'.9	313° 30'.3	01'.4	0° 00'.8	38'.9	61° 21'.8	33'.7	265° 57'.8	14'.0
10	114° 27'.4	328° 29'.7	00'.5	15° 01'.5	38'.8	76° 24'.2	33'.7	281° 00'.1	14'.1
11	129° 29'.8	343° 29'.2	14° 59'.5 N	30° 02'.2	38'.7	91° 26'.5	33'.7	296° 02'.3	14'.2
12	144° 32'.3	358° 28'.6	14° 58'.5 N	45° 02'.8	23° 38'.6 N	106° 28'.9	13° 33'.8 N	311° 04'.6	3° 14'.3 S
13	159° 34'.8	13° 28'.0	57'.5	60° 03'.5	38'.6	121° 31'.2	33'.8	326° 06'.8	14'.4
14	174° 37'.2	28° 27'.5	56'.5	75° 04'.2	38'.5	136° 33'.6	33'.8	341° 09'.1	14'.5
15	189° 39'.7	43° 26'.9	55'.5	90° 04'.9	38'.4	151° 35'.9	33'.8	356° 11'.3	14'.6
16	204° 42'.2	58° 26'.3	54'.6	105° 05'.5	38'.3	166° 38'.3	33'.9	11° 13'.6	14'.7
17	219° 44'.6	73° 25'.7	53'.6	120° 06'.2	38'.3	181° 40'.6	33'.9	26° 15'.9	14'.8
18	234° 47'.1	88° 25'.2	52'.6	135° 06'.9	38'.2	196° 43'.0	33'.9	41° 18'.1	14'.9
19	249° 49'.5	103° 24'.6	51'.6	150° 07'.6	38'.1	211° 45'.3	34'.0	56° 20'.4	15'.0
20	264° 52'.0	118° 24'.1	50'.6	165° 08'.3	38'.0	226° 47'.7	34'.0	71° 22'.6	15'.1
21	279° 54'.5	133° 23'.5	49'.6	180° 08'.9	37'.9	241° 50'.0	34'.0	86° 24'.9	15'.2
22	294° 56'.9	148° 22'.9	48'.6	195° 09'.6	37'.9	256° 52'.4	34'.0	101° 27'.1	15'.3
23	309° 59'.4	163° 22'.4	47'.6	210° 10'.3	37'.8	271° 54'.8	34'.1	116° 29'.4	15'.4
	M.P. 02:23	v -0'.6	d 1'.0	v 0'.7	d 0'.1	v 2'.3	d 0'.0	v 2'.3	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.2	40° 15'.2 S
Achernar	335° 27'.4	57° 10'.3 S
Acrux	173° 11'.4	63° 10'.1 S
Adhara	255° 13'.8	28° 59'.2 S
Aldebaran	290° 51'.0	16° 31'.9 N
Alioth	166° 22'.1	55° 54'.0 N
Alkaid	153° 00'.0	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.8	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.6	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.5 N
Atria	107° 30'.5	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.5	6° 21'.6 N
Betelgeuse	271° 02'.9	7° 24'.6 N
Canopus	263° 57'.1	52° 41'.9 S
Capella	280° 36'.6	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.5 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 56'.9	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.3 N
Elnath	278° 14'.4	28° 36'.9 N
Eltanin	90° 46'.4	51° 29'.6 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.0	29° 33'.3 S
Gacrux	172° 02'.8	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 50'.0	60° 26'.0 S
Hamal	328° 02'.1	23° 31'.1 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 20'.0	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.4	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 46'.0 S
Mirfak	308° 42'.2	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 20'.9	89° 18'.6 N
Pollux	243° 29'.6	27° 59'.8 N
Procyon	245° 01'.4	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.2 S
Rigil Kent	139° 53'.6	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.7	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.1	16° 43'.9 S
Spica	158° 32'.8	11° 13'.4 S
Suhail	222° 53'.9	43° 28'.8 S
Vega	80° 39'.5	38° 48'.0 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	215° 45'.8	12:05
Mars	261° 35'.0	09:01
Jupiter	322° 00'.9	04:59
Saturn	166° 39'.8	15:19

SUN										
GHA		Dec		d	HP					
178° 47'.6	14° 31'.8 N	357° 54'.5	14'.0	9° 32'.1 S	11'.4	55'.4				
193° 47'.7	31'.1	12° 27'.5	14'.1	20'.7	11'.3	55'.3				
208° 47'.8	30'.3	27° 00'.6	14'.2	09'.4	11'.4					
223° 47'.9	29'.6	41° 33'.8	14'.2	8° 58'.0 S	11'.4					
238° 48'.1	28'.8	56° 07'.0	14'.3	46'.6	11'.5					
253° 48'.2	28'.0	70° 40'.3	14'.3	35'.1	11'.4					
268° 48'.3	27'.2	85° 13'.6	14'.4	23'.7	11'.5					
283° 48'.4	26'.5	99° 47'.0	14'.4	12'.2	11'.6	55'.2				
298° 48'.5	25'.7	114° 20'.4	14'.4	00'.6	11'.5					
313° 48'.6	24'.9	128° 53'.8	14'.5	7° 49'.1 S	11'.6					
328° 48'.8	24'.2	143° 27'.3	14'.6	37'.5	11'.6					
343° 48'.9	23'.4	158° 00'.9	14'.6	25'.9	11'.6					
358° 49'.0	14° 22'.6 N	172° 34'.5	14'.6	7° 14'.3 S	11'.7	55'.1				
13° 49'.1	21'.9	187° 08'.1	14'.7	02'.6	11'.6					
28° 49'.2	21'.1	201° 41'.8	14'.7	6° 51'.0 S	11'.7					
43° 49'.4	20'.3	216° 15'.5	14'.8	39'.3	11'.7					
58° 49'.5	19'.6	230° 49'.3	14'.8	27'.6	11'.8					
73° 49'.6	18'.8	245° 23'.1	14'.8	15'.8	11'.7					
88° 49'.7	18'.0	259° 56'.9	14'.9	04'.1	11'.8	55'.0				
103° 49'.8	17'.2	274° 30'.8	14'.9	5° 52'.3 S	11'.7					
118° 49'.9	16'.5	289° 04'.7	15'.0	40'.6	11'.8					
133° 50'.1	15'.7	303° 38'.7	15'.0	28'.8	11'.9					
148° 50'.2	14'.9	318° 12'.7	15'.0	16'.9	11'.8					
163° 50'.3	14'.1	332° 46'.7	15'.1	05'.1	11'.8					
178° 50'.4	14° 13'.4 N	347° 20'.8	15'.1	4° 53'.3 S	11'.9	54'.9				
193° 50'.5	12'.6	1° 54'.9	15'.1	41'.4	11'.8					
208° 50'.7	11'.8	16° 29'.0	15'.2	29'.6	11'.9					
223° 50'.8	11'.0	31° 03'.2	15'.2	17'.7	11'.9					
238° 50'.9	10'.3	45° 37'.4	15'.2	05'.8	11'.8					
253° 51'.0	09'.5	60° 11'.6	15'.3	3° 54'.0 S	11'.9					
268° 51'.2	08'.7	74° 45'.9	15'.3	42'.1	11'.9	54'.8				
283° 51'.3	07'.9	89° 20'.2	15'.3	30'.2	12'.0					
298° 51'.4	07'.2	103° 54'.5	15'.3	18'.2	11'.9					
313° 51'.5	06'.4	118° 28'.8	15'.4	06'.3	11'.9					
328° 51'.6	05'.6	133° 03'.2	15'.4	2° 54'.4 S	11'.9					
343° 51'.8	04'.8	147° 37'.6	15'.4	42'.5	11'.9					
358° 51'.9	14° 04'.1 N	162° 12'.0	15'.5	2° 30'.6 S	12'.0	54'.8				
13° 52'.0	03'.3	176° 46'.5	15'.5	18'.6	11'.9	54'.7				
28° 52'.1	02'.5	191° 21'.0	15'.5	06'.7	11'.9					
43° 52'.3	01'.7	205° 55'.5	15'.5	1° 54'.8 S	12'.0					
58° 52'.4	00'.9	220° 30'.0	15'.5	42'.8	11'.9					
73° 52'.5	00'.2	235° 04'.5	15'.6	30'.9	11'.9					
88° 52'.6	13° 59'.4 N	249° 39'.1	15'.6	19'.0	12'.0					
103° 52'.8	58'.6	264° 13'.7	15'.6	07'.0	11'.9	54'.6				
118° 52'.9	57'.8	278° 48'.3	15'.6	0° 55'.1 S	11'.9					
133° 53'.0	57'.0	293° 22'.9	15'.7	43'.2	11'.9					
148° 53'.1	56'.2	307° 57'.6	15'.6	31'.3	11'.9					
163° 53'.3	55'.5	322° 32'.2	15'.7	19'.4	11'.9					
178° 53'.4	13° 54'.7 N	337° 06'.9	15'.7	0° 07'.5 S	11'.9	54'.6				
193° 53'.5	53'.9	351° 41'.6	15'.7	0° 04'.4 N	11'.9					
208° 53'.6	53'.1	6° 16'.3	15'.8	16'.3	11'.9					
223° 53'.8	52'.3	20° 51'.1	15'.7	28'.2	11'.9	54'.5				
238° 53'.9	51'.5	35° 25'.8	15'.7	40'.1	11'.9					
253° 54'.0	50'.8	50° 00'.5	15'.8	52'.0	11'.8					
268° 54'.1	50'.0	64° 35'.3	15'.8	1° 03'.8 N	11'.9					
283° 54'.3	49'.2	79° 10'.1	15'.8	15'.7	11'.8					
298° 54'.4	48'.4	93° 44'.9	15'.7	27'.5	11'.8					
313° 54'.5	47'.6	108° 19'.6	15'.8	39'.3	11'.8					
328° 54'.7	46'.8	122° 54'.4	15'.8	51'.1	11'.8					
343° 54'.8	46'.0	137° 29'.2	15'.9	2° 02'.9 N	11'.8	54'.4				
358° 54'.9	13° 45'.2 N	152° 04'.1	15'.8	2° 14'.7 N	11'.8	54'.4				
13° 55'.0	44'.5	166° 38'.9	15'.8	26'.5	11'.7					
28° 55'.2	43'.7	181° 13'.7	15'.8	38'.2	11'.8					
43° 55'.3	42'.9	195° 48'.5	15'.9	50'.0	11'.7					
58° 55'.4	42'.1	210° 23'.4	15'.8	3° 01'.7 N	11'.7					
73° 55'.6	41'.3	224° 58'.2	15'.8	13'.4	11'.7					
88° 55'.7	40'.5	239° 33'.0	15'.9	25'.1	11'.7					
103° 55'.8	39'.7	254° 07'.9	15'.8	36'.8	11'.6					
118° 56'.0	38'.9	268° 42'.7	15'.8	48'.4	11'.6	54'.3				
133° 56'.1	38'.1	283° 17'.5	15'.9	4° 00'.0 N	11'.6					
148° 56'.2	37'.3	297° 52'.4	15'.8	11'.6	11'.6					
163° 56'.3	36'.5	312° 27'.2	15'.9	23'.2	11'.6					
SD 15'.8	d 0'.8	SD	15'.0	14'.9	14'.8					

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 14	Moonrise 15	Moonrise 16
N 72°	-	-	02:22	19:56	19:38	19:20
N 70°	-	-	02:54	19:48	19:36	19:24
68°	-	01:40	03:18	19:42	19:35	19:28
66°	-	02:19	03:36	19:36	19:34	19:32
64°	-	02:45	03:51	19:32	19:33	19:35
62°	01:29	03:05	04:03	19:28	19:32	19:37
60°	02:04	03:21	04:13	19:24	19:32	19:39
N 58°	02:28	03:35	04:22	19:21	19:31	19:41
56°	02:47	03:46	04:30	19:18	19:31	19:43
54°	03:03	03:56	04:37	19:15	19:30	19:45
52°	03:16	04:05	04:43	19:13	19:30	19:46
50°	03:27	04:13	04:49	19:11	19:29	19:47
45°	03:50	04:29	05:01	19:06	19:29	19:50
N 40°	04:07	04:42	05:11	19:02	19:28	19:53
35°	04:21	04:53	05:20	18:59	19:27	19:55
30°	04:32	05:02	05:27	18:56	19:27	19:57
20°	04:50	05:17	05:40	18:51	19:26	20:00
N 10°	05:04	05:29	05:51	18:46	19:25	20:03
0°	05:15	05:40	06:01	18:42	19:24	20:06
S 10°	05:25	05:50	06:11	18:37	19:23	20:08
20°	05:33	05:59	06:22	18:33	19:23	20:11
30°	05:41	06:09	06:34	18:28	19:22	20:15
35°	05:45	06:15	06:41	18:25	19:21	20:17
40°	05:49	06:21	06:49	18:21	19:21	20:19
45°	05:53	06:27	06:58	18:17	19:20	20:22
S 50°	05:57	06:35	07:09	18:12	19:19	20:25
52°	05:59	06:38	07:14	18:10	19:19	20:26
54°	06:00	06:42	07:19	18:08	19:18	20:28
56°	06:02	06:46	07:26	18:05	19:18	20:30
58°	06:04	06:51	07:33	18:02	19:18	20:32
S 60°	06:06	06:56	07:40	17:59	19:17	20:34
S 62°	06:09	07:01	07:49	17:55	19:16	20:37

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 14	Moonset 15	Moonset 16
N 72°	21:42	-	-	04:22	06:15	08:02
N 70°	21:11	23:43	-	04:36	06:20	08:00
68°	20:48	22:22	-	04:48	06:25	07:58
66°	20:31	21:46	-	04:57	06:28	07:57
64°	20:16	21:21	23:45	05:04	06:31	07:56
62°	20:04	21:01	22:34	05:11	06:34	07:55
60°	19:54	20:45	22:01	05:17	06:36	07:54
N 58°	19:45	20:32	21:38	05:22	06:38	07:53
56°	19:38	20:21	21:19	05:26	06:40	07:53
54°	19:31	20:11	21:04	05:30	06:42	07:52
52°	19:25	20:03	20:51	05:34	06:43	07:51
50°	19:19	19:55	20:41	05:37	06:45	07:51
45°	19:07	19:39	20:18	05:44	06:48	07:50
N 40°	18:57	19:26	20:01	05:50	06:50	07:49
35°	18:49	19:16	19:48	05:55	06:52	07:48
30°	18:42	19:07	19:37	05:59	06:54	07:47
20°	18:29	18:52	19:19	06:07	06:57	07:46
N 10°	18:18	18:40	19:05	06:13	07:00	07:45
0°	18:08	18:29	18:54	06:19	07:02	07:44
S 10°	17:58	18:20	18:44	06:25	07:05	07:43
20°	17:47	18:10	18:36	06:32	07:08	07:42
30°	17:35	18:00	18:28	06:39	07:11	07:41
35°	17:29	17:55	18:24	06:43	07:12	07:40
40°	17:21	17:49	18:21	06:48	07:14	07:39
45°	17:12	17:42	18:17	06:53	07:16	07:38
S 50°	17:01	17:35	18:13	07:00	07:19	07:37
52°	16:56	17:31	18:11	07:03	07:20	07:37
54°	16:50	17:28	18:09	07:06	07:22	07:36
56°	16:44	17:24	18:08	07:10	07:23	07:35
58°	16:37	17:19	18:06	07:14	07:25	07:35
S 60°	16:30	17:15	18:04	07:18	07:26	07:34
S 62°	16:21	17:09	18:02	07:23	07:28	07:33

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
14	4 50	4 44	12:05	00:09	12:31	15d 99%
15	4 39	4 33	12:05	00:52	13:13	16d 97%
16	4 27	4 21	12:04	01:34	13:55	17d 93%

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2011 August 17, 18, 19 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
17 00	325° 01'.9	178° 21'.8	14° 46'.7 N	225° 11'.0	23° 37'.7 N	286° 57'.1	13° 34'.1 N	131° 31'.6	3° 15'.5 S
01	340° 04'.3	193° 21'.2	45'.7	240° 11'.6	37'.6	301° 59'.5	34'.1	146° 33'.9	15'.6
02	355° 06'.8	208° 20'.7	44'.7	255° 12'.3	37'.6	317° 01'.8	34'.1	161° 36'.1	15'.7
03	10° 09'.3	223° 20'.1	43'.7	270° 13'.0	37'.5	332° 04'.2	34'.2	176° 38'.4	15'.7
04	25° 11'.7	238° 19'.5	42'.7	285° 13'.7	37'.4	347° 06'.5	34'.2	191° 40'.6	15'.8
05	40° 14'.2	253° 19'.0	41'.7	300° 14'.4	37'.3	2° 08'.9	34'.2	206° 42'.9	15'.9
06	55° 16'.7	268° 18'.4	40'.7	315° 15'.0	37'.2	17° 11'.2	34'.2	221° 45'.1	16'.0
07	70° 19'.1	283° 17'.9	39'.7	330° 15'.7	37'.2	32° 13'.6	34'.3	236° 47'.4	16'.1
08	85° 21'.6	298° 17'.3	38'.7	345° 16'.4	37'.1	47° 15'.9	34'.3	251° 49'.7	16'.2
09	100° 24'.0	313° 16'.7	37'.7	0° 17'.1	37'.0	62° 18'.3	34'.3	266° 51'.9	16'.3
10	115° 26'.5	328° 16'.2	36'.7	15° 17'.8	36'.9	77° 20'.7	34'.3	281° 54'.2	16'.4
11	130° 29'.0	343° 15'.6	35'.7	30° 18'.4	36'.8	92° 23'.0	34'.4	296° 56'.4	16'.5
12	145° 31'.4	358° 15'.1	14° 34'.7 N	45° 19'.1	23° 36'.7 N	107° 25'.4	13° 34'.4 N	311° 58'.7	3° 16'.6 S
13	160° 33'.9	13° 14'.5	33'.7	60° 19'.8	36'.7	122° 27'.7	34'.4	327° 00'.9	16'.7
14	175° 36'.4	28° 13'.9	32'.7	75° 20'.5	36'.6	137° 30'.1	34'.4	342° 03'.2	16'.8
15	190° 38'.8	43° 13'.4	31'.7	90° 21'.2	36'.5	152° 32'.5	34'.5	357° 05'.4	16'.9
16	205° 41'.3	58° 12'.8	30'.7	105° 21'.9	36'.4	167° 34'.8	34'.5	12° 07'.7	17'.0
17	220° 43'.8	73° 12'.3	29'.7	120° 22'.5	36'.3	182° 37'.2	34'.5	27° 09'.9	17'.1
18	235° 46'.2	88° 11'.7	28'.7	135° 23'.2	36'.2	197° 39'.5	34'.5	42° 12'.2	17'.2
19	250° 48'.7	103° 11'.2	27'.7	150° 23'.9	36'.2	212° 41'.9	34'.6	57° 14'.4	17'.3
20	265° 51'.1	118° 10'.6	26'.7	165° 24'.6	36'.1	227° 44'.2	34'.6	72° 16'.7	17'.4
21	280° 53'.6	133° 10'.1	25'.7	180° 25'.3	36'.0	242° 46'.6	34'.6	87° 18'.9	17'.5
22	295° 56'.1	148° 09'.5	24'.7	195° 25'.9	35'.9	257° 49'.0	34'.6	102° 21'.2	17'.6
23	310° 58'.5	163° 08'.9	23'.7	210° 26'.6	35'.8	272° 51'.3	34'.7	117° 23'.4	17'.7
18 00	326° 01'.0	178° 08'.4	14° 22'.7 N	225° 27'.3	23° 35'.7 N	287° 53'.7	13° 34'.7 N	132° 25'.7	3° 17'.8 S
01	341° 03'.5	193° 07'.8	21'.7	240° 28'.0	35'.6	302° 56'.1	34'.7	147° 27'.9	17'.9
02	356° 05'.9	208° 07'.3	20'.7	255° 28'.7	35'.6	317° 58'.4	34'.7	162° 30'.2	18'.0
03	11° 08'.4	223° 06'.7	19'.7	270° 29'.4	35'.5	333° 00'.8	34'.7	177° 32'.4	18'.1
04	26° 10'.9	238° 06'.2	18'.6	285° 30'.0	35'.4	348° 03'.1	34'.8	192° 34'.7	18'.1
05	41° 13'.3	253° 05'.6	17'.6	300° 30'.7	35'.3	3° 05'.5	34'.8	207° 36'.9	18'.2
06	56° 15'.8	268° 05'.1	16'.6	315° 31'.4	35'.2	18° 07'.9	34'.8	222° 39'.2	18'.3
07	71° 18'.3	283° 04'.5	15'.6	330° 32'.1	35'.1	33° 10'.2	34'.8	237° 41'.4	18'.4
08	86° 20'.7	298° 04'.0	14'.6	345° 32'.8	35'.0	48° 12'.6	34'.9	252° 43'.7	18'.5
09	101° 23'.2	313° 03'.4	13'.6	0° 33'.5	34'.9	63° 15'.0	34'.9	267° 45'.9	18'.6
10	116° 25'.6	328° 02'.9	12'.6	15° 34'.2	34'.8	78° 17'.3	34'.9	282° 48'.2	18'.7
11	131° 28'.1	343° 02'.3	11'.6	30° 34'.8	34'.8	93° 19'.7	34'.9	297° 50'.4	18'.8
12	146° 30'.6	358° 01'.8	14° 10'.5 N	45° 35'.5	23° 34'.7 N	108° 22'.1	13° 34'.9 N	312° 52'.7	3° 18'.9 S
13	161° 33'.0	13° 01'.2	09'.5	60° 36'.2	34'.6	123° 24'.4	35'.0	327° 54'.9	19'.0
14	176° 35'.5	28° 00'.7	08'.5	75° 36'.9	34'.5	138° 26'.8	35'.0	342° 57'.2	19'.1
15	191° 38'.0	43° 00'.1	07'.5	90° 37'.6	34'.4	153° 29'.2	35'.0	357° 59'.4	19'.2
16	206° 40'.4	57° 59'.6	06'.5	105° 38'.3	34'.3	168° 31'.5	35'.0	13° 01'.7	19'.3
17	221° 42'.9	72° 59'.1	05'.5	120° 39'.0	34'.2	183° 33'.9	35'.1	28° 03'.9	19'.4
18	236° 45'.4	87° 58'.5	04'.4	135° 39'.6	34'.1	198° 36'.3	35'.1	43° 06'.2	19'.5
19	251° 47'.8	102° 58'.0	03'.4	150° 40'.3	34'.0	213° 38'.6	35'.1	58° 08'.4	19'.6
20	266° 50'.3	117° 57'.4	02'.4	165° 41'.0	33'.9	228° 41'.0	35'.1	73° 10'.7	19'.7
21	281° 52'.8	132° 56'.9	01'.4	180° 41'.7	33'.8	243° 43'.4	35'.1	88° 12'.9	19'.8
22	296° 55'.2	147° 56'.3	00'.4	195° 42'.4	33'.8	258° 45'.7	35'.2	103° 15'.2	19'.9
23	311° 57'.7	162° 55'.8	13° 59'.3 N	210° 43'.1	33'.7	273° 48'.1	35'.2	118° 17'.4	20'.0
19 00	327° 00'.1	177° 55'.2	13° 58'.3 N	225° 43'.8	23° 33'.6 N	288° 50'.5	13° 35'.2 N	133° 19'.7	3° 20'.1 S
01	342° 02'.6	192° 54'.7	57'.3	240° 44'.4	33'.5	303° 52'.8	35'.2	148° 21'.9	20'.2
02	357° 05'.1	207° 54'.2	56'.3	255° 45'.1	33'.4	318° 55'.2	35'.2	163° 24'.2	20'.3
03	12° 07'.5	222° 53'.6	55'.2	270° 45'.8	33'.3	333° 57'.6	35'.3	178° 26'.4	20'.4
04	27° 10'.0	237° 53'.1	54'.2	285° 46'.5	33'.2	348° 59'.9	35'.3	193° 28'.7	20'.5
05	42° 12'.5	252° 52'.5	53'.2	300° 47'.2	33'.1	4° 02'.3	35'.3	208° 30'.9	20'.6
06	57° 14'.9	267° 52'.0	52'.2	315° 47'.9	33'.0	19° 04'.7	35'.3	223° 33'.2	20'.7
07	72° 17'.4	282° 51'.5	51'.1	330° 48'.6	32'.9	34° 07'.1	35'.4	238° 35'.4	20'.8
08	87° 19'.9	297° 50'.9	50'.1	345° 49'.3	32'.8	49° 09'.4	35'.4	253° 37'.7	20'.9
09	102° 22'.3	312° 50'.4	49'.1	0° 49'.9	32'.7	64° 11'.8	35'.4	268° 39'.9	21'.0
10	117° 24'.8	327° 49'.8	48'.0	15° 50'.6	32'.6	79° 14'.2	35'.4	283° 42'.2	21'.1
11	132° 27'.2	342° 49'.3	47'.0	30° 51'.3	32'.5	94° 16'.5	35'.4	298° 44'.4	21'.2
12	147° 29'.7	357° 48'.8	13° 46'.0 N	45° 52'.0	23° 32'.4 N	109° 18'.9	13° 35'.4 N	313° 46'.7	3° 21'.3 S
13	162° 32'.2	12° 48'.2	45'.0	60° 52'.7	32'.3	124° 21'.3	35'.5	328° 48'.9	21'.4
14	177° 34'.6	27° 47'.7	43'.9	75° 53'.4	32'.2	139° 23'.7	35'.5	343° 51'.2	21'.5
15	192° 37'.1	42° 47'.2	42'.9	90° 54'.1	32'.1	154° 26'.0	35'.5	358° 53'.4	21'.5
16	207° 39'.6	57° 46'.6	41'.9	105° 54'.8	32'.0	169° 28'.4	35'.5	13° 55'.6	21'.6
17	222° 42'.0	72° 46'.1	40'.8	120° 55'.5	31'.9	184° 30'.8	35'.5	28° 57'.9	21'.7
18	237° 44'.5	87° 45'.5	39'.8	135° 56'.2	31'.8	199° 33'.2	35'.6	44° 00'.1	21'.8
19	252° 47'.0	102° 45'.0	38'.8	150° 56'.8	31'.7	214° 35'.5	35'.6	59° 02'.4	21'.9
20	267° 49'.4	117° 44'.5	37'.7	165° 57'.5	31'.6	229° 37'.9	35'.6	74° 04'.6	22'.0
21	282° 51'.9	132° 43'.9	36'.7	180° 58'.2	31'.5	244° 40'.3	35'.6	89° 06'.9	22'.1
22	297° 54'.4	147° 43'.4	35'.6	195° 58'.9	31'.4	259° 42'.7	35'.6	104° 09'.1	22'.2
23	312° 56'.8	162° 42'.9	34'.6	210° 59'.6	31'.3	274° 45'.0	35'.7	119° 11'.4	22'.3
	M.P. 02:12	v -0'.5	d 1'.0	v 0'.7	d 0'.1	v 2'.4	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.2	40° 15'.2 S
Achernar	335° 27'.4	57° 10'.3 S
Acrux	173° 11'.4	63° 10'.1 S
Adhara	255° 13'.8	28° 59'.2 S
Aldebaran	290° 50'.9	16° 32'.0 N
Alioth	166° 22'.1	55° 54'.0 N
Alkaid	153° 00'.1	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.8	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.6	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.2 S
Antares	112° 27'.7	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.5 N
Atria	107° 30'.5	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.5	6° 21'.6 N
Betelgeuse	271° 02'.9	7° 24'.6 N
Canopus	263° 57'.1	52° 41'.9 S
Capella	280° 36'.5	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 56'.9	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.3 N
Elnath	278° 14'.4	28° 36'.9 N
Eltanin	90° 46'.4	51° 29'.6 N
Enif	33° 48'.1	9° 55'.9 N
Fomalhaut	15° 25'.0	29° 33'.3 S
Gacrux	172° 02'.8	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 50'.0	60° 26'.0 S
Hamal	328° 02'.1	23° 31'.1 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 20'.0	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.3	4° 08'.2 N
Menkent	148° 09'.3	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 45'.9 S
Mirfak	308° 42'.2	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 19'.5	89° 18'.6 N
Pollux	243° 29'.6	27° 59'.8 N
Procyon	245° 01'.3	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.2 S
Rigil Kent	139° 53'.6	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.7	56° 36'.0 N
Shaula	96° 23'.4	37° 06'.7 S
Sirius	258° 35'.1	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.9	43° 28'.8 S
Vega	80° 39'.5	38° 48'.0 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	212° 07'.4	12:08
Mars	259° 26'.3	08:58
Jupiter	321° 52'.7	04:48
Saturn	166° 24'.7	15:08

SUN						
GHA	Dec	GHA	v	Dec	d	HP
178° 56'.5	13° 35'.8 N	327° 02'.1	15'.8	4° 34'.8 N	11'.5	54'.3
193° 56'.6	35'.0	341° 36'.9	15'.8	46'.3	11'.5	
208° 56'.7	34'.2	356° 11'.7	15'.8	57'.8	11'.5	
223° 56'.9	33'.4	10° 46'.5	15'.8	5° 09'.3 N	11'.5	
238° 57'.0	32'.6	25° 21'.3	15'.8	20'.8	11'.4	
253° 57'.1	31'.8	39° 56'.1	15'.8	32'.2	11'.5	
268° 57'.3	31'.0	54° 30'.9	15'.8	43'.7	11'.3	
283° 57'.4	30'.2	69° 05'.7	15'.8	55'.0	11'.4	
298° 57'.5	29'.4	83° 40'.5	15'.8	6° 06'.4 N	11'.3	54'.2
313° 57'.7	28'.6	98° 15'.3	15'.7	17'.7	11'.4	
328° 57'.8	27'.8	112° 50'.0	15'.8	29'.1	11'.2	
343° 57'.9	27'.0	127° 24'.8	15'.7	40'.3	11'.3	
358° 58'.1	13° 26'.2 N	141° 59'.5	15'.8	6° 51'.6 N	11'.2	54'.2
13° 58'.2	25'.4	156° 34'.3	15'.7	7° 02'.8 N	11'.2	
28° 58'.3	24'.6	171° 09'.0	15'.7	14'.0	11'.1	
43° 58'.5	23'.8	185° 43'.7	15'.7	25'.1	11'.1	
58° 58'.6	23'.0	200° 18'.4	15'.6	36'.2	11'.1	
73° 58'.7	22'.2	214° 53'.0	15'.7	47'.3	11'.1	
88° 58'.9	21'.4	229° 27'.7	15'.6	58'.4	11'.0	
103° 59'.0	20'.6	244° 02'.3	15'.6	8° 09'.4 N	11'.0	
118° 59'.1	19'.8	258° 36'.9	15'.6	20'.4	10'.9	
133° 59'.3	19'.0	273° 11'.5	15'.6	31'.3	11'.0	
148° 59'.4	18'.2	287° 46'.1	15'.6	42'.3	10'.8	
163° 59'.6	17'.4	302° 20'.7	15'.5	53'.1	10'.9	
178° 59'.7	13° 16'.6 N	316° 55'.2	15'.5	9° 04'.0 N	10'.8	54'.2
193° 59'.8	15'.8	331° 29'.7	15'.5	14'.8	10'.7	54'.1
209° 00'.0	15'.0	346° 04'.2	15'.5	25'.5	10'.8	
224° 00'.1	14'.2	0° 38'.7	15'.4	36'.3	10'.6	
239° 00'.2	13'.4	15° 13'.1	15'.4	46'.9	10'.7	
254° 00'.4	12'.6	29° 47'.5	15'.4	57'.6	10'.6	
269° 00'.5	11'.8	44° 21'.9	15'.4	10° 08'.2 N	10'.5	
284° 00'.7	11'.0	58° 56'.3	15'.3	18'.7	10'.6	
299° 00'.8	10'.2	73° 30'.6	15'.4	29'.3	10'.4	
314° 00'.9	09'.4	88° 05'.0	15'.2	39'.7	10'.5	
329° 01'.1	08'.6	102° 39'.2	15'.3	50'.2	10'.3	
344° 01'.2	07'.8	117° 13'.5	15'.2	11° 00'.5 N	10'.4	
359° 01'.3	13° 07'.0 N	131° 47'.7	15'.2	11° 10'.9 N	10'.3	54'.1
14° 01'.5	06'.2	146° 21'.9	15'.2	21'.2	10'.2	
29° 01'.6	05'.4	160° 56'.1	15'.1	31'.4	10'.2	
44° 01'.8	04'.5	175° 30'.2	15'.1	41'.6	10'.2	
59° 01'.9	03'.7	190° 04'.3	15'.1	51'.8	10'.1	
74° 02'.0	02'.9	204° 38'.4	15'.0	12° 01'.9 N	10'.0	
89° 02'.2	02'.1	219° 12'.4	15'.0	11'.9	10'.0	
104° 02'.3	01'.3	233° 46'.4	15'.0	21'.9	10'.0	
119° 02'.5	00'.5	248° 20'.4	15'.0	31'.9	9'.9	
134° 02'.6	12° 59'.7 N	262° 54'.4	14'.8	41'.8	9'.9	
149° 02'.7	58'.9	277° 28'.2	14'.9	51'.7	9'.8	
164° 02'.9	58'.1	292° 02'.1	14'.8	13° 01'.5 N	9'.7	
179° 03'.0	12° 57'.3 N	306° 35'.9	14'.8	13° 11'.2 N	9'.7	54'.1
194° 03'.2	56'.5	321° 09'.7	14'.8	20'.9	9'.7	
209° 03'.3	55'.6	335° 43'.5	14'.7	30'.6	9'.5	
224° 03'.5	54'.8	350° 17'.2	14'.6	40'.1	9'.6	
239° 03'.6	54'.0	4° 50'.8	14'.7	49'.7	9'.5	
254° 03'.7	53'.2	19° 24'.5	14'.6	59'.2	9'.4	
269° 03'.9	52'.4	33° 58'.1	14'.5	14° 08'.6 N	9'.3	
284° 04'.0	51'.6	48° 31'.6	14'.5	17'.9	9'.3	
299° 04'.2	50'.8	63° 05'.1	14'.5	27'.2	9'.3	54'.2
314° 04'.3	50'.0	77° 38'.6	14'.4	36'.5	9'.2	
329° 04'.5	49'.1	92° 12'.0	14'.4	45'.7	9'.1	
344° 04'.6	48'.3	106° 45'.4	14'.3	54'.8	9'.1	
359° 04'.7	12° 47'.5 N	121° 18'.7	14'.3	15° 03'.9 N	9'.0	54'.2
14° 04'.9	46'.7	135° 52'.0	14'.2	12'.9	8'.9	
29° 05'.0	45'.9	150° 25'.2	14'.2	21'.8	8'.9	
44° 05'.2	45'.1	164° 58'.4	14'.1	30'.7	8'.8	
59° 05'.3	44'.2	179° 31'.5	14'.1	39'.5	8'.8	
74° 05'.5	43'.4	194° 04'.6	14'.1	48'.3	8'.7	
89° 05'.6	42'.6	208° 37'.7	14'.0	57'.0	8'.6	
104° 05'.8	41'.8	223° 10'.7	14'.0	16° 05'.6 N	8'.6	
119° 05'.9	41'.0	237° 43'.7	13'.9	14'.2	8'.4	
134° 06'.0	40'.2	252° 16'.6	13'.8	22'.6	8'.5	
149° 06'.2	39'.3	266° 49'.4	13'.8	31'.1	8'.3	
164° 06'.3	38'.5	281° 22'.2	13'.8	39'.4	8'.3	
SD 15'.8	d 0'.8	SD	14'.8	14'.7	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 17	Moonrise 18	Moonrise 19
N 72°	-	-	02:42	19:00	18:37	18:02
N 70°	-	01:08	03:10	19:12	18:58	18:40
68°	-	02:02	03:30	19:22	19:15	19:06
66°	-	02:34	03:46	19:30	19:28	19:27
64°	01:00	02:57	04:00	19:36	19:39	19:43
62°	01:48	03:15	04:11	19:42	19:49	19:57
60°	02:18	03:30	04:20	19:47	19:57	20:09
N 58°	02:39	03:43	04:29	19:52	20:04	20:19
56°	02:56	03:53	04:36	19:56	20:10	20:28
54°	03:10	04:02	04:42	20:00	20:16	20:36
52°	03:22	04:11	04:48	20:03	20:21	20:43
50°	03:33	04:18	04:53	20:06	20:26	20:49
45°	03:54	04:33	05:05	20:13	20:36	21:03
N 40°	04:10	04:45	05:14	20:18	20:45	21:15
35°	04:23	04:55	05:22	20:23	20:52	21:24
30°	04:34	05:04	05:29	20:27	20:59	21:33
20°	04:51	05:18	05:41	20:35	21:10	21:48
N 10°	05:04	05:29	05:51	20:41	21:20	22:01
0°	05:15	05:39	06:01	20:47	21:30	22:13
S 10°	05:24	05:48	06:10	20:53	21:39	22:26
20°	05:31	05:57	06:20	21:00	21:49	22:39
30°	05:38	06:07	06:31	21:08	22:01	22:55
35°	05:42	06:12	06:38	21:12	22:08	23:03
40°	05:45	06:17	06:45	21:17	22:15	23:14
45°	05:48	06:23	06:53	21:23	22:24	23:26
S 50°	05:52	06:30	07:03	21:30	22:35	23:40
52°	05:53	06:33	07:08	21:34	22:41	23:47
54°	05:55	06:36	07:13	21:37	22:46	23:55
56°	05:56	06:40	07:19	21:41	22:52	24:04
58°	05:58	06:44	07:25	21:46	22:59	24:13
S 60°	05:59	06:48	07:32	21:51	23:08	24:25
S 62°	06:01	06:53	07:40	21:56	23:17	24:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 17	Moonset 18	Moonset 19
N 72°	21:21	-	-	09:48	11:40	13:46
N 70°	20:55	22:48	-	09:39	11:20	13:09
68°	20:35	22:00	-	09:31	11:05	12:43
66°	20:19	21:30	-	09:25	10:53	12:24
64°	20:06	21:07	22:58	09:19	10:43	12:08
62°	19:55	20:50	22:14	09:15	10:35	11:55
60°	19:46	20:35	21:47	09:11	10:27	11:44
N 58°	19:38	20:23	21:26	09:07	10:21	11:35
56°	19:31	20:13	21:09	09:04	10:15	11:27
54°	19:24	20:04	20:55	09:01	10:10	11:19
52°	19:19	19:56	20:44	08:59	10:06	11:13
50°	19:13	19:49	20:33	08:56	10:02	11:07
45°	19:02	19:34	20:13	08:51	09:53	10:54
N 40°	18:53	19:22	19:57	08:47	09:45	10:43
35°	18:45	19:12	19:44	08:44	09:39	10:35
30°	18:39	19:04	19:33	08:40	09:33	10:27
20°	18:27	18:50	19:16	08:35	09:24	10:13
N 10°	18:17	18:38	19:04	08:30	09:15	10:02
0°	18:07	18:28	18:53	08:26	09:08	09:51
S 10°	17:58	18:19	18:44	08:21	09:00	09:40
20°	17:48	18:11	18:37	08:16	08:51	09:28
30°	17:37	18:02	18:30	08:11	08:42	09:15
35°	17:31	17:57	18:26	08:08	08:36	09:07
40°	17:24	17:51	18:23	08:04	08:30	08:58
45°	17:15	17:46	18:20	08:00	08:23	08:48
S 50°	17:05	17:39	18:17	07:55	08:15	08:36
52°	17:01	17:36	18:15	07:53	08:11	08:30
54°	16:56	17:33	18:14	07:51	08:06	08:24
56°	16:50	17:29	18:13	07:48	08:02	08:17
58°	16:44	17:25	18:11	07:45	07:56	08:10
S 60°	16:37	17:21	18:10	07:42	07:50	08:01
S 62°	16:28	17:16	18:08	07:38	07:44	07:51

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
17	4 14	4 08	12:04	02:16	14:36	18d 87%
18	4 02	3 55	12:04	02:57	15:19	19d 80%
19	3 48	3 41	12:04	03:40	16:02	20d 72%

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2011 August 20, 21, 22 (Sat, Sun, Monday)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
20 00	327° 59'.3	177° 42'.3	13° 33'.6 N	226° 00'.3	23° 31'.2 N	289° 47'.4	13° 35'.7 N	134° 13'.6	3° 22'.4 S
01	343° 01'.7	192° 41'.8	32'.5	241° 01'.0	31'.1	304° 49'.8	35'.7	149° 15'.9	22'.5
02	358° 04'.2	207° 41'.3	31'.5	256° 01'.7	31'.0	319° 52'.2	35'.7	164° 18'.1	22'.6
03	13° 06'.7	222° 40'.8	30'.4	271° 02'.4	30'.9	334° 54'.6	35'.7	179° 20'.4	22'.7
04	28° 09'.1	237° 40'.2	29'.4	286° 03'.1	30'.8	349° 56'.9	35'.7	194° 22'.6	22'.8
05	43° 11'.6	252° 39'.7	28'.4	301° 03'.8	30'.7	4° 59'.3	35'.8	209° 24'.9	22'.9
06	58° 14'.1	267° 39'.2	27'.3	316° 04'.5	30'.6	20° 01'.7	35'.8	224° 27'.1	23'.0
07	73° 16'.5	282° 38'.6	26'.3	331° 05'.1	30'.5	35° 04'.1	35'.8	239° 29'.3	23'.1
08	88° 19'.0	297° 38'.1	25'.2	346° 05'.8	30'.4	50° 06'.4	35'.8	254° 31'.6	23'.2
09	103° 21'.5	312° 37'.6	24'.2	1° 06'.5	30'.3	65° 08'.8	35'.8	269° 33'.8	23'.3
10	118° 23'.9	327° 37'.0	23'.1	16° 07'.2	30'.2	80° 11'.2	35'.9	284° 36'.1	23'.4
11	133° 26'.4	342° 36'.5	22'.1	31° 07'.9	30'.1	95° 13'.6	35'.9	299° 38'.3	23'.5
12	148° 28'.8	357° 36'.0	13° 21'.0 N	46° 08'.6	23° 30'.0 N	110° 16'.0	13° 35'.9 N	314° 40'.6	3° 23'.6 S
13	163° 31'.3	12° 35'.5	20'.0	61° 09'.3	29'.9	125° 18'.4	35'.9	329° 42'.8	23'.7
14	178° 33'.8	27° 34'.9	19'.0	76° 10'.0	29'.8	140° 20'.7	35'.9	344° 45'.1	23'.8
15	193° 36'.2	42° 34'.4	17'.9	91° 10'.7	29'.7	155° 23'.1	35'.9	359° 47'.3	23'.9
16	208° 38'.7	57° 33'.9	16'.9	106° 11'.4	29'.5	170° 25'.5	36'.0	14° 49'.6	24'.0
17	223° 41'.2	72° 33'.4	15'.8	121° 12'.1	29'.4	185° 27'.9	36'.0	29° 51'.8	24'.1
18	238° 43'.6	87° 32'.8	14'.8	136° 12'.8	29'.3	200° 30'.3	36'.0	44° 54'.0	24'.2
19	253° 46'.1	102° 32'.3	13'.7	151° 13'.5	29'.2	215° 32'.6	36'.0	59° 56'.3	24'.3
20	268° 48'.6	117° 31'.8	12'.7	166° 14'.2	29'.1	230° 35'.0	36'.0	74° 58'.5	24'.4
21	283° 51'.0	132° 31'.3	11'.6	181° 14'.9	29'.0	245° 37'.4	36'.0	90° 00'.8	24'.5
22	298° 53'.5	147° 30'.7	10'.5	196° 15'.6	28'.9	260° 39'.8	36'.1	105° 03'.0	24'.6
23	313° 56'.0	162° 30'.2	09'.5	211° 16'.2	28'.8	275° 42'.2	36'.1	120° 05'.3	24'.7
21 00	328° 58'.4	177° 29'.7	13° 08'.4 N	226° 16'.9	23° 28'.7 N	290° 44'.6	13° 36'.1 N	135° 07'.5	3° 24'.8 S
01	344° 00'.9	192° 29'.2	07'.4	241° 17'.6	28'.6	305° 47'.0	36'.1	150° 09'.8	24'.9
02	359° 03'.3	207° 28'.7	06'.3	256° 18'.3	28'.5	320° 49'.3	36'.1	165° 12'.0	25'.0
03	14° 05'.8	222° 28'.1	05'.3	271° 19'.0	28'.4	335° 51'.7	36'.1	180° 14'.2	25'.1
04	29° 08'.3	237° 27'.6	04'.2	286° 19'.7	28'.2	350° 54'.1	36'.1	195° 16'.5	25'.2
05	44° 10'.7	252° 27'.1	03'.2	301° 20'.4	28'.1	5° 56'.5	36'.2	210° 18'.7	25'.3
06	59° 13'.2	267° 26'.6	02'.1	316° 21'.1	28'.0	20° 58'.9	36'.2	225° 21'.0	25'.4
07	74° 15'.7	282° 26'.1	01'.0	331° 21'.8	27'.9	36° 01'.3	36'.2	240° 23'.2	25'.5
08	89° 18'.1	297° 25'.5	00'.0	346° 22'.5	27'.8	51° 03'.7	36'.2	255° 25'.5	25'.6
09	104° 20'.6	312° 25'.0	12° 58'.9 N	1° 23'.2	27'.7	66° 06'.0	36'.2	270° 27'.7	25'.7
10	119° 23'.1	327° 24'.5	57'.9	16° 23'.9	27'.6	81° 08'.4	36'.2	285° 29'.9	25'.8
11	134° 25'.5	342° 24'.0	56'.8	31° 24'.6	27'.5	96° 10'.8	36'.3	300° 32'.2	25'.9
12	149° 28'.0	357° 23'.5	12° 55'.7 N	46° 25'.3	23° 27'.3 N	111° 13'.2	13° 36'.3 N	315° 34'.4	3° 26'.0 S
13	164° 30'.5	12° 22'.9	54'.7	61° 26'.0	27'.2	126° 15'.6	36'.3	330° 36'.7	26'.1
14	179° 32'.9	27° 22'.4	53'.6	76° 26'.7	27'.1	141° 18'.0	36'.3	345° 38'.9	26'.2
15	194° 35'.4	42° 21'.9	52'.6	91° 27'.4	27'.0	156° 20'.4	36'.3	0° 41'.2	26'.3
16	209° 37'.8	57° 21'.4	51'.5	106° 28'.1	26'.9	171° 22'.8	36'.3	15° 43'.4	26'.4
17	224° 40'.3	72° 20'.9	50'.4	121° 28'.8	26'.8	186° 25'.2	36'.3	30° 45'.6	26'.5
18	239° 42'.8	87° 20'.4	49'.4	136° 29'.5	26'.7	201° 27'.6	36'.4	45° 47'.9	26'.6
19	254° 45'.2	102° 19'.8	48'.3	151° 30'.2	26'.5	216° 29'.9	36'.4	60° 50'.1	26'.7
20	269° 47'.7	117° 19'.3	47'.2	166° 30'.9	26'.4	231° 32'.3	36'.4	75° 52'.4	26'.8
21	284° 50'.2	132° 18'.8	46'.2	181° 31'.6	26'.3	246° 34'.7	36'.4	90° 54'.6	26'.9
22	299° 52'.6	147° 18'.3	45'.1	196° 32'.3	26'.2	261° 37'.1	36'.4	105° 56'.9	27'.0
23	314° 55'.1	162° 17'.8	44'.0	211° 33'.0	26'.1	276° 39'.5	36'.4	120° 59'.1	27'.1
22 00	329° 57'.6	177° 17'.3	12° 43'.0 N	226° 33'.7	23° 26'.0 N	291° 41'.9	13° 36'.4 N	136° 01'.3	3° 27'.2 S
01	345° 00'.0	192° 16'.8	41'.9	241° 34'.4	25'.9	306° 44'.3	36'.4	151° 03'.6	27'.3
02	0° 02'.5	207° 16'.3	40'.8	256° 35'.1	25'.7	321° 46'.7	36'.5	166° 05'.8	27'.4
03	15° 05'.0	222° 15'.7	39'.7	271° 35'.8	25'.6	336° 49'.1	36'.5	181° 08'.1	27'.5
04	30° 07'.4	237° 15'.2	38'.7	286° 36'.5	25'.5	351° 51'.5	36'.5	196° 10'.3	27'.6
05	45° 09'.9	252° 14'.7	37'.6	301° 37'.2	25'.4	6° 53'.9	36'.5	211° 12'.6	27'.7
06	60° 12'.3	267° 14'.2	36'.5	316° 37'.9	25'.3	21° 56'.3	36'.5	226° 14'.8	27'.8
07	75° 14'.8	282° 13'.7	35'.5	331° 38'.6	25'.1	36° 58'.7	36'.5	241° 17'.0	27'.9
08	90° 17'.3	297° 13'.2	34'.4	346° 39'.3	25'.0	52° 01'.1	36'.5	256° 19'.3	28'.0
09	105° 19'.7	312° 12'.7	33'.3	1° 40'.0	24'.9	67° 03'.5	36'.5	271° 21'.5	28'.1
10	120° 22'.2	327° 12'.2	32'.2	16° 40'.7	24'.8	82° 05'.9	36'.6	286° 23'.8	28'.2
11	135° 24'.7	342° 11'.7	31'.2	31° 41'.4	24'.7	97° 08'.2	36'.6	301° 26'.0	28'.3
12	150° 27'.1	357° 11'.2	12° 30'.1 N	46° 42'.1	23° 24'.5 N	112° 10'.6	13° 36'.6 N	316° 28'.2	3° 28'.4 S
13	165° 29'.6	12° 10'.7	29'.0	61° 42'.8	24'.4	127° 13'.0	36'.6	331° 30'.5	28'.5
14	180° 32'.1	27° 10'.1	27'.9	76° 43'.5	24'.3	142° 15'.4	36'.6	346° 32'.7	28'.6
15	195° 34'.5	42° 09'.6	26'.9	91° 44'.2	24'.2	157° 17'.8	36'.6	1° 35'.0	28'.7
16	210° 37'.0	57° 09'.1	25'.8	106° 44'.9	24'.1	172° 20'.2	36'.6	16° 37'.2	28'.8
17	225° 39'.4	72° 08'.6	24'.7	121° 45'.6	23'.9	187° 22'.6	36'.6	31° 39'.4	28'.9
18	240° 41'.9	87° 08'.1	23'.6	136° 46'.3	23'.8	202° 25'.0	36'.7	46° 41'.7	29'.0
19	255° 44'.4	102° 07'.6	22'.5	151° 47'.0	23'.7	217° 27'.4	36'.7	61° 43'.9	29'.1
20	270° 46'.8	117° 07'.1	21'.5	166° 47'.7	23'.6	232° 29'.8	36'.7	76° 46'.2	29'.2
21	285° 49'.3	132° 06'.6	20'.4	181° 48'.4	23'.4	247° 32'.2	36'.7	91° 48'.4	29'.3
22	300° 51'.8	147° 06'.1	19'.3	196° 49'.1	23'.3	262° 34'.6	36'.7	106° 50'.6	29'.4
23	315° 54'.2	162° 05'.6	18'.2	211° 49'.8	23'.2	277° 37'.0	36'.7	121° 52'.9	29'.5
	M.P. 02:00	v -0'.5	d 1'.1	v 0'.7	d 0'.1	v 2'.4	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.2	40° 15'.2 S
Achernar	335° 27'.3	57° 10'.3 S
Acrux	173° 11'.4	63° 10'.1 S
Adhara	255° 13'.8	28° 59'.2 S
Aldebaran	290° 50'.9	16° 32'.0 N
Alioth	166° 22'.1	55° 54'.0 N
Alkaid	153° 00'.1	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.8	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.5	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.2 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.5 N
Atria	107° 30'.6	69° 03'.1 S
Avior	234° 19'.2	59° 32'.8 S
Bellatrix	278° 33'.5	6° 21'.6 N
Betelgeuse	271° 02'.9	7° 24'.6 N
Canopus	263° 57'.1	52° 41'.9 S
Capella	280° 36'.5	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.5 N
Diphda	348° 56'.9	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.3 N
Elnath	278° 14'.4	28° 36'.9 N
Eltanin	90° 46'.4	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.8	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 50'.0	60° 26'.0 S
Hamal	328° 02'.1	23° 31'.1 N
Kaus Aust.	83° 45'.2	34° 22'.7 S
Kochab	137° 20'.1	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.3	4° 08'.2 N
Menkent	148° 09'.3	36° 25'.8 S
Miaplacidus	221° 41'.0	69° 45'.9 S
Mirfak	308° 42'.2	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.7 S
Polaris	318° 18'.0	89° 18'.6 N
Pollux	243° 29'.6	27° 59'.8 N
Procyon	245° 01'.3	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.2 S
Rigil Kent	139° 53'.7	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.7 S
Sirius	258° 35'.1	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.9	43° 28'.8 S
Vega	80° 39'.5	38° 48'.0 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	208° 31'.3	12:10
Mars	257° 18'.5	08:54
Jupiter	321° 46'.1	04:36
Saturn	166° 09'.1	14:57

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 06'.5	12° 37'.7 N	295° 55'.0	13'.7	16° 47'.7 N	8'.2	54'.3
194° 06'.6	36'.9	310° 27'.7	13'.6	55'.9	8'.2	
209° 06'.8	36'.1	325° 00'.3	13'.6	17° 04'.1 N	8'.1	
224° 06'.9	35'.2	339° 32'.9	13'.6	12'.2	8'.0	
239° 07'.1	34'.4	354° 05'.5	13'.5	20'.2	7'.9	
254° 07'.2	33'.6	8° 38'.0	13'.4	28'.1	7'.9	
269° 07'.4	32'.8	23° 10'.4	13'.4	36'.0	7'.8	
284° 07'.5	32'.0	37° 42'.8	13'.4	43'.8	7'.7	
299° 07'.7	31'.1	52° 15'.2	13'.2	51'.5	7'.6	
314° 07'.8	30'.3	66° 47'.4	13'.3	59'.1	7'.6	
329° 08'.0	29'.5	81° 19'.7	13'.2	18° 06'.7 N	7'.5	54'.4
344° 08'.1	28'.7	95° 51'.9	13'.1	14'.2	7'.4	
359° 08'.3	12° 27'.9 N	110° 24'.0	13'.0	18° 21'.6 N	7'.4	54'.4
14° 08'.4	27'.0	124° 56'.0	13'.0	29'.0	7'.2	
29° 08'.6	26'.2	139° 28'.0	13'.0	36'.2	7'.2	
44° 08'.7	25'.4	154° 00'.0	12'.9	43'.4	7'.1	
59° 08'.9	24'.6	168° 31'.9	12'.8	50'.5	7'.0	
74° 09'.0	23'.7	183° 03'.7	12'.8	57'.5	7'.0	
89° 09'.2	22'.9	197° 35'.5	12'.7	19° 04'.5 N	6'.8	54'.5
104° 09'.3	22'.1	212° 07'.2	12'.7	11'.3	6'.8	
119° 09'.5	21'.3	226° 38'.9	12'.6	18'.1	6'.7	
134° 09'.6	20'.4	241° 10'.5	12'.6	24'.8	6'.6	
149° 09'.8	19'.6	255° 42'.1	12'.5	31'.4	6'.5	
164° 09'.9	18'.8	270° 13'.6	12'.4	37'.9	6'.5	
179° 10'.1	12° 18'.0 N	284° 45'.0	12'.4	19° 44'.4 N	6'.3	54'.5
194° 10'.2	17'.1	299° 16'.4	12'.3	50'.7	6'.3	54'.6
209° 10'.4	16'.3	313° 47'.7	12'.3	57'.0	6'.2	
224° 10'.5	15'.5	328° 19'.0	12'.2	20° 03'.2 N	6'.1	
239° 10'.7	14'.6	342° 50'.2	12'.1	09'.3	6'.0	
254° 10'.8	13'.8	357° 21'.3	12'.1	15'.3	5'.9	
269° 11'.0	13'.0	11° 52'.4	12'.0	21'.2	5'.8	
284° 11'.1	12'.2	26° 23'.4	12'.0	27'.0	5'.7	54'.7
299° 11'.3	11'.3	40° 54'.4	11'.9	32'.7	5'.7	
314° 11'.4	10'.5	55° 25'.3	11'.9	38'.4	5'.5	
329° 11'.6	09'.7	69° 56'.2	11'.8	43'.9	5'.5	
344° 11'.7	08'.8	84° 27'.0	11'.7	49'.4	5'.3	
359° 11'.9	12° 08'.0 N	98° 57'.7	11'.7	20° 54'.7 N	5'.3	54'.7
14° 12'.0	07'.2	113° 28'.4	11'.6	21° 00'.0 N	5'.2	54'.8
29° 12'.2	06'.3	127° 59'.0	11'.5	05'.2	5'.1	
44° 12'.4	05'.5	142° 29'.5	11'.5	10'.3	5'.0	
59° 12'.5	04'.7	157° 00'.0	11'.5	15'.3	4'.8	
74° 12'.7	03'.8	171° 30'.5	11'.4	20'.1	4'.8	
89° 12'.8	03'.0	186° 00'.9	11'.3	24'.9	4'.7	54'.9
104° 13'.0	02'.2	200° 31'.2	11'.2	29'.6	4'.6	
119° 13'.1	01'.3	215° 01'.4	11'.2	34'.2	4'.5	
134° 13'.3	00'.5	229° 31'.6	11'.2	38'.7	4'.4	
149° 13'.4	11° 59'.7 N	244° 01'.8	11'.1	43'.1	4'.3	55'.0
164° 13'.6	58'.8	258° 31'.9	11'.0	47'.4	4'.2	
179° 13'.8	11° 58'.0 N	273° 01'.9	11'.0	21° 51'.6 N	4'.0	55'.0
194° 13'.9	57'.2	287° 31'.9	10'.9	55'.6	4'.0	
209° 14'.1	56'.3	302° 01'.8	10'.8	59'.6	3'.9	
224° 14'.2	55'.5	316° 31'.6	10'.8	22° 03'.5 N	3'.8	55'.1
239° 14'.4	54'.7	331° 01'.4	10'.8	07'.3	3'.6	
254° 14'.5	53'.8	345° 31'.2	10'.7	10'.9	3'.6	
269° 14'.7	53'.0	0° 00'.9	10'.6	14'.5	3'.5	
284° 14'.9	52'.1	14° 30'.5	10'.6	18'.0	3'.3	55'.2
299° 15'.0	51'.3	29° 00'.1	10'.5	21'.3	3'.2	
314° 15'.2	50'.5	43° 29'.6	10'.4	24'.5	3'.2	
329° 15'.3	49'.6	57° 59'.0	10'.4	27'.7	3'.0	
344° 15'.5	48'.8	72° 28'.4	10'.4	30'.7	2'.9	55'.3
359° 15'.6	11° 47'.9 N	86° 57'.8	10'.3	22° 33'.6 N	2'.8	55'.3
14° 15'.8	47'.1	101° 27'.1	10'.2	36'.4	2'.7	
29° 16'.0	46'.3	115° 56'.3	10'.2	39'.1	2'.6	
44° 16'.1	45'.4	130° 25'.5	10'.2	41'.7	2'.5	55'.4
59° 16'.3	44'.6	144° 54'.7	10'.0	44'.2	2'.3	
74° 16'.4	43'.7	159° 23'.7	10'.1	46'.5	2'.2	
89° 16'.6	42'.9	173° 52'.8	10'.0	48'.7	2'.2	
104° 16'.8	42'.1	188° 21'.8	9'.9	50'.9	2'.0	55'.5
119° 16'.9	41'.2	202° 50'.7	9'.9	52'.9	1'.9	
134° 17'.1	40'.4	217° 19'.6	9'.8	54'.8	1'.8	
149° 17'.2	39'.5	231° 48'.4	9'.8	56'.6	1'.6	55'.6
164° 17'.4	38'.7	246° 17'.2	9'.7	58'.2	1'.6	
SD 15'.8	d 0'.8	SD	14'.8	14'.9	15'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 20	Moonrise 21	Moonrise 22
N 72°	-	-	03:00	-	-	-
N 70°	-	01:41	03:24	18:06	-	-
68°	-	02:21	03:42	18:56	18:35	-
66°	-	02:49	03:57	19:27	19:32	19:46
64°	01:29	03:09	04:09	19:51	20:05	20:32
62°	02:05	03:25	04:19	20:10	20:30	21:02
60°	02:30	03:39	04:28	20:25	20:49	21:25
N 58°	02:49	03:50	04:35	20:39	21:05	21:43
56°	03:05	04:00	04:42	20:50	21:19	21:58
54°	03:18	04:08	04:48	21:00	21:31	22:12
52°	03:29	04:16	04:53	21:09	21:42	22:23
50°	03:39	04:23	04:58	21:17	21:51	22:33
45°	03:59	04:37	05:08	21:34	22:11	22:55
N 40°	04:14	04:48	05:17	21:48	22:27	23:13
35°	04:26	04:58	05:24	22:00	22:41	23:27
30°	04:36	05:06	05:31	22:11	22:53	23:40
20°	04:52	05:19	05:42	22:29	23:13	24:02
N 10°	05:04	05:30	05:51	22:45	23:31	24:21
0°	05:14	05:39	06:00	22:59	23:48	24:39
S 10°	05:22	05:47	06:09	23:14	-	00:05
20°	05:29	05:55	06:18	23:30	-	00:23
30°	05:36	06:04	06:28	23:49	-	00:44
35°	05:38	06:08	06:34	24:00	-	00:56
40°	05:41	06:13	06:41	-	00:12	01:10
45°	05:44	06:18	06:48	-	00:27	01:27
S 50°	05:47	06:24	06:58	-	00:45	01:47
52°	05:48	06:27	07:02	-	00:53	01:57
54°	05:49	06:30	07:06	-	01:03	02:08
56°	05:50	06:33	07:12	00:04	01:14	02:21
58°	05:51	06:36	07:17	00:13	01:26	02:36
S 60°	05:52	06:40	07:24	00:25	01:41	02:53
S 62°	05:53	06:45	07:31	00:38	01:58	03:15

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 20	Moonset 21	Moonset 22
N 72°	21:02	23:49	-	-	-	-
N 70°	20:39	22:18	-	15:17	-	-
68°	20:21	21:40	-	14:28	16:28	-
66°	20:07	21:14	23:51	13:57	15:32	17:01
64°	19:55	20:54	22:31	13:34	14:59	16:16
62°	19:46	20:39	21:57	13:16	14:34	15:46
60°	19:37	20:26	21:33	13:01	14:15	15:24
N 58°	19:30	20:15	21:15	12:48	13:59	15:05
56°	19:23	20:05	20:59	12:37	13:46	14:50
54°	19:17	19:57	20:47	12:28	13:34	14:37
52°	19:12	19:49	20:36	12:19	13:24	14:26
50°	19:08	19:43	20:26	12:11	13:15	14:15
45°	18:57	19:29	20:07	11:55	12:56	13:54
N 40°	18:49	19:17	19:52	11:42	12:40	13:37
35°	18:42	19:08	19:40	11:31	12:27	13:22
30°	18:35	19:00	19:30	11:21	12:15	13:10
20°	18:25	18:47	19:14	11:04	11:56	12:48
N 10°	18:15	18:37	19:02	10:49	11:38	12:30
0°	18:07	18:28	18:52	10:35	11:23	12:12
S 10°	17:58	18:19	18:44	10:22	11:07	11:55
20°	17:49	18:11	18:37	10:07	10:50	11:36
30°	17:39	18:03	18:31	09:50	10:30	11:15
35°	17:33	17:59	18:28	09:41	10:19	11:02
40°	17:26	17:54	18:26	09:30	10:06	10:48
45°	17:19	17:49	18:23	09:17	09:50	10:31
S 50°	17:10	17:43	18:21	09:01	09:32	10:09
52°	17:05	17:40	18:20	08:54	09:23	09:59
54°	17:01	17:37	18:19	08:46	09:13	09:48
56°	16:56	17:34	18:18	08:37	09:02	09:35
58°	16:50	17:31	18:17	08:26	08:49	09:20
S 60°	16:44	17:27	18:16	08:15	08:34	09:02
S 62°	16:36	17:23	18:15	08:01	08:16	08:41

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
20	3 34	3 27	12:03	04:24	16:47	21d 64%
21	3 20	3 13	12:03	05:11	17:35	22d 54%
22	3 05	2 58	12:03	06:00	18:25	23d 44%

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2011 August 23, 24, 25 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
23 Tuesday 00	330° 56'.7	177° 05'.1	12° 17'.1 N	226° 50'.5	23° 23'.1 N	292° 39'.4	13° 36'.7 N	136° 55'.1	3° 29'.6 S
01	345° 59'.2	192° 04'.6	16'.0	241° 51'.2	23'.0	307° 41'.8	36'.7	151° 57'.4	29'.7
02	1° 01'.6	207° 04'.1	15'.0	256° 51'.9	22'.8	322° 44'.2	36'.7	166° 59'.6	29'.8
03	16° 04'.1	222° 03'.6	13'.9	271° 52'.6	22'.7	337° 46'.6	36'.8	182° 01'.8	29'.9
04	31° 06'.6	237° 03'.1	12'.8	286° 53'.4	22'.6	352° 49'.0	36'.8	197° 04'.1	30'.0
05	46° 09'.0	252° 02'.6	11'.7	301° 54'.1	22'.5	7° 51'.4	36'.8	212° 06'.3	30'.1
06	61° 11'.5	267° 02'.1	10'.6	316° 54'.8	22'.3	22° 53'.8	36'.8	227° 08'.6	30'.2
07	76° 13'.9	282° 01'.6	09'.5	331° 55'.5	22'.2	37° 56'.3	36'.8	242° 10'.8	30'.3
08	91° 16'.4	297° 01'.1	08'.4	346° 56'.2	22'.1	52° 58'.7	36'.8	257° 13'.0	30'.4
09	106° 18'.9	312° 00'.6	07'.4	1° 56'.9	21'.9	68° 01'.1	36'.8	272° 15'.3	30'.5
10	121° 21'.3	327° 00'.1	06'.3	16° 57'.6	21'.8	83° 03'.5	36'.8	287° 17'.5	30'.6
11	136° 23'.8	341° 59'.6	05'.2	31° 58'.3	21'.7	98° 05'.9	36'.8	302° 19'.8	30'.7
12	151° 26'.3	356° 59'.1	12° 04'.1 N	46° 59'.0	23° 21'.6 N	113° 08'.3	13° 36'.8 N	317° 22'.0	3° 30'.8 S
13	166° 28'.7	11° 58'.6	03'.0	61° 59'.7	21'.4	128° 10'.7	36'.9	332° 24'.2	30'.9
14	181° 31'.2	26° 58'.1	01'.9	77° 00'.4	21'.3	143° 13'.1	36'.9	347° 26'.5	31'.0
15	196° 33'.7	41° 57'.6	00'.8	92° 01'.1	21'.2	158° 15'.5	36'.9	2° 28'.7	31'.1
16	211° 36'.1	56° 57'.1	11° 59'.7 N	107° 01'.8	21'.1	173° 17'.9	36'.9	17° 31'.0	31'.2
17	226° 38'.6	71° 56'.6	58'.6	122° 02'.5	20'.9	188° 20'.3	36'.9	32° 33'.2	31'.3
18	241° 41'.1	86° 56'.1	57'.5	137° 03'.2	20'.8	203° 22'.7	36'.9	47° 35'.4	31'.4
19	256° 43'.5	101° 55'.6	56'.4	152° 04'.0	20'.7	218° 25'.1	36'.9	62° 37'.7	31'.5
20	271° 46'.0	116° 55'.1	55'.3	167° 04'.7	20'.5	233° 27'.5	36'.9	77° 39'.9	31'.6
21	286° 48'.4	131° 54'.6	54'.3	182° 05'.4	20'.4	248° 29'.9	36'.9	92° 42'.1	31'.7
22	301° 50'.9	146° 54'.1	53'.2	197° 06'.1	20'.3	263° 32'.3	36'.9	107° 44'.4	31'.8
23	316° 53'.4	161° 53'.6	52'.1	212° 06'.8	20'.1	278° 34'.7	36'.9	122° 46'.6	31'.9
24 Wednesday 00	331° 55'.8	176° 53'.1	11° 51'.0 N	227° 07'.5	23° 20'.0 N	293° 37'.2	13° 36'.9 N	137° 48'.9	3° 32'.0 S
01	346° 58'.3	191° 52'.7	49'.9	242° 08'.2	19'.9	308° 39'.6	37'.0	152° 51'.1	32'.1
02	2° 00'.8	206° 52'.2	48'.8	257° 08'.9	19'.7	323° 42'.0	37'.0	167° 53'.3	32'.2
03	17° 03'.2	221° 51'.7	47'.7	272° 09'.6	19'.6	338° 44'.4	37'.0	182° 55'.6	32'.3
04	32° 05'.7	236° 51'.2	46'.6	287° 10'.3	19'.5	353° 46'.8	37'.0	197° 57'.8	32'.4
05	47° 08'.2	251° 50'.7	45'.5	302° 11'.0	19'.4	8° 49'.2	37'.0	213° 00'.0	32'.5
06	62° 10'.6	266° 50'.2	44'.4	317° 11'.7	19'.2	23° 51'.6	37'.0	228° 02'.3	32'.6
07	77° 13'.1	281° 49'.7	43'.3	332° 12'.5	19'.1	38° 54'.0	37'.0	243° 04'.5	32'.7
08	92° 15'.6	296° 49'.2	42'.2	347° 13'.2	19'.0	53° 56'.4	37'.0	258° 06'.8	32'.8
09	107° 18'.0	311° 48'.7	41'.1	2° 13'.9	18'.8	68° 58'.9	37'.0	273° 09'.0	32'.9
10	122° 20'.5	326° 48'.2	40'.0	17° 14'.6	18'.7	84° 01'.3	37'.0	288° 11'.2	33'.0
11	137° 22'.9	341° 47'.7	38'.9	32° 15'.3	18'.5	99° 03'.7	37'.0	303° 13'.5	33'.1
12	152° 25'.4	356° 47'.3	11° 37'.8 N	47° 16'.0	23° 18'.4 N	114° 06'.1	13° 37'.0 N	318° 15'.7	3° 33'.2 S
13	167° 27'.9	11° 46'.8	36'.7	62° 16'.7	18'.3	129° 08'.5	37'.0	333° 17'.9	33'.3
14	182° 30'.3	26° 46'.3	35'.5	77° 17'.4	18'.1	144° 10'.9	37'.0	348° 20'.2	33'.4
15	197° 32'.8	41° 45'.8	34'.4	92° 18'.1	18'.0	159° 13'.3	37'.1	3° 22'.4	33'.5
16	212° 35'.3	56° 45'.3	33'.3	107° 18'.9	17'.9	174° 15'.7	37'.1	18° 24'.6	33'.6
17	227° 37'.7	71° 44'.8	32'.2	122° 19'.6	17'.7	189° 18'.2	37'.1	33° 26'.9	33'.7
18	242° 40'.2	86° 44'.3	31'.1	137° 20'.3	17'.6	204° 20'.6	37'.1	48° 29'.1	33'.8
19	257° 42'.7	101° 43'.8	30'.0	152° 21'.0	17'.5	219° 23'.0	37'.1	63° 31'.4	33'.9
20	272° 45'.1	116° 43'.4	28'.9	167° 21'.7	17'.3	234° 25'.4	37'.1	78° 33'.6	34'.0
21	287° 47'.6	131° 42'.9	27'.8	182° 22'.4	17'.2	249° 27'.8	37'.1	93° 35'.8	34'.1
22	302° 50'.0	146° 42'.4	26'.7	197° 23'.1	17'.0	264° 30'.2	37'.1	108° 38'.1	34'.2
23	317° 52'.5	161° 41'.9	25'.6	212° 23'.8	16'.9	279° 32'.7	37'.1	123° 40'.3	34'.3
25 Thursday 00	332° 55'.0	176° 41'.4	11° 24'.5 N	227° 24'.6	23° 16'.8 N	294° 35'.1	13° 37'.1 N	138° 42'.5	3° 34'.4 S
01	347° 57'.4	191° 40'.9	23'.4	242° 25'.3	16'.6	309° 37'.5	37'.1	153° 44'.8	34'.5
02	2° 59'.9	206° 40'.4	22'.3	257° 26'.0	16'.5	324° 39'.9	37'.1	168° 47'.0	34'.6
03	18° 02'.4	221° 40'.0	21'.1	272° 26'.7	16'.4	339° 42'.3	37'.1	183° 49'.2	34'.7
04	33° 04'.8	236° 39'.5	20'.0	287° 27'.4	16'.2	354° 44'.7	37'.1	198° 51'.5	34'.8
05	48° 07'.3	251° 39'.0	18'.9	302° 28'.1	16'.1	9° 47'.2	37'.1	213° 53'.7	34'.9
06	63° 09'.8	266° 38'.5	17'.8	317° 28'.8	15'.9	24° 49'.6	37'.1	228° 55'.9	35'.0
07	78° 12'.2	281° 38'.0	16'.7	332° 29'.6	15'.8	39° 52'.0	37'.1	243° 58'.2	35'.1
08	93° 14'.7	296° 37'.6	15'.6	347° 30'.3	15'.7	54° 54'.4	37'.2	259° 00'.4	35'.2
09	108° 17'.2	311° 37'.1	14'.5	2° 31'.0	15'.5	69° 56'.8	37'.2	274° 02'.6	35'.3
10	123° 19'.6	326° 36'.6	13'.3	17° 31'.7	15'.4	84° 59'.3	37'.2	289° 04'.9	35'.4
11	138° 22'.1	341° 36'.1	12'.2	32° 32'.4	15'.2	100° 01'.7	37'.2	304° 07'.1	35'.5
12	153° 24'.5	356° 35'.6	11° 11'.1 N	47° 33'.1	23° 15'.1 N	115° 04'.1	13° 37'.2 N	319° 09'.4	3° 35'.6 S
13	168° 27'.0	11° 35'.2	10'.0	62° 33'.9	14'.9	130° 06'.5	37'.2	334° 11'.6	35'.8
14	183° 29'.5	26° 34'.7	08'.9	77° 34'.6	14'.8	145° 08'.9	37'.2	349° 13'.8	35'.9
15	198° 31'.9	41° 34'.2	07'.8	92° 35'.3	14'.7	160° 11'.4	37'.2	4° 16'.1	36'.0
16	213° 34'.4	56° 33'.7	06'.6	107° 36'.0	14'.5	175° 13'.8	37'.2	19° 18'.3	36'.1
17	228° 36'.9	71° 33'.2	05'.5	122° 36'.7	14'.4	190° 16'.2	37'.2	34° 20'.5	36'.2
18	243° 39'.3	86° 32'.8	04'.4	137° 37'.4	14'.2	205° 18'.6	37'.2	49° 22'.8	36'.3
19	258° 41'.8	101° 32'.3	03'.3	152° 38'.2	14'.1	220° 21'.1	37'.2	64° 25'.0	36'.4
20	273° 44'.3	116° 31'.8	02'.2	167° 38'.9	13'.9	235° 23'.5	37'.2	79° 27'.2	36'.5
21	288° 46'.7	131° 31'.3	01'.0	182° 39'.6	13'.8	250° 25'.9	37'.2	94° 29'.5	36'.6
22	303° 49'.2	146° 30'.9	10° 59'.9 N	197° 40'.3	13'.7	265° 28'.3	37'.2	109° 31'.7	36'.7
23	318° 51'.7	161° 30'.4	58'.8	212° 41'.0	13'.5	280° 30'.8	37'.2	124° 33'.9	36'.8
	M.P. 01:48	v -0'.5	d 1'.1	v 0'.7	d 0'.1	v 2'.4	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.2	40° 15'.1 S
Achernar	335° 27'.3	57° 10'.3 S
Acrux	173° 11'.4	63° 10'.0 S
Adhara	255° 13'.8	28° 59'.2 S
Aldebaran	290° 50'.9	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.9 N
Alkaid	153° 00'.1	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.8	1° 11'.6 S
Alphard	217° 57'.7	8° 42'.6 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.5	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.2 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.5 N
Atria	107° 30'.6	69° 03'.1 S
Avior	234° 19'.2	59° 32'.7 S
Bellatrix	278° 33'.5	6° 21'.6 N
Betelgeuse	271° 02'.8	7° 24'.6 N
Canopus	263° 57'.0	52° 41'.9 S
Capella	280° 36'.5	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.9	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.3 N
Elnath	278° 14'.4	28° 36'.9 N
Eltanin	90° 46'.5	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.8	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.5 S
Hadar	148° 50'.1	60° 26'.0 S
Hamal	328° 02'.0	23° 31'.1 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.2	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.3	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 45'.9 S
Mirfak	308° 42'.1	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.8 S
Polaris	318° 16'.4	89° 18'.6 N
Pollux	243° 29'.6	27° 59'.8 N
Procyon	245° 01'.3	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.2 S
Rigil Kent	139° 53'.7	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.7 S
Sirius	258° 35'.1	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.8 S
Vega	80° 39'.6	38° 48'.0 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	204° 57'.3	12:13
Mars	255° 11'.7	08:51
Jupiter	321° 41'.3	04:25
Saturn	165° 53'.0	14:47

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 17'.6	11° 37'.8 N	260° 45'.9	9'.7	22° 59'.8 N	1'.4	55'.6
194° 17'.7	37'.0	275° 14'.6	9'.6	23° 01'.2 N	1'.3	
209° 17'.9	36'.2	289° 43'.2	9'.6	02'.5	1'.2	55'.7
224° 18'.0	35'.3	304° 11'.8	9'.6	03'.7	1'.1	
239° 18'.2	34'.5	318° 40'.4	9'.4	04'.8	0'.9	
254° 18'.4	33'.6	333° 08'.8	9'.5	05'.7	0'.9	55'.8
269° 18'.5	32'.8	347° 37'.3	9'.4	06'.6	0'.7	
284° 18'.7	31'.9	2° 05'.7	9'.4	07'.3	0'.6	
299° 18'.8	31'.1	16° 34'.1	9'.3	07'.9	0'.4	
314° 19'.0	30'.2	31° 02'.4	9'.3	08'.3	0'.4	55'.9
329° 19'.2	29'.4	45° 30'.7	9'.2	08'.7	0'.2	
344° 19'.3	28'.6	59° 58'.9	9'.2	08'.9	0'.1	
359° 19'.5	11° 27'.7 N	74° 27'.1	9'.1	23° 09'.0 N	0'.0	56'.0
14° 19'.7	26'.9	88° 55'.2	9'.1	09'.0	0'.1	
29° 19'.8	26'.0	103° 23'.3	9'.1	08'.9	0'.3	
44° 20'.0	25'.2	117° 51'.4	9'.1	08'.6	0'.4	56'.1
59° 20'.1	24'.3	132° 19'.5	8'.9	08'.2	0'.5	
74° 20'.3	23'.5	146° 47'.4	9'.0	07'.7	0'.7	
89° 20'.5	22'.6	161° 15'.4	8'.9	07'.0	0'.7	56'.2
104° 20'.6	21'.8	175° 43'.3	8'.9	06'.3	0'.9	
119° 20'.8	20'.9	190° 11'.2	8'.9	05'.4	1'.1	
134° 21'.0	20'.1	204° 39'.1	8'.8	04'.3	1'.1	56'.3
149° 21'.1	19'.2	219° 06'.9	8'.8	03'.2	1'.3	
164° 21'.3	18'.4	233° 34'.7	8'.7	01'.9	1'.4	
179° 21'.5	11° 17'.5 N	248° 02'.4	8'.8	23° 00'.5 N	1'.5	56'.4
194° 21'.6	16'.7	262° 30'.2	8'.7	22° 59'.0 N	1'.7	
209° 21'.8	15'.8	276° 57'.9	8'.6	57'.3	1'.8	
224° 22'.0	15'.0	291° 25'.5	8'.7	55'.5	1'.9	56'.5
239° 22'.1	14'.1	305° 53'.2	8'.6	53'.6	2'.0	
254° 22'.3	13'.3	320° 20'.8	8'.6	51'.6	2'.2	
269° 22'.5	12'.4	334° 48'.4	8'.5	49'.4	2'.3	56'.6
284° 22'.6	11'.6	349° 15'.9	8'.5	47'.1	2'.5	
299° 22'.8	10'.7	3° 43'.4	8'.6	44'.6	2'.5	
314° 23'.0	09'.8	18° 11'.0	8'.4	42'.1	2'.7	56'.7
329° 23'.1	09'.0	32° 38'.4	8'.5	39'.4	2'.8	
344° 23'.3	08'.1	47° 05'.9	8'.4	36'.6	3'.0	
359° 23'.5	11° 07'.3 N	61° 33'.3	8'.5	22° 33'.6 N	3'.1	56'.8
14° 23'.6	06'.4	76° 00'.8	8'.4	30'.5	3'.2	
29° 23'.8	05'.6	90° 28'.2	8'.3	27'.3	3'.4	56'.9
44° 24'.0	04'.7	104° 55'.5	8'.4	23'.9	3'.4	
59° 24'.1	03'.9	119° 22'.9	8'.3	20'.5	3'.6	
74° 24'.3	03'.0	133° 50'.2	8'.4	16'.9	3'.8	57'.0
89° 24'.5	02'.2	148° 17'.6	8'.3	13'.1	3'.8	
104° 24'.6	01'.3	162° 44'.9	8'.3	09'.3	4'.0	
119° 24'.8	00'.4	177° 12'.2	8'.3	05'.3	4'.2	57'.1
134° 25'.0	10° 59'.6 N	191° 39'.5	8'.2	01'.1	4'.2	
149° 25'.1	58'.7	206° 06'.7	8'.3	21° 56'.9 N	4'.4	
164° 25'.3	57'.9	220° 34'.0	8'.2	52'.5	4'.5	57'.2
179° 25'.5	10° 57'.0 N	235° 01'.2	8'.3	21° 48'.0 N	4'.7	57'.2
194° 25'.6	56'.1	249° 28'.5	8'.2	43'.3	4'.8	57'.3
209° 25'.8	55'.3	263° 55'.7	8'.2	38'.5	4'.9	
224° 26'.0	54'.4	278° 22'.9	8'.2	33'.6	5'.0	
239° 26'.1	53'.6	292° 50'.1	8'.2	28'.6	5'.2	57'.4
254° 26'.3	52'.7	307° 17'.3	8'.2	23'.4	5'.3	
269° 26'.5	51'.9	321° 44'.5	8'.2	18'.1	5'.4	
284° 26'.7	51'.0	336° 11'.7	8'.2	12'.7	5'.6	57'.5
299° 26'.8	50'.1	350° 38'.9	8'.2	07'.1	5'.7	
314° 27'.0	49'.3	5° 06'.1	8'.1	01'.4	5'.8	57'.6
329° 27'.2	48'.4	19° 33'.2	8'.2	20° 55'.6 N	6'.0	
344° 27'.3	47'.5	34° 00'.4	8'.2	49'.6	6'.0	
359° 27'.5	10° 46'.7 N	48° 27'.6	8'.1	20° 43'.6 N	6'.2	57'.7
14° 27'.7	45'.8	62° 54'.7	8'.2	37'.4	6'.4	
29° 27'.9	45'.0	77° 21'.9	8'.2	31'.0	6'.4	
44° 28'.0	44'.1	91° 49'.1	8'.2	24'.6	6'.6	57'.8
59° 28'.2	43'.2	106° 16'.3	8'.1	18'.0	6'.7	
74° 28'.4	42'.4	120° 43'.4	8'.2	11'.3	6'.9	57'.9
89° 28'.5	41'.5	135° 10'.6	8'.2	04'.4	6'.9	
104° 28'.7	40'.6	149° 37'.8	8'.2	19° 57'.5 N	7'.1	
119° 28'.9	39'.8	164° 05'.0	8'.2	50'.4	7'.3	58'.0
134° 29'.1	38'.9	178° 32'.2	8'.1	43'.1	7'.3	
149° 29'.2	38'.1	192° 59'.3	8'.2	35'.8	7'.5	
164° 29'.4	37'.2	207° 26'.5	8'.2	28'.3	7'.6	58'.1
SD 15'.8	d 0'.9	SD	15'.3	15'.5	15'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 23	Moonrise 24	Moonrise 25
N 72°	-	01:09	03:17	-	-	-
N 70°	-	02:06	03:38	-	-	22:04
68°	-	02:39	03:54	-	20:32	23:10
66°	01:00	03:02	04:07	20:32	21:59	23:46
64°	01:50	03:20	04:18	21:21	22:37	24:11
62°	02:20	03:35	04:27	21:52	23:04	24:31
60°	02:42	03:47	04:35	22:16	23:24	24:47
N 58°	02:59	03:57	04:42	22:34	23:41	25:00
56°	03:13	04:06	04:48	22:50	23:55	25:12
54°	03:25	04:14	04:53	23:04	-	00:08
52°	03:35	04:21	04:58	23:15	-	00:19
50°	03:44	04:28	05:02	23:26	-	00:28
45°	04:03	04:41	05:12	23:48	-	00:49
N 40°	04:17	04:51	05:20	-	00:05	01:05
35°	04:29	05:00	05:26	-	00:20	01:19
30°	04:38	05:08	05:32	-	00:33	01:31
20°	04:53	05:20	05:42	00:02	00:55	01:51
N 10°	05:05	05:30	05:51	00:21	01:14	02:09
0°	05:14	05:38	05:59	00:39	01:32	02:26
S 10°	05:21	05:46	06:07	00:57	01:49	02:42
20°	05:27	05:53	06:15	01:16	02:08	03:00
30°	05:33	06:01	06:25	01:38	02:30	03:21
35°	05:35	06:04	06:30	01:51	02:43	03:32
40°	05:37	06:09	06:36	02:06	02:58	03:46
45°	05:39	06:13	06:43	02:23	03:16	04:02
S 50°	05:41	06:19	06:52	02:45	03:38	04:22
52°	05:42	06:21	06:55	02:56	03:48	04:31
54°	05:42	06:23	07:00	03:08	04:00	04:42
56°	05:43	06:26	07:04	03:22	04:13	04:54
58°	05:44	06:29	07:10	03:38	04:29	05:08
S 60°	05:44	06:32	07:15	03:57	04:47	05:24
S 62°	05:44	06:36	07:22	04:21	05:11	05:43

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 23	Moonset 24	Moonset 25
N 72°	20:43	22:43	-	-	-	-
N 70°	20:23	21:53	-	-	-	20:20
68°	20:08	21:22	-	-	19:58	19:14
66°	19:55	20:59	22:54	18:05	18:30	18:38
64°	19:45	20:42	22:09	17:16	17:52	18:12
62°	19:36	20:28	21:41	16:44	17:25	17:51
60°	19:28	20:16	21:20	16:21	17:04	17:34
N 58°	19:22	20:06	21:03	16:02	16:47	17:20
56°	19:16	19:57	20:50	15:46	16:32	17:08
54°	19:11	19:49	20:38	15:33	16:20	16:58
52°	19:06	19:42	20:28	15:21	16:09	16:48
50°	19:01	19:36	20:19	15:11	15:59	16:40
45°	18:52	19:23	20:01	14:49	15:38	16:21
N 40°	18:45	19:13	19:47	14:31	15:21	16:07
35°	18:38	19:04	19:35	14:16	15:07	15:54
30°	18:32	18:57	19:26	14:03	14:55	15:43
20°	18:22	18:45	19:11	13:41	14:33	15:24
N 10°	18:14	18:35	19:00	13:22	14:15	15:07
0°	18:06	18:27	18:51	13:04	13:58	14:52
S 10°	17:58	18:19	18:44	12:46	13:40	14:36
20°	17:50	18:12	18:38	12:27	13:21	14:19
30°	17:40	18:05	18:33	12:05	13:00	14:00
35°	17:35	18:01	18:30	11:52	12:47	13:49
40°	17:29	17:57	18:28	11:37	12:33	13:35
45°	17:22	17:52	18:26	11:19	12:15	13:20
S 50°	17:14	17:47	18:25	10:57	11:54	13:01
52°	17:10	17:45	18:24	10:46	11:44	12:52
54°	17:06	17:42	18:24	10:34	11:32	12:42
56°	17:01	17:40	18:23	10:20	11:19	12:30
58°	16:56	17:37	18:23	10:04	11:03	12:17
S 60°	16:50	17:34	18:22	09:45	10:45	12:01
S 62°	16:44	17:30	18:22	09:21	10:22	11:42

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
23	2 50	2 42	12:03	06:51	19:18	24d 35%
24	2 34	2 27	12:02	07:45	20:12	25d 25%
25	2 18	2 10	12:02	08:39	21:06	26d 17%

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2011 August 26, 27, 28 (Fri, Saturday, Sunday)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
26 00	333° 54'.1	176° 29'.9	10° 57'.7 N	227° 41'.7	23° 13'.4 N	295° 33'.2	13° 37'.2 N	139° 36'.2	3° 36'.9 S
01	348° 56'.6	191° 29'.4	56'.6	242° 42'.5	13'.2	310° 35'.6	37'.2	154° 38'.4	37'.0
02	3° 59'.0	206° 29'.0	55'.4	257° 43'.2	13'.1	325° 38'.0	37'.2	169° 40'.6	37'.1
03	19° 01'.5	221° 28'.5	54'.3	272° 43'.9	12'.9	340° 40'.5	37'.2	184° 42'.9	37'.2
04	34° 04'.0	236° 28'.0	53'.2	287° 44'.6	12'.8	355° 42'.9	37'.2	199° 45'.1	37'.3
05	49° 06'.4	251° 27'.5	52'.1	302° 45'.3	12'.6	10° 45'.3	37'.2	214° 47'.3	37'.4
06	64° 08'.9	266° 27'.1	50'.9	317° 46'.1	12'.5	25° 47'.7	37'.2	229° 49'.6	37'.5
07	79° 11'.4	281° 26'.6	49'.8	332° 46'.8	12'.3	40° 50'.2	37'.2	244° 51'.8	37'.6
08	94° 13'.8	296° 26'.1	48'.7	347° 47'.5	12'.2	55° 52'.6	37'.2	259° 54'.0	37'.7
09	109° 16'.3	311° 25'.6	47'.5	2° 48'.2	12'.0	70° 55'.0	37'.2	274° 56'.3	37'.8
10	124° 18'.8	326° 25'.2	46'.4	17° 48'.9	11'.9	85° 57'.4	37'.2	289° 58'.5	37'.9
11	139° 21'.2	341° 24'.7	45'.3	32° 49'.7	11'.7	100° 59'.9	37'.2	305° 00'.7	38'.0
12	154° 23'.7	356° 24'.2	10° 44'.2 N	47° 50'.4	23° 11'.6 N	116° 02'.3	13° 37'.2 N	320° 03'.0	3° 38'.1 S
13	169° 26'.2	11° 23'.8	43'.0	62° 51'.1	11'.4	131° 04'.7	37'.2	335° 05'.2	38'.2
14	184° 28'.6	26° 23'.3	41'.9	77° 51'.8	11'.3	146° 07'.2	37'.2	350° 07'.4	38'.3
15	199° 31'.1	41° 22'.8	40'.8	92° 52'.5	11'.1	161° 09'.6	37'.2	5° 09'.6	38'.4
16	214° 33'.5	56° 22'.3	39'.6	107° 53'.3	11'.0	176° 12'.0	37'.2	20° 11'.9	38'.5
17	229° 36'.0	71° 21'.9	38'.5	122° 54'.0	10'.8	191° 14'.5	37'.3	35° 14'.1	38'.6
18	244° 38'.5	86° 21'.4	37'.4	137° 54'.7	10'.7	206° 16'.9	37'.3	50° 16'.3	38'.7
19	259° 40'.9	101° 20'.9	36'.2	152° 55'.4	10'.5	221° 19'.3	37'.3	65° 18'.6	38'.8
20	274° 43'.4	116° 20'.5	35'.1	167° 56'.1	10'.4	236° 21'.8	37'.3	80° 20'.8	38'.9
21	289° 45'.9	131° 20'.0	34'.0	182° 56'.9	10'.2	251° 24'.2	37'.3	95° 23'.0	39'.0
22	304° 48'.3	146° 19'.5	32'.8	197° 57'.6	10'.1	266° 26'.6	37'.3	110° 25'.3	39'.1
23	319° 50'.8	161° 19'.1	31'.7	212° 58'.3	09'.9	281° 29'.1	37'.3	125° 27'.5	39'.2
27 00	334° 53'.3	176° 18'.6	10° 30'.6 N	227° 59'.0	23° 09'.8 N	296° 31'.5	13° 37'.3 N	140° 29'.7	3° 39'.3 S
01	349° 55'.7	191° 18'.1	29'.4	242° 59'.8	09'.6	311° 33'.9	37'.3	155° 32'.0	39'.4
02	4° 58'.2	206° 17'.7	28'.3	258° 00'.5	09'.5	326° 36'.4	37'.3	170° 34'.2	39'.6
03	20° 00'.6	221° 17'.2	27'.2	273° 01'.2	09'.3	341° 38'.8	37'.3	185° 36'.4	39'.7
04	35° 03'.1	236° 16'.7	26'.0	288° 01'.9	09'.2	356° 41'.2	37'.3	200° 38'.7	39'.8
05	50° 05'.6	251° 16'.3	24'.9	303° 02'.7	09'.0	11° 43'.7	37'.3	215° 40'.9	39'.9
06	65° 08'.0	266° 15'.8	23'.8	318° 03'.4	08'.9	26° 46'.1	37'.3	230° 43'.1	40'.0
07	80° 10'.5	281° 15'.3	22'.6	333° 04'.1	08'.7	41° 48'.5	37'.3	245° 45'.4	40'.1
08	95° 13'.0	296° 14'.9	21'.5	348° 04'.8	08'.5	56° 51'.0	37'.3	260° 47'.6	40'.2
09	110° 15'.4	311° 14'.4	20'.3	3° 05'.6	08'.4	71° 53'.4	37'.3	275° 49'.8	40'.3
10	125° 17'.9	326° 13'.9	19'.2	18° 06'.3	08'.2	86° 55'.8	37'.3	290° 52'.0	40'.4
11	140° 20'.4	341° 13'.5	18'.1	33° 07'.0	08'.1	101° 58'.3	37'.3	305° 54'.3	40'.5
12	155° 22'.8	356° 13'.0	10° 16'.9 N	48° 07'.7	23° 07'.9 N	117° 00'.7	13° 37'.3 N	320° 56'.5	3° 40'.6 S
13	170° 25'.3	11° 12'.6	15'.8	63° 08'.5	07'.8	132° 03'.1	37'.3	335° 58'.7	40'.7
14	185° 27'.8	26° 12'.1	14'.6	78° 09'.2	07'.6	147° 05'.6	37'.3	351° 01'.0	40'.8
15	200° 30'.2	41° 11'.6	13'.5	93° 09'.9	07'.5	162° 08'.0	37'.3	6° 03'.2	40'.9
16	215° 32'.7	56° 11'.2	12'.4	108° 10'.6	07'.3	177° 10'.5	37'.2	21° 05'.4	41'.0
17	230° 35'.1	71° 10'.7	11'.2	123° 11'.4	07'.1	192° 12'.9	37'.2	36° 07'.7	41'.1
18	245° 37'.6	86° 10'.3	10'.1	138° 12'.1	07'.0	207° 15'.3	37'.2	51° 09'.9	41'.2
19	260° 40'.1	101° 09'.8	08'.9	153° 12'.8	06'.8	222° 17'.8	37'.2	66° 12'.1	41'.3
20	275° 42'.5	116° 09'.3	07'.8	168° 13'.5	06'.7	237° 20'.2	37'.2	81° 14'.3	41'.4
21	290° 45'.0	131° 08'.9	06'.6	183° 14'.3	06'.5	252° 22'.7	37'.2	96° 16'.6	41'.5
22	305° 47'.5	146° 08'.4	05'.5	198° 15'.0	06'.3	267° 25'.1	37'.2	111° 18'.8	41'.6
23	320° 49'.9	161° 08'.0	04'.3	213° 15'.7	06'.2	282° 27'.5	37'.2	126° 21'.0	41'.7
28 00	335° 52'.4	176° 07'.5	10° 03'.2 N	228° 16'.4	23° 06'.0 N	297° 30'.0	13° 37'.2 N	141° 23'.3	3° 41'.8 S
01	350° 54'.9	191° 07'.0	02'.0	243° 17'.2	05'.9	312° 32'.4	37'.2	156° 25'.5	41'.9
02	5° 57'.3	206° 06'.6	00'.9	258° 17'.9	05'.7	327° 34'.9	37'.2	171° 27'.7	42'.0
03	20° 59'.8	221° 06'.1	9° 59'.8 N	273° 18'.6	05'.5	342° 37'.3	37'.2	186° 29'.9	42'.1
04	36° 02'.3	236° 05'.7	58'.6	288° 19'.4	05'.4	357° 39'.8	37'.2	201° 32'.2	42'.2
05	51° 04'.7	251° 05'.2	57'.5	303° 20'.1	05'.2	12° 42'.2	37'.2	216° 34'.4	42'.3
06	66° 07'.2	266° 04'.7	56'.3	318° 20'.8	05'.1	27° 44'.6	37'.2	231° 36'.6	42'.5
07	81° 09'.6	281° 04'.3	55'.2	333° 21'.5	04'.9	42° 47'.1	37'.2	246° 38'.9	42'.6
08	96° 12'.1	296° 03'.8	54'.0	348° 22'.3	04'.7	57° 49'.5	37'.2	261° 41'.1	42'.7
09	111° 14'.6	311° 03'.4	52'.9	3° 23'.0	04'.6	72° 52'.0	37'.2	276° 43'.3	42'.8
10	126° 17'.0	326° 02'.9	51'.7	18° 23'.7	04'.4	87° 54'.4	37'.2	291° 45'.6	42'.9
11	141° 19'.5	341° 02'.5	50'.6	33° 24'.5	04'.3	102° 56'.9	37'.2	306° 47'.8	43'.0
12	156° 22'.0	356° 02'.0	9° 49'.4 N	48° 25'.2	23° 04'.1 N	117° 59'.3	13° 37'.2 N	321° 50'.0	3° 43'.1 S
13	171° 24'.4	11° 01'.6	48'.2	63° 25'.9	03'.9	133° 01'.8	37'.2	336° 52'.2	43'.2
14	186° 26'.9	26° 01'.1	47'.1	78° 26'.7	03'.8	148° 04'.2	37'.2	351° 54'.5	43'.3
15	201° 29'.4	41° 00'.7	45'.9	93° 27'.4	03'.6	163° 06'.6	37'.2	6° 56'.7	43'.4
16	216° 31'.8	56° 00'.2	44'.8	108° 28'.1	03'.4	178° 09'.1	37'.2	21° 58'.9	43'.5
17	231° 34'.3	70° 59'.7	43'.6	123° 28'.9	03'.3	193° 11'.5	37'.2	37° 01'.1	43'.6
18	246° 36'.7	85° 59'.3	42'.5	138° 29'.6	03'.1	208° 14'.0	37'.2	52° 03'.4	43'.7
19	261° 39'.2	100° 58'.8	41'.3	153° 30'.3	02'.9	223° 16'.4	37'.2	67° 05'.6	43'.8
20	276° 41'.7	115° 58'.4	40'.2	168° 31'.0	02'.8	238° 18'.9	37'.2	82° 07'.8	43'.9
21	291° 44'.1	130° 57'.9	39'.0	183° 31'.8	02'.6	253° 21'.3	37'.2	97° 10'.1	44'.0
22	306° 46'.6	145° 57'.5	37'.9	198° 32'.5	02'.4	268° 23'.8	37'.2	112° 12'.3	44'.1
23	321° 49'.1	160° 57'.0	36'.7	213° 33'.2	02'.3	283° 26'.2	37'.2	127° 14'.5	44'.2
	M.P. 01:36	v -0'.5	d 1'.1	v 0'.7	d 0'.2	v 2'.4	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.1	40° 15'.1 S
Achernar	335° 27'.3	57° 10'.3 S
Acrux	173° 11'.4	63° 10'.0 S
Adhara	255° 13'.8	28° 59'.1 S
Aldebaran	290° 50'.9	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.9 N
Alkaid	153° 00'.1	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.0 S
Alnilam	275° 47'.8	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.6 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.5	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.2 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.4 N
Atria	107° 30'.6	69° 03'.1 S
Avior	234° 19'.1	59° 32'.7 S
Bellatrix	278° 33'.5	6° 21'.6 N
Betelgeuse	271° 02'.8	7° 24'.6 N
Canopus	263° 57'.0	52° 41'.9 S
Capella	280° 36'.4	46° 00'.4 N
Deneb	49° 31'.9	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.9	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.3 N
Elnath	278° 14'.3	28° 36'.9 N
Eltanin	90° 46'.5	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.1	60° 26'.0 S
Hamal	328° 02'.0	23° 31'.1 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.2	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.3	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 45'.9 S
Mirfak	308° 42'.1	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.6	56° 41'.8 S
Polaris	318° 15'.1	89° 18'.6 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.3	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.4	8° 11'.2 S
Rigil Kent	139° 53'.7	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.7 S
Sirius	258° 35'.0	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.8 S
Vega	80° 39'.6	38° 48'.0 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	201° 25'.3	12:15
Mars	253° 05'.8	08:48
Jupiter	321° 38'.2	04:13
Saturn	165° 36'.5	14:36

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 29'.6	10° 36'.3 N	221° 53'.7	8'.3	19° 20'.7 N	7'.7	58'.1
194° 29'.8	35'.5	236° 21'.0	8'.2	13'.0	7'.8	58'.2
209° 29'.9	34'.6	250° 48'.2	8'.2	05'.2	8'.0	
224° 30'.1	33'.7	265° 15'.4	8'.2	18° 57'.2 N	8'.0	
239° 30'.3	32'.9	279° 42'.6	8'.3	49'.2	8'.2	58'.3
254° 30'.4	32'.0	294° 09'.9	8'.2	41'.0	8'.4	
269° 30'.6	31'.1	308° 37'.1	8'.3	32'.6	8'.4	
284° 30'.8	30'.3	323° 04'.4	8'.3	24'.2	8'.6	58'.4
299° 31'.0	29'.4	337° 31'.7	8'.3	15'.6	8'.6	
314° 31'.1	28'.5	351° 59'.0	8'.3	07'.0	8'.8	58'.5
329° 31'.3	27'.7	6° 26'.3	8'.3	17° 58'.2 N	8'.9	
344° 31'.5	26'.8	20° 53'.6	8'.3	49'.3	9'.1	
359° 31'.7	10° 25'.9 N	35° 20'.9	8'.3	17° 40'.2 N	9'.1	58'.6
14° 31'.8	25'.0	49° 48'.2	8'.4	31'.1	9'.3	
29° 32'.0	24'.2	64° 15'.6	8'.3	21'.8	9'.4	
44° 32'.2	23'.3	78° 42'.9	8'.4	12'.4	9'.4	58'.7
59° 32'.4	22'.4	93° 10'.3	8'.4	03'.0	9'.6	
74° 32'.5	21'.6	107° 37'.7	8'.4	16° 53'.4 N	9'.7	
89° 32'.7	20'.7	122° 05'.1	8'.4	43'.7	9'.9	58'.8
104° 32'.9	19'.8	136° 32'.5	8'.4	33'.8	9'.9	
119° 33'.1	19'.0	150° 59'.9	8'.5	23'.9	10'.0	58'.9
134° 33'.3	18'.1	165° 27'.4	8'.4	13'.9	10'.2	
149° 33'.4	17'.2	179° 54'.8	8'.5	03'.7	10'.2	
164° 33'.6	16'.3	194° 22'.3	8'.5	15° 53'.5 N	10'.4	59'.0
179° 33'.8	10° 15'.5 N	208° 49'.8	8'.5	15° 43'.1 N	10'.5	59'.0
194° 34'.0	14'.6	223° 17'.3	8'.5	32'.6	10'.5	
209° 34'.1	13'.7	237° 44'.8	8'.6	22'.1	10'.7	59'.1
224° 34'.3	12'.8	252° 12'.4	8'.5	11'.4	10'.8	
239° 34'.5	12'.0	266° 39'.9	8'.6	00'.6	10'.9	
254° 34'.7	11'.1	281° 07'.5	8'.6	14° 49'.7 N	10'.9	59'.2
269° 34'.9	10'.2	295° 35'.1	8'.6	38'.8	11'.1	
284° 35'.0	09'.4	310° 02'.7	8'.6	27'.7	11'.2	
299° 35'.2	08'.5	324° 30'.3	8'.7	16'.5	11'.3	59'.3
314° 35'.4	07'.6	338° 58'.0	8'.6	05'.2	11'.3	
329° 35'.6	06'.7	353° 25'.6	8'.7	13° 53'.9 N	11'.5	
344° 35'.7	05'.9	7° 53'.3	8'.7	42'.4	11'.6	59'.4
359° 35'.9	10° 05'.0 N	22° 21'.0	8'.7	13° 30'.8 N	11'.6	59'.4
14° 36'.1	04'.1	36° 48'.7	8'.7	19'.2	11'.8	
29° 36'.3	03'.2	51° 16'.4	8'.8	07'.4	11'.8	59'.5
44° 36'.5	02'.4	65° 44'.2	8'.7	12° 55'.6 N	11'.9	
59° 36'.6	01'.5	80° 11'.9	8'.8	43'.7	12'.0	
74° 36'.8	00'.6	94° 39'.7	8'.8	31'.7	12'.1	59'.6
89° 37'.0	9° 59'.7 N	109° 07'.5	8'.8	19'.6	12'.2	
104° 37'.2	58'.8	123° 35'.3	8'.8	07'.4	12'.3	
119° 37'.4	58'.0	138° 03'.1	8'.9	11° 55'.1 N	12'.3	
134° 37'.5	57'.1	152° 31'.0	8'.8	42'.8	12'.4	59'.7
149° 37'.7	56'.2	166° 58'.8	8'.9	30'.4	12'.6	
164° 37'.9	55'.3	181° 26'.7	8'.9	17'.8	12'.5	
179° 38'.1	9° 54'.5 N	195° 54'.6	8'.9	11° 05'.3 N	12'.7	59'.8
194° 38'.3	53'.6	210° 22'.5	8'.9	10° 52'.6 N	12'.8	
209° 38'.4	52'.7	224° 50'.4	9'.0	39'.8	12'.8	
224° 38'.6	51'.8	239° 18'.4	8'.9	27'.0	12'.9	59'.9
239° 38'.8	50'.9	253° 46'.3	9'.0	14'.1	12'.9	
254° 39'.0	50'.1	268° 14'.3	8'.9	01'.2	13'.1	
269° 39'.2	49'.2	282° 42'.2	9'.0	9° 48'.1 N	13'.1	
284° 39'.4	48'.3	297° 10'.2	9'.0	35'.0	13'.2	60'.0
299° 39'.5	47'.4	311° 38'.2	9'.0	21'.8	13'.2	
314° 39'.7	46'.5	326° 06'.2	9'.1	08'.6	13'.3	
329° 39'.9	45'.6	340° 34'.3	9'.0	8° 55'.3 N	13'.4	
344° 40'.1	44'.8	355° 02'.3	9'.1	41'.9	13'.4	60'.1
359° 40'.3	9° 43'.9 N	9° 30'.4	9'.0	8° 28'.5 N	13'.5	60'.1
14° 40'.5	43'.0	23° 58'.4	9'.1	15'.0	13'.6	
29° 40'.6	42'.1	38° 26'.5	9'.1	01'.4	13'.6	
44° 40'.8	41'.2	52° 54'.6	9'.1	7° 47'.8 N	13'.6	60'.2
59° 41'.0	40'.4	67° 22'.7	9'.1	34'.2	13'.8	
74° 41'.2	39'.5	81° 50'.8	9'.1	20'.4	13'.7	
89° 41'.4	38'.6	96° 18'.9	9'.1	06'.7	13'.9	
104° 41'.6	37'.7	110° 47'.0	9'.1	6° 52'.8 N	13'.8	
119° 41'.7	36'.8	125° 15'.1	9'.2	39'.0	14'.0	60'.3
134° 41'.9	35'.9	139° 43'.3	9'.1	25'.0	14'.0	
149° 42'.1	35'.0	154° 11'.4	9'.1	11'.0	14'.0	
164° 42'.3	34'.2	168° 39'.5	9'.2	5° 57'.0 N	14'.0	
SD 15'.8	d 0'.9	SD	16'.0	16'.2	16'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 26	Moonrise 27	Moonrise 28
N 72°	-	01:45	03:34	-	00:10	02:46
N 70°	-	02:27	03:52	-	00:49	03:03
68°	-	02:54	04:06	-	01:16	03:17
66°	01:31	03:15	04:17	-	01:37	03:29
64°	02:08	03:31	04:27	00:11	01:53	03:38
62°	02:33	03:44	04:35	00:31	02:06	03:46
60°	02:53	03:55	04:42	00:47	02:18	03:53
N 58°	03:08	04:05	04:48	01:00	02:28	03:59
56°	03:21	04:13	04:54	01:12	02:36	04:04
54°	03:32	04:20	04:58	01:22	02:44	04:09
52°	03:42	04:27	05:03	01:31	02:50	04:13
50°	03:50	04:32	05:07	01:39	02:56	04:17
45°	04:07	04:45	05:15	01:57	03:10	04:26
N 40°	04:21	04:54	05:23	02:11	03:20	04:32
35°	04:31	05:02	05:29	02:22	03:29	04:38
30°	04:40	05:09	05:34	02:33	03:37	04:44
20°	04:54	05:21	05:43	02:51	03:51	04:53
N 10°	05:05	05:30	05:51	03:06	04:03	05:01
0°	05:13	05:37	05:58	03:20	04:14	05:08
S 10°	05:20	05:44	06:05	03:35	04:26	05:15
20°	05:25	05:51	06:13	03:50	04:38	05:23
30°	05:29	05:57	06:22	04:07	04:51	05:32
35°	05:31	06:01	06:26	04:18	04:59	05:37
40°	05:33	06:04	06:32	04:29	05:08	05:43
45°	05:34	06:08	06:38	04:43	05:18	05:50
S 50°	05:35	06:13	06:46	04:59	05:31	05:58
52°	05:36	06:15	06:49	05:07	05:36	06:01
54°	05:36	06:17	06:53	05:16	05:43	06:05
56°	05:36	06:19	06:57	05:25	05:50	06:10
58°	05:36	06:22	07:02	05:36	05:58	06:15
S 60°	05:36	06:24	07:07	05:49	06:07	06:20
S 62°	05:36	06:27	07:13	06:04	06:17	06:27

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 26	Moonset 27	Moonset 28
N 72°	20:26	22:09	-	20:11	19:28	19:02
N 70°	20:08	21:31	-	19:29	19:08	18:52
68°	19:55	21:05	23:41	19:01	18:52	18:45
66°	19:44	20:45	22:25	18:39	18:39	18:38
64°	19:34	20:30	21:50	18:22	18:28	18:33
62°	19:26	20:17	21:26	18:08	18:19	18:28
60°	19:20	20:06	21:08	17:56	18:11	18:23
N 58°	19:14	19:57	20:53	17:45	18:04	18:20
56°	19:08	19:49	20:40	17:36	17:58	18:16
54°	19:04	19:41	20:29	17:28	17:52	18:13
52°	18:59	19:35	20:20	17:20	17:47	18:11
50°	18:55	19:30	20:12	17:14	17:43	18:08
45°	18:47	19:18	19:55	16:59	17:32	18:03
N 40°	18:40	19:08	19:42	16:47	17:24	17:58
35°	18:34	19:00	19:31	16:37	17:17	17:54
30°	18:29	18:53	19:22	16:28	17:10	17:50
20°	18:20	18:42	19:09	16:13	16:59	17:44
N 10°	18:12	18:33	18:58	15:59	16:49	17:38
0°	18:05	18:26	18:50	15:46	16:40	17:33
S 10°	17:58	18:19	18:44	15:33	16:31	17:28
20°	17:50	18:13	18:38	15:19	16:20	17:22
30°	17:42	18:06	18:34	15:03	16:09	17:15
35°	17:37	18:03	18:32	14:54	16:02	17:12
40°	17:32	17:59	18:31	14:43	15:54	17:07
45°	17:26	17:56	18:30	14:31	15:45	17:02
S 50°	17:18	17:51	18:29	14:15	15:34	16:56
52°	17:15	17:49	18:29	14:08	15:29	16:53
54°	17:11	17:47	18:28	14:00	15:24	16:50
56°	17:07	17:45	18:28	13:51	15:17	16:47
58°	17:03	17:43	18:28	13:40	15:10	16:43
S 60°	16:57	17:40	18:28	13:28	15:02	16:38
S 62°	16:52	17:37	18:29	13:14	14:53	16:33

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
26	2 02	1 54	12:02	09:33	22:00	27d 9%
27	1 45	1 37	12:02	10:27	22:54	28d 4%
28	1 28	1 19	12:01	11:21	23:47	29d 1%

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2011 August 29, 30, 31 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
29 Monday 00	336° 51'.5	175° 56'.6	9° 35'.5 N	228° 34'.0	23° 02'.1 N	298° 28'.7	13° 37'.2 N	142° 16'.7	3° 44'.3 S
01	351° 54'.0	190° 56'.1	34'.4	243° 34'.7	01'.9	313° 31'.1	37'.1	157° 19'.0	44'.4
02	6° 56'.5	205° 55'.7	33'.2	258° 35'.4	01'.8	328° 33'.6	37'.1	172° 21'.2	44'.5
03	21° 58'.9	220° 55'.2	32'.1	273° 36'.2	01'.6	343° 36'.0	37'.1	187° 23'.4	44'.6
04	37° 01'.4	235° 54'.8	30'.9	288° 36'.9	01'.4	358° 38'.5	37'.1	202° 25'.7	44'.7
05	52° 03'.9	250° 54'.3	29'.7	303° 37'.6	01'.3	13° 40'.9	37'.1	217° 27'.9	44'.9
06	67° 06'.3	265° 53'.9	28'.6	318° 38'.4	01'.1	28° 43'.4	37'.1	232° 30'.1	45'.0
07	82° 08'.8	280° 53'.4	27'.4	333° 39'.1	00'.9	43° 45'.8	37'.1	247° 32'.3	45'.1
08	97° 11'.2	295° 53'.0	26'.3	348° 39'.8	00'.8	58° 48'.3	37'.1	262° 34'.6	45'.2
09	112° 13'.7	310° 52'.5	25'.1	3° 40'.6	00'.6	73° 50'.7	37'.1	277° 36'.8	45'.3
10	127° 16'.2	325° 52'.1	23'.9	18° 41'.3	00'.4	88° 53'.2	37'.1	292° 39'.0	45'.4
11	142° 18'.6	340° 51'.7	22'.8	33° 42'.1	00'.3	103° 55'.7	37'.1	307° 41'.2	45'.5
12	157° 21'.1	355° 51'.2	9° 21'.6 N	48° 42'.8	23° 00'.1 N	118° 58'.1	13° 37'.1 N	322° 43'.5	3° 45'.6 S
13	172° 23'.6	10° 50'.8	20'.5	63° 43'.5	22° 59'.9 N	134° 00'.6	37'.1	337° 45'.7	45'.7
14	187° 26'.0	25° 50'.3	19'.3	78° 44'.3	59'.8	149° 03'.0	37'.1	352° 47'.9	45'.8
15	202° 28'.5	40° 49'.9	18'.1	93° 45'.0	59'.6	164° 05'.5	37'.1	7° 50'.1	45'.9
16	217° 31'.0	55° 49'.4	17'.0	108° 45'.7	59'.4	179° 07'.9	37'.1	22° 52'.4	46'.0
17	232° 33'.4	70° 49'.0	15'.8	123° 46'.5	59'.2	194° 10'.4	37'.1	37° 54'.6	46'.1
18	247° 35'.9	85° 48'.5	14'.6	138° 47'.2	59'.1	209° 12'.8	37'.1	52° 56'.8	46'.2
19	262° 38'.3	100° 48'.1	13'.5	153° 47'.9	58'.9	224° 15'.3	37'.0	67° 59'.0	46'.3
20	277° 40'.8	115° 47'.6	12'.3	168° 48'.7	58'.7	239° 17'.7	37'.0	83° 01'.3	46'.4
21	292° 43'.3	130° 47'.2	11'.1	183° 49'.4	58'.6	254° 20'.2	37'.0	98° 03'.5	46'.5
22	307° 45'.7	145° 46'.8	10'.0	198° 50'.2	58'.4	269° 22'.7	37'.0	113° 05'.7	46'.6
23	322° 48'.2	160° 46'.3	08'.8	213° 50'.9	58'.2	284° 25'.1	37'.0	128° 07'.9	46'.7
30 Tuesday 00	337° 50'.7	175° 45'.9	9° 07'.6 N	228° 51'.6	22° 58'.0 N	299° 27'.6	13° 37'.0 N	143° 10'.2	3° 46'.8 S
01	352° 53'.1	190° 45'.4	06'.5	243° 52'.4	57'.9	314° 30'.0	37'.0	158° 12'.4	46'.9
02	7° 55'.6	205° 45'.0	05'.3	258° 53'.1	57'.7	329° 32'.5	37'.0	173° 14'.6	47'.1
03	22° 58'.1	220° 44'.5	04'.1	273° 53'.8	57'.5	344° 35'.0	37'.0	188° 16'.9	47'.2
04	38° 00'.5	235° 44'.1	02'.9	288° 54'.6	57'.3	359° 37'.4	37'.0	203° 19'.1	47'.3
05	53° 03'.0	250° 43'.7	01'.8	303° 55'.3	57'.2	14° 39'.9	37'.0	218° 21'.3	47'.4
06	68° 05'.5	265° 43'.2	00'.6	318° 56'.1	57'.0	29° 42'.3	37'.0	233° 23'.5	47'.5
07	83° 07'.9	280° 42'.8	8° 59'.4 N	333° 56'.8	56'.8	44° 44'.8	37'.0	248° 25'.8	47'.6
08	98° 10'.4	295° 42'.3	58'.3	348° 57'.5	56'.6	59° 47'.3	36'.9	263° 28'.0	47'.7
09	113° 12'.8	310° 41'.9	57'.1	3° 58'.3	56'.5	74° 49'.7	36'.9	278° 30'.2	47'.8
10	128° 15'.3	325° 41'.5	55'.9	18° 59'.0	56'.3	89° 52'.2	36'.9	293° 32'.4	47'.9
11	143° 17'.8	340° 41'.0	54'.7	33° 59'.8	56'.1	104° 54'.6	36'.9	308° 34'.6	48'.0
12	158° 20'.2	355° 40'.6	8° 53'.6 N	49° 00'.5	22° 55'.9 N	119° 57'.1	13° 36'.9 N	323° 36'.9	3° 48'.1 S
13	173° 22'.7	10° 40'.1	52'.4	64° 01'.2	55'.8	134° 59'.6	36'.9	338° 39'.1	48'.2
14	188° 25'.2	25° 39'.7	51'.2	79° 02'.0	55'.6	150° 02'.0	36'.9	353° 41'.3	48'.3
15	203° 27'.6	40° 39'.3	50'.0	94° 02'.7	55'.4	165° 04'.5	36'.9	8° 43'.5	48'.4
16	218° 30'.1	55° 38'.8	48'.9	109° 03'.5	55'.2	180° 06'.9	36'.9	23° 45'.8	48'.5
17	233° 32'.6	70° 38'.4	47'.7	124° 04'.2	55'.0	195° 09'.4	36'.9	38° 48'.0	48'.6
18	248° 35'.0	85° 37'.9	46'.5	139° 05'.0	54'.9	210° 11'.9	36'.9	53° 50'.2	48'.7
19	263° 37'.5	100° 37'.5	45'.3	154° 05'.7	54'.7	225° 14'.3	36'.8	68° 52'.4	48'.8
20	278° 39'.9	115° 37'.1	44'.2	169° 06'.4	54'.5	240° 16'.8	36'.8	83° 54'.7	48'.9
21	293° 42'.4	130° 36'.6	43'.0	184° 07'.2	54'.3	255° 19'.3	36'.8	98° 56'.9	49'.1
22	308° 44'.9	145° 36'.2	41'.8	199° 07'.9	54'.1	270° 21'.7	36'.8	113° 59'.1	49'.2
23	323° 47'.3	160° 35'.8	40'.6	214° 08'.7	54'.0	285° 24'.2	36'.8	129° 01'.3	49'.3
31 Wednesday 00	338° 49'.8	175° 35'.3	8° 39'.5 N	229° 09'.4	22° 53'.8 N	300° 26'.7	13° 36'.8 N	144° 03'.6	3° 49'.4 S
01	353° 52'.3	190° 34'.9	38'.3	244° 10'.2	53'.6	315° 29'.1	36'.8	159° 05'.8	49'.5
02	8° 54'.7	205° 34'.5	37'.1	259° 10'.9	53'.4	330° 31'.6	36'.8	174° 08'.0	49'.6
03	23° 57'.2	220° 34'.0	35'.9	274° 11'.6	53'.2	345° 34'.1	36'.8	189° 10'.2	49'.7
04	38° 59'.7	235° 33'.6	34'.7	289° 12'.4	53'.1	0° 36'.5	36'.8	204° 12'.5	49'.8
05	54° 02'.1	250° 33'.2	33'.6	304° 13'.1	52'.9	15° 39'.0	36'.8	219° 14'.7	49'.9
06	69° 04'.6	265° 32'.7	32'.4	319° 13'.9	52'.7	30° 41'.5	36'.7	234° 16'.9	50'.0
07	84° 07'.1	280° 32'.3	31'.2	334° 14'.6	52'.5	45° 43'.9	36'.7	249° 19'.1	50'.1
08	99° 09'.5	295° 31'.9	30'.0	349° 15'.4	52'.3	60° 46'.4	36'.7	264° 21'.3	50'.2
09	114° 12'.0	310° 31'.4	28'.8	4° 16'.1	52'.2	75° 48'.9	36'.7	279° 23'.6	50'.3
10	129° 14'.4	325° 31'.0	27'.7	19° 16'.9	52'.0	90° 51'.3	36'.7	294° 25'.8	50'.4
11	144° 16'.9	340° 30'.6	26'.5	34° 17'.6	51'.8	105° 53'.8	36'.7	309° 28'.0	50'.5
12	159° 19'.4	355° 30'.1	8° 25'.3 N	49° 18'.3	22° 51'.6 N	120° 56'.3	13° 36'.7 N	324° 30'.2	3° 50'.6 S
13	174° 21'.8	10° 29'.7	24'.1	64° 19'.1	51'.4	135° 58'.8	36'.7	339° 32'.5	50'.7
14	189° 24'.3	25° 29'.3	22'.9	79° 19'.8	51'.2	151° 01'.2	36'.7	354° 34'.7	50'.9
15	204° 26'.8	40° 28'.8	21'.7	94° 20'.6	51'.1	166° 03'.7	36'.6	9° 36'.9	51'.0
16	219° 29'.2	55° 28'.4	20'.5	109° 21'.3	50'.9	181° 06'.2	36'.6	24° 39'.1	51'.1
17	234° 31'.7	70° 28'.0	19'.4	124° 22'.1	50'.7	196° 08'.6	36'.6	39° 41'.4	51'.2
18	249° 34'.2	85° 27'.5	18'.2	139° 22'.8	50'.5	211° 11'.1	36'.6	54° 43'.6	51'.3
19	264° 36'.6	100° 27'.1	17'.0	154° 23'.6	50'.3	226° 13'.6	36'.6	69° 45'.8	51'.4
20	279° 39'.1	115° 26'.7	15'.8	169° 24'.3	50'.1	241° 16'.1	36'.6	84° 48'.0	51'.5
21	294° 41'.6	130° 26'.3	14'.6	184° 25'.1	49'.9	256° 18'.5	36'.6	99° 50'.2	51'.6
22	309° 44'.0	145° 25'.8	13'.4	199° 25'.8	49'.8	271° 21'.0	36'.6	114° 52'.5	51'.7
23	324° 46'.5	160° 25'.4	12'.2	214° 26'.6	49'.6	286° 23'.5	36'.5	129° 54'.7	51'.8
	M.P. 01:24	v -0'.4	d 1'.2	v 0'.7	d 0'.2	v 2'.5	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.1	40° 15'.1 S
Achernar	335° 27'.2	57° 10'.3 S
Acrux	173° 11'.4	63° 10'.0 S
Adhara	255° 13'.7	28° 59'.1 S
Aldebaran	290° 50'.8	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.9 N
Alkaid	153° 00'.1	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.7	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.5	29° 09'.4 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.4 N
Atria	107° 30'.7	69° 03'.1 S
Avior	234° 19'.1	59° 32'.7 S
Bellatrix	278° 33'.4	6° 21'.7 N
Betelgeuse	271° 02'.8	7° 24'.6 N
Canopus	263° 57'.0	52° 41'.9 S
Capella	280° 36'.4	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.9	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.3 N
Elnath	278° 14'.3	28° 36'.9 N
Eltanin	90° 46'.5	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.1	60° 26'.0 S
Hamal	328° 02'.0	23° 31'.1 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.3	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.3	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.8 S
Miaplacidus	221° 40'.9	69° 45'.9 S
Mirfak	308° 42'.1	49° 54'.0 N
Nunki	75° 59'.6	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 13'.8	89° 18'.6 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.3	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.3	8° 11'.2 S
Rigil Kent	139° 53'.7	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.8 S
Sirius	258° 35'.0	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.7 S
Vega	80° 39'.6	38° 48'.0 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	197° 55'.2	12:17
Mars	251° 01'.0	08:44
Jupiter	321° 36'.9	04:02
Saturn	165° 19'.5	14:25

SUN						
GHA	Dec	GHA	v	Dec	d	HP
179° 42'.5	9° 33'.3 N	183° 07'.7	9'.2	5° 43'.0 N	14'.1	60'.4
194° 42'.7	32'.4	197° 35'.9	9'.1	28'.9	14'.2	
209° 42'.9	31'.5	212° 04'.0	9'.2	14'.7	14'.2	
224° 43'.0	30'.6	226° 32'.2	9'.2	00'.5	14'.2	
239° 43'.2	29'.7	241° 00'.4	9'.1	4° 46'.3 N	14'.3	
254° 43'.4	28'.8	255° 28'.5	9'.2	32'.0	14'.3	
269° 43'.6	28'.0	269° 56'.7	9'.2	17'.7	14'.3	60'.5
284° 43'.8	27'.1	284° 24'.9	9'.2	03'.4	14'.4	
299° 44'.0	26'.2	298° 53'.1	9'.2	3° 49'.0 N	14'.4	
314° 44'.2	25'.3	313° 21'.3	9'.2	34'.6	14'.4	
329° 44'.3	24'.4	327° 49'.5	9'.1	20'.2	14'.4	
344° 44'.5	23'.5	342° 17'.6	9'.2	05'.8	14'.5	
359° 44'.7	9° 22'.6 N	356° 45'.8	9'.2	2° 51'.3 N	14'.5	60'.6
14° 44'.9	21'.7	11° 14'.0	9'.2	36'.8	14'.5	
29° 45'.1	20'.9	25° 42'.2	9'.2	22'.3	14'.6	
44° 45'.3	20'.0	40° 10'.4	9'.1	07'.7	14'.5	
59° 45'.5	19'.1	54° 38'.5	9'.2	1° 53'.2 N	14'.6	
74° 45'.6	18'.2	69° 06'.7	9'.2	38'.6	14'.6	
89° 45'.8	17'.3	83° 34'.9	9'.1	24'.0	14'.6	
104° 46'.0	16'.4	98° 03'.0	9'.2	09'.4	14'.6	
119° 46'.2	15'.5	112° 31'.2	9'.1	0° 54'.8 N	14'.6	60'.7
134° 46'.4	14'.6	126° 59'.3	9'.2	40'.2	14'.6	
149° 46'.6	13'.7	141° 27'.5	9'.1	25'.6	14'.7	
164° 46'.8	12'.8	155° 55'.6	9'.1	10'.9	14'.6	
179° 47'.0	9° 11'.9 N	170° 23'.7	9'.2	0° 03'.7 S	14'.7	60'.7
194° 47'.2	11'.1	184° 51'.9	9'.1	18'.4	14'.6	
209° 47'.3	10'.2	199° 20'.0	9'.1	33'.0	14'.7	
224° 47'.5	09'.3	213° 48'.1	9'.1	47'.7	14'.6	
239° 47'.7	08'.4	228° 16'.2	9'.0	1° 02'.3 S	14'.6	
254° 47'.9	07'.5	242° 44'.2	9'.1	16'.9	14'.7	
269° 48'.1	06'.6	257° 12'.3	9'.0	31'.6	14'.6	
284° 48'.3	05'.7	271° 40'.3	9'.1	46'.2	14'.6	
299° 48'.5	04'.8	286° 08'.4	9'.0	2° 00'.8 S	14'.6	
314° 48'.7	03'.9	300° 36'.4	9'.0	15'.4	14'.6	
329° 48'.9	03'.0	315° 04'.4	9'.0	30'.0	14'.6	60'.8
344° 49'.0	02'.1	329° 32'.4	8'.9	44'.6	14'.5	
359° 49'.2	9° 01'.2 N	344° 00'.3	9'.0	2° 59'.1 S	14'.6	60'.8
14° 49'.4	00'.3	358° 28'.3	8'.9	3° 13'.7 S	14'.5	
29° 49'.6	8° 59'.4 N	12° 56'.2	9'.0	28'.2	14'.5	
44° 49'.8	58'.5	27° 24'.2	8'.9	42'.7	14'.5	
59° 50'.0	57'.7	41° 52'.1	8'.8	57'.2	14'.5	
74° 50'.2	56'.8	56° 19'.9	8'.9	4° 11'.7 S	14'.4	
89° 50'.4	55'.9	70° 47'.8	8'.8	26'.1	14'.4	
104° 50'.6	55'.0	85° 15'.6	8'.9	40'.5	14'.4	
119° 50'.8	54'.1	99° 43'.5	8'.8	54'.9	14'.3	
134° 51'.0	53'.2	114° 11'.3	8'.7	5° 09'.2 S	14'.3	
149° 51'.1	52'.3	128° 39'.0	8'.8	23'.5	14'.3	
164° 51'.3	51'.4	143° 06'.8	8'.7	37'.8	14'.2	
179° 51'.5	8° 50'.5 N	157° 34'.5	8'.7	5° 52'.0 S	14'.2	60'.8
194° 51'.7	49'.6	172° 02'.2	8'.7	6° 06'.2 S	14'.2	
209° 51'.9	48'.7	186° 29'.9	8'.6	20'.4	14'.1	60'.7
224° 52'.1	47'.8	200° 57'.5	8'.7	34'.5	14'.1	
239° 52'.3	46'.9	215° 25'.2	8'.6	48'.6	14'.0	
254° 52'.5	46'.0	229° 52'.8	8'.5	7° 02'.6 S	14'.0	
269° 52'.7	45'.1	244° 20'.3	8'.6	16'.6	13'.9	
284° 52'.9	44'.2	258° 47'.9	8'.5	30'.5	13'.9	
299° 53'.1	43'.3	273° 15'.4	8'.5	44'.4	13'.8	
314° 53'.3	42'.4	287° 42'.9	8'.5	58'.2	13'.8	
329° 53'.5	41'.5	302° 10'.4	8'.4	8° 12'.0 S	13'.7	
344° 53'.7	40'.6	316° 37'.8	8'.4	25'.7	13'.7	
359° 53'.8	8° 39'.7 N	331° 05'.2	8'.4	8° 39'.4 S	13'.6	60'.7
14° 54'.0	38'.8	345° 32'.6	8'.3	53'.0	13'.5	
29° 54'.2	37'.9	359° 59'.9	8'.3	9° 06'.5 S	13'.5	
44° 54'.4	37'.0	14° 27'.2	8'.3	20'.0	13'.5	
59° 54'.6	36'.1	28° 54'.5	8'.2	33'.5	13'.3	60'.6
74° 54'.8	35'.2	43° 21'.7	8'.2	46'.8	13'.3	
89° 55'.0	34'.3	57° 48'.9	8'.2	10° 00'.1 S	13'.2	
104° 55'.2	33'.4	72° 16'.1	8'.1	13'.3	13'.2	
119° 55'.4	32'.5	86° 43'.2	8'.2	26'.5	13'.1	
134° 55'.6	31'.6	101° 10'.4	8'.0	39'.6	13'.0	
149° 55'.8	30'.7	115° 37'.4	8'.1	52'.6	12'.9	
164° 56'.0	29'.8	130° 04'.5	8'.0	11° 05'.5 S	12'.9	
SD 15'.8	d 0'.9	SD	16'.5	16'.6	16'.5	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 29	Moonrise 30	Moonrise 31
N 72°	-	02:13	03:49	05:04	07:19	09:37
N 70°	-	02:46	04:05	05:11	07:16	09:24
68°	01:04	03:09	04:17	05:16	07:14	09:13
66°	01:54	03:27	04:27	05:20	07:12	09:05
64°	02:24	03:41	04:36	05:24	07:10	08:57
62°	02:46	03:53	04:43	05:27	07:09	08:51
60°	03:03	04:03	04:49	05:30	07:07	08:46
N 58°	03:17	04:12	04:55	05:32	07:06	08:41
56°	03:29	04:20	04:59	05:34	07:05	08:37
54°	03:39	04:26	05:04	05:36	07:04	08:33
52°	03:48	04:32	05:08	05:38	07:04	08:30
50°	03:56	04:37	05:11	05:40	07:03	08:27
45°	04:12	04:48	05:19	05:43	07:01	08:20
N 40°	04:24	04:57	05:25	05:46	07:00	08:15
35°	04:34	05:05	05:31	05:48	06:59	08:10
30°	04:42	05:11	05:36	05:51	06:58	08:06
20°	04:55	05:21	05:44	05:54	06:56	07:59
N 10°	05:05	05:30	05:51	05:58	06:55	07:53
0°	05:12	05:36	05:57	06:01	06:54	07:47
S 10°	05:18	05:43	06:04	06:04	06:53	07:42
20°	05:23	05:48	06:11	06:07	06:51	07:36
30°	05:26	05:54	06:18	06:11	06:50	07:29
35°	05:28	05:57	06:22	06:13	06:49	07:25
40°	05:29	06:00	06:27	06:16	06:48	07:21
45°	05:29	06:03	06:33	06:19	06:47	07:16
S 50°	05:29	06:07	06:39	06:22	06:46	07:10
52°	05:29	06:08	06:43	06:24	06:45	07:07
54°	05:29	06:10	06:46	06:25	06:45	07:04
56°	05:29	06:12	06:50	06:27	06:44	07:01
58°	05:28	06:14	06:54	06:29	06:43	06:57
S 60°	05:28	06:16	06:58	06:32	06:42	06:53
S 62°	05:27	06:18	07:03	06:34	06:41	06:49

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 29	Moonset 30	Moonset 31
N 72°	20:09	21:42	-	18:40	18:19	17:55
N 70°	19:54	21:11	-	18:39	18:25	18:10
68°	19:42	20:49	22:46	18:38	18:31	18:23
66°	19:32	20:31	22:01	18:37	18:35	18:34
64°	19:24	20:17	21:33	18:36	18:39	18:42
62°	19:17	20:06	21:12	18:35	18:42	18:50
60°	19:11	19:56	20:56	18:34	18:45	18:57
N 58°	19:05	19:48	20:42	18:34	18:47	19:03
56°	19:01	19:40	20:30	18:33	18:50	19:08
54°	18:56	19:34	20:21	18:33	18:52	19:12
52°	18:53	19:28	20:12	18:32	18:54	19:17
50°	18:49	19:23	20:04	18:32	18:55	19:21
45°	18:42	19:12	19:49	18:31	18:59	19:29
N 40°	18:35	19:03	19:36	18:30	19:02	19:36
35°	18:30	18:56	19:27	18:29	19:05	19:42
30°	18:25	18:50	19:19	18:29	19:08	19:48
20°	18:17	18:40	19:06	18:28	19:12	19:57
N 10°	18:10	18:32	18:57	18:27	19:15	20:05
0°	18:04	18:25	18:49	18:26	19:19	20:13
S 10°	17:58	18:19	18:44	18:25	19:22	20:21
20°	17:51	18:13	18:39	18:24	19:26	20:29
30°	17:44	18:08	18:36	18:23	19:30	20:38
35°	17:40	18:05	18:34	18:22	19:33	20:44
40°	17:35	18:02	18:34	18:21	19:36	20:50
45°	17:29	17:59	18:33	18:20	19:39	20:58
S 50°	17:23	17:55	18:33	18:19	19:43	21:06
52°	17:20	17:54	18:33	18:18	19:44	21:11
54°	17:16	17:52	18:33	18:18	19:46	21:15
56°	17:13	17:51	18:34	18:17	19:48	21:20
58°	17:09	17:49	18:34	18:16	19:51	21:26
S 60°	17:04	17:47	18:35	18:16	19:54	21:32
S 62°	16:59	17:45	18:36	18:15	19:57	21:39

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
29	1 10	1 02	12:01	12:13	24:40	0d 0%
30	0 53	0 43	12:01	13:06	00:40	1d 3%
31	0 34	0 25	12:00	14:00	01:33	2d 8%

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2011 September 1, 2, 3 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
1 Thursday 00	339° 48'.9	175° 25'.0	8° 11'.1 N	229° 27'.3	22° 49'.4 N	301° 26'.0	13° 36'.5 N	144° 56'.9	3° 51'.9 S
01	354° 51'.4	190° 24'.5	09'.9	244° 28'.1	49'.2	316° 28'.4	36'.5	159° 59'.1	52'.0
02	9° 53'.9	205° 24'.1	08'.7	259° 28'.8	49'.0	331° 30'.9	36'.5	175° 01'.3	52'.1
03	24° 56'.3	220° 23'.7	07'.5	274° 29'.6	48'.8	346° 33'.4	36'.5	190° 03'.6	52'.2
04	39° 58'.8	235° 23'.3	06'.3	289° 30'.3	48'.6	1° 35'.9	36'.5	205° 05'.8	52'.3
05	55° 01'.3	250° 22'.8	05'.1	304° 31'.1	48'.4	16° 38'.3	36'.5	220° 08'.0	52'.4
06	70° 03'.7	265° 22'.4	03'.9	319° 31'.8	48'.3	31° 40'.8	36'.5	235° 10'.2	52'.6
07	85° 06'.2	280° 22'.0	02'.7	334° 32'.6	48'.1	46° 43'.3	36'.4	250° 12'.5	52'.7
08	100° 08'.7	295° 21'.6	01'.5	349° 33'.3	47'.9	61° 45'.8	36'.4	265° 14'.7	52'.8
09	115° 11'.1	310° 21'.1	00'.3	4° 34'.1	47'.7	76° 48'.2	36'.4	280° 16'.9	52'.9
10	130° 13'.6	325° 20'.7	7° 59'.2 N	19° 34'.8	47'.5	91° 50'.7	36'.4	295° 19'.1	53'.0
11	145° 16'.0	340° 20'.3	58'.0	34° 35'.6	47'.3	106° 53'.2	36'.4	310° 21'.3	53'.1
12	160° 18'.5	355° 19'.8	7° 56'.8 N	49° 36'.3	22° 47'.1 N	121° 55'.7	13° 36'.4 N	325° 23'.6	3° 53'.2 S
13	175° 21'.0	10° 19'.4	55'.6	64° 37'.1	46'.9	136° 58'.2	36'.4	340° 25'.8	53'.3
14	190° 23'.4	25° 19'.0	54'.4	79° 37'.8	46'.7	152° 00'.6	36'.3	355° 28'.0	53'.4
15	205° 25'.9	40° 18'.6	53'.2	94° 38'.6	46'.6	167° 03'.1	36'.3	10° 30'.2	53'.5
16	220° 28'.4	55° 18'.2	52'.0	109° 39'.3	46'.4	182° 05'.6	36'.3	25° 32'.4	53'.6
17	235° 30'.8	70° 17'.7	50'.8	124° 40'.1	46'.2	197° 08'.1	36'.3	40° 34'.7	53'.7
18	250° 33'.3	85° 17'.3	49'.6	139° 40'.8	46'.0	212° 10'.6	36'.3	55° 36'.9	53'.8
19	265° 35'.8	100° 16'.9	48'.4	154° 41'.6	45'.8	227° 13'.0	36'.3	70° 39'.1	53'.9
20	280° 38'.2	115° 16'.5	47'.2	169° 42'.3	45'.6	242° 15'.5	36'.3	85° 41'.3	54'.0
21	295° 40'.7	130° 16'.0	46'.0	184° 43'.1	45'.4	257° 18'.0	36'.2	100° 43'.5	54'.1
22	310° 43'.2	145° 15'.6	44'.8	199° 43'.8	45'.2	272° 20'.5	36'.2	115° 45'.8	54'.3
23	325° 45'.6	160° 15'.2	43'.6	214° 44'.6	45'.0	287° 23'.0	36'.2	130° 48'.0	54'.4
2 Friday 00	340° 48'.1	175° 14'.8	7° 42'.4 N	229° 45'.4	22° 44'.8 N	302° 25'.4	13° 36'.2 N	145° 50'.2	3° 54'.5 S
01	355° 50'.5	190° 14'.4	41'.2	244° 46'.1	44'.6	317° 27'.9	36'.2	160° 52'.4	54'.6
02	10° 53'.0	205° 13'.9	40'.0	259° 46'.9	44'.4	332° 30'.4	36'.2	175° 54'.6	54'.7
03	25° 55'.5	220° 13'.5	38'.8	274° 47'.6	44'.2	347° 32'.9	36'.2	190° 56'.9	54'.8
04	40° 57'.9	235° 13'.1	37'.6	289° 48'.4	44'.0	2° 35'.4	36'.1	205° 59'.1	54'.9
05	56° 00'.4	250° 12'.7	36'.4	304° 49'.1	43'.9	17° 37'.9	36'.1	221° 01'.3	55'.0
06	71° 02'.9	265° 12'.2	35'.2	319° 49'.9	43'.7	32° 40'.3	36'.1	236° 03'.5	55'.1
07	86° 05'.3	280° 11'.8	34'.0	334° 50'.6	43'.5	47° 42'.8	36'.1	251° 05'.7	55'.2
08	101° 07'.8	295° 11'.4	32'.8	349° 51'.4	43'.3	62° 45'.3	36'.1	266° 08'.0	55'.3
09	116° 10'.3	310° 11'.0	31'.6	4° 52'.1	43'.1	77° 47'.8	36'.1	281° 10'.2	55'.4
10	131° 12'.7	325° 10'.6	30'.4	19° 52'.9	42'.9	92° 50'.3	36'.0	296° 12'.4	55'.5
11	146° 15'.2	340° 10'.2	29'.2	34° 53'.7	42'.7	107° 52'.8	36'.0	311° 14'.6	55'.6
12	161° 17'.6	355° 09'.7	7° 28'.0 N	49° 54'.4	22° 42'.5 N	122° 55'.3	13° 36'.0 N	326° 16'.8	3° 55'.8 S
13	176° 20'.1	10° 09'.3	26'.8	64° 55'.2	42'.3	137° 57'.7	36'.0	341° 19'.1	55'.9
14	191° 22'.6	25° 08'.9	25'.6	79° 55'.9	42'.1	153° 00'.2	36'.0	356° 21'.3	56'.0
15	206° 25'.0	40° 08'.5	24'.4	94° 56'.7	41'.9	168° 02'.7	36'.0	11° 23'.5	56'.1
16	221° 27'.5	55° 08'.1	23'.2	109° 57'.4	41'.7	183° 05'.2	35'.9	26° 25'.7	56'.2
17	236° 30'.0	70° 07'.6	22'.0	124° 58'.2	41'.5	198° 07'.7	35'.9	41° 27'.9	56'.3
18	251° 32'.4	85° 07'.2	20'.8	139° 59'.0	41'.3	213° 10'.2	35'.9	56° 30'.1	56'.4
19	266° 34'.9	100° 06'.8	19'.6	154° 59'.7	41'.1	228° 12'.7	35'.9	71° 32'.4	56'.5
20	281° 37'.4	115° 06'.4	18'.4	170° 00'.5	40'.9	243° 15'.2	35'.9	86° 34'.6	56'.6
21	296° 39'.8	130° 06'.0	17'.2	185° 01'.2	40'.7	258° 17'.7	35'.9	101° 36'.8	56'.7
22	311° 42'.3	145° 05'.6	16'.0	200° 02'.0	40'.5	273° 20'.1	35'.8	116° 39'.0	56'.8
23	326° 44'.8	160° 05'.1	14'.8	215° 02'.8	40'.3	288° 22'.6	35'.8	131° 41'.2	56'.9
3 Saturday 00	341° 47'.2	175° 04'.7	7° 13'.6 N	230° 03'.5	22° 40'.1 N	303° 25'.1	13° 35'.8 N	146° 43'.5	3° 57'.0 S
01	356° 49'.7	190° 04'.3	12'.4	245° 04'.3	39'.9	318° 27'.6	35'.8	161° 45'.7	57'.1
02	11° 52'.1	205° 03'.9	11'.2	260° 05'.0	39'.7	333° 30'.1	35'.8	176° 47'.9	57'.3
03	26° 54'.6	220° 03'.5	10'.0	275° 05'.8	39'.5	348° 32'.6	35'.8	191° 50'.1	57'.4
04	41° 57'.1	235° 03'.1	08'.8	290° 06'.6	39'.3	3° 35'.1	35'.7	206° 52'.3	57'.5
05	56° 59'.5	250° 02'.7	07'.6	305° 07'.3	39'.1	18° 37'.6	35'.7	221° 54'.5	57'.6
06	72° 02'.0	265° 02'.2	06'.3	320° 08'.1	38'.9	33° 40'.1	35'.7	236° 56'.8	57'.7
07	87° 04'.5	280° 01'.8	05'.1	335° 08'.8	38'.7	48° 42'.6	35'.7	251° 59'.0	57'.8
08	102° 06'.9	295° 01'.4	03'.9	350° 09'.6	38'.5	63° 45'.1	35'.7	267° 01'.2	57'.9
09	117° 09'.4	310° 01'.0	02'.7	5° 10'.4	38'.3	78° 47'.6	35'.6	282° 03'.4	58'.0
10	132° 11'.9	325° 00'.6	01'.5	20° 11'.1	38'.1	93° 50'.1	35'.6	297° 05'.6	58'.1
11	147° 14'.3	340° 00'.2	00'.3	35° 11'.9	37'.9	108° 52'.5	35'.6	312° 07'.9	58'.2
12	162° 16'.8	354° 59'.8	6° 59'.1 N	50° 12'.6	22° 37'.7 N	123° 55'.0	13° 35'.6 N	327° 10'.1	3° 58'.3 S
13	177° 19'.3	9° 59'.4	57'.9	65° 13'.4	37'.5	138° 57'.5	35'.6	342° 12'.3	58'.4
14	192° 21'.7	24° 58'.9	56'.7	80° 14'.2	37'.3	154° 00'.0	35'.6	357° 14'.5	58'.5
15	207° 24'.2	39° 58'.5	55'.5	95° 14'.9	37'.1	169° 02'.5	35'.5	12° 16'.7	58'.7
16	222° 26'.6	54° 58'.1	54'.2	110° 15'.7	36'.9	184° 05'.0	35'.5	27° 18'.9	58'.8
17	237° 29'.1	69° 57'.7	53'.0	125° 16'.5	36'.7	199° 07'.5	35'.5	42° 21'.2	58'.9
18	252° 31'.6	84° 57'.3	51'.8	140° 17'.2	36'.5	214° 10'.0	35'.5	57° 23'.4	59'.0
19	267° 34'.0	99° 56'.9	50'.6	155° 18'.0	36'.3	229° 12'.5	35'.5	72° 25'.6	59'.1
20	282° 36'.5	114° 56'.5	49'.4	170° 18'.8	36'.1	244° 15'.0	35'.4	87° 27'.8	59'.2
21	297° 39'.0	129° 56'.1	48'.2	185° 19'.5	35'.8	259° 17'.5	35'.4	102° 30'.0	59'.3
22	312° 41'.4	144° 55'.7	47'.0	200° 20'.3	35'.6	274° 20'.0	35'.4	117° 32'.2	59'.4
23	327° 43'.9	159° 55'.3	45'.8	215° 21'.0	35'.4	289° 22'.5	35'.4	132° 34'.5	59'.5
	M.P. 01:13	v -0'.4	d 1'.2	v 0'.8	d 0'.2	v 2'.5	d 0'.0	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.1	40° 15'.2 S
Achernar	335° 27'.2	57° 10'.3 S
Acrux	173° 11'.5	63° 10'.0 S
Adhara	255° 13'.7	28° 59'.1 S
Aldebaran	290° 50'.8	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.9 N
Alkaid	153° 00'.1	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.7	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.1	26° 40'.8 N
Alpheratz	357° 44'.5	29° 09'.5 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.0	19° 07'.4 N
Atria	107° 30'.7	69° 03'.1 S
Avior	234° 19'.1	59° 32'.7 S
Bellatrix	278° 33'.4	6° 21'.7 N
Betelgeuse	271° 02'.8	7° 24'.6 N
Canopus	263° 57'.0	52° 41'.9 S
Capella	280° 36'.4	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.2 N
Elnath	278° 14'.3	28° 36'.9 N
Eltanin	90° 46'.5	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.1	60° 26'.0 S
Hamal	328° 02'.0	23° 31'.1 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.3	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.2	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.7 S
Miaplacidus	221° 40'.9	69° 45'.9 S
Mirfak	308° 42'.0	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 12'.4	89° 18'.6 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.3	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.2	11° 54'.6 N
Rigel	281° 13'.3	8° 11'.2 S
Rigil Kent	139° 53'.8	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.8 S
Sirius	258° 35'.0	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.7 S
Vega	80° 39'.6	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	194° 26'.7	12:19
Mars	248° 57'.3	08:41
Jupiter	321° 37'.4	03:50
Saturn	165° 02'.1	14:15

SUN

GHA	Dec
179° 56'.2	8° 28'.9 N
194° 56'.4	28'.0
209° 56'.6	27'.1
224° 56'.8	26'.2
239° 57'.0	25'.3
254° 57'.2	24'.3
269° 57'.4	23'.4
284° 57'.6	22'.5
299° 57'.8	21'.6
314° 57'.9	20'.7
329° 58'.1	19'.8
344° 58'.3	18'.9
359° 58'.5	8° 18'.0 N
14° 58'.7	17'.1
29° 58'.9	16'.2
44° 59'.1	15'.3
59° 59'.3	14'.4
74° 59'.5	13'.5
89° 59'.7	12'.6
104° 59'.9	11'.7
120° 00'.1	10'.8
135° 00'.3	09'.8
150° 00'.5	08'.9
165° 00'.7	08'.0
180° 00'.9	8° 07'.1 N
195° 01'.1	06'.2
210° 01'.3	05'.3
225° 01'.5	04'.4
240° 01'.7	03'.5
255° 01'.9	02'.6
270° 02'.1	01'.7
285° 02'.3	00'.8
300° 02'.5	7° 59'.8 N
315° 02'.7	58'.9
330° 02'.9	58'.0
345° 03'.1	57'.1
0° 03'.3	7° 56'.2 N
15° 03'.5	55'.3
30° 03'.7	54'.4
45° 03'.9	53'.5
60° 04'.1	52'.5
75° 04'.3	51'.6
90° 04'.5	50'.7
105° 04'.7	49'.8
120° 04'.9	48'.9
135° 05'.1	48'.0
150° 05'.3	47'.1
165° 05'.5	46'.2
180° 05'.7	7° 45'.2 N
195° 05'.9	44'.3
210° 06'.1	43'.4
225° 06'.3	42'.5
240° 06'.5	41'.6
255° 06'.7	40'.7
270° 06'.9	39'.8
285° 07'.1	38'.8
300° 07'.3	37'.9
315° 07'.5	37'.0
330° 07'.7	36'.1
345° 07'.9	35'.2
0° 08'.2	7° 34'.3 N
15° 08'.4	33'.3
30° 08'.6	32'.4
45° 08'.8	31'.5
60° 09'.0	30'.6
75° 09'.2	29'.7
90° 09'.4	28'.8
105° 09'.6	27'.8
120° 09'.8	26'.9
135° 10'.0	26'.0
150° 10'.2	25'.1
165° 10'.4	24'.2

SD 15'.9 d 0'.9

MOON

GHA	v	Dec	d	HP
144° 31'.5	7'.9	11° 18'.4 S	12'.8	60'.6
158° 58'.4	8'.0	31'.2	12'.7	60'.5
173° 25'.4	7'.9	43'.9	12'.6	
187° 52'.3	7'.8	56'.5	12'.5	
202° 19'.1	7'.9	12° 09'.0 S	12'.5	
216° 46'.0	7'.8	21'.5	12'.4	
231° 12'.8	7'.7	33'.9	12'.3	
245° 39'.5	7'.7	46'.2	12'.2	
260° 06'.2	7'.7	58'.4	12'.1	60'.4
274° 32'.9	7'.7	13° 10'.5 S	12'.0	
288° 59'.6	7'.6	22'.5	11'.9	
303° 26'.2	7'.6	34'.4	11'.9	
317° 52'.8	7'.5	13° 46'.3 S	11'.7	60'.4
332° 19'.3	7'.5	58'.0	11'.7	60'.3
346° 45'.8	7'.5	14° 09'.7 S	11'.5	
1° 12'.3	7'.4	21'.2	11'.5	
15° 38'.7	7'.4	32'.7	11'.3	
30° 05'.1	7'.3	44'.0	11'.3	
44° 31'.4	7'.4	55'.3	11'.1	
58° 57'.8	7'.2	15° 06'.4 S	11'.0	60'.2
73° 24'.0	7'.3	17'.4	11'.0	
87° 50'.3	7'.2	28'.4	10'.8	
102° 16'.5	7'.2	39'.2	10'.7	
116° 42'.7	7'.1	49'.9	10'.6	
131° 08'.8	7'.1	16° 00'.5 S	10'.5	60'.1
145° 34'.9	7'.1	11'.0	10'.4	
160° 01'.0	7'.0	21'.4	10'.3	
174° 27'.0	7'.0	31'.7	10'.2	
188° 53'.0	6'.9	41'.9	10'.0	60'.0
203° 18'.9	7'.0	51'.9	10'.0	
217° 44'.9	6'.8	17° 01'.9 S	9'.8	
232° 10'.7	6'.9	11'.7	9'.7	
246° 36'.6	6'.8	21'.4	9'.5	
261° 02'.4	6'.8	30'.9	9'.5	59'.9
275° 28'.2	6'.8	40'.4	9'.3	
289° 54'.0	6'.7	49'.7	9'.2	
304° 19'.7	6'.7	17° 58'.9 S	9'.1	59'.9
318° 45'.4	6'.7	18° 08'.0 S	9'.0	59'.8
333° 11'.1	6'.6	17'.0	8'.8	
347° 36'.7	6'.6	25'.8	8'.7	
2° 02'.3	6'.6	34'.5	8'.6	
16° 27'.9	6'.5	43'.1	8'.5	59'.7
30° 53'.4	6'.5	51'.6	8'.3	
45° 18'.9	6'.5	59'.9	8'.2	
59° 44'.4	6'.5	19° 08'.1 S	8'.1	
74° 09'.9	6'.4	16'.2	7'.9	59'.6
88° 35'.3	6'.5	24'.1	7'.8	
103° 00'.8	6'.3	31'.9	7'.7	
117° 26'.1	6'.4	19° 39'.6 S	7'.5	59'.5
131° 51'.5	6'.4	47'.1	7'.4	
146° 16'.9	6'.3	54'.5	7'.3	
160° 42'.2	6'.3	20° 01'.8 S	7'.1	
175° 07'.5	6'.3	08'.9	7'.0	59'.4
189° 32'.8	6'.2	15'.9	6'.8	
203° 58'.0	6'.3	22'.7	6'.8	
218° 23'.3	6'.2	29'.5	6'.5	
232° 48'.5	6'.2	36'.0	6'.5	59'.3
247° 13'.7	6'.2	42'.5	6'.3	
261° 38'.9	6'.2	48'.8	6'.1	
276° 04'.1	6'.1	54'.9	6'.0	59'.2
290° 29'.2	6'.2	21° 00'.9 S	5'.9	59'.2
304° 54'.4	6'.1	06'.8	5'.7	
319° 19'.5	6'.2	12'.5	5'.6	
333° 44'.7	6'.1	18'.1	5'.5	59'.1
348° 09'.8	6'.1	23'.6	5'.3	
2° 34'.9	6'.1	28'.9	5'.1	
17° 00'.0	6'.1	34'.0	5'.0	59'.0
31° 25'.1	6'.1	39'.0	4'.9	
45° 50'.2	6'.1	43'.9	4'.7	
60° 15'.3	6'.1	48'.6	4'.6	
74° 40'.4	6'.1	53'.2	4'.5	58'.9
89° 05'.5	6'.1	57'.7	4'.3	

SD 16'.4 16'.3 16'.1

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 1	Moonrise 2	Moonrise 3
N 72°	-	02:35	04:04	12:09	-	-
N 70°	-	03:03	04:18	11:39	14:14	-
68°	01:36	03:23	04:28	11:17	13:27	15:58
66°	02:13	03:39	04:37	11:00	12:57	14:52
64°	02:38	03:52	04:44	10:46	12:34	14:17
62°	02:58	04:02	04:51	10:34	12:16	13:52
60°	03:13	04:11	04:56	10:24	12:01	13:32
N 58°	03:26	04:19	05:01	10:16	11:49	13:15
56°	03:37	04:26	05:05	10:08	11:38	13:02
54°	03:46	04:32	05:09	10:02	11:28	12:50
52°	03:54	04:37	05:13	09:56	11:20	12:39
50°	04:01	04:42	05:16	09:50	11:12	12:30
45°	04:16	04:52	05:23	09:39	10:56	12:10
N 40°	04:27	05:00	05:28	09:29	10:43	11:54
35°	04:37	05:07	05:33	09:21	10:32	11:40
30°	04:44	05:13	05:37	09:14	10:22	11:29
20°	04:56	05:22	05:45	09:02	10:06	11:09
N 10°	05:05	05:30	05:51	08:52	09:51	10:52
0°	05:11	05:36	05:57	08:42	09:38	10:35
S 10°	05:16	05:41	06:02	08:32	09:25	10:19
20°	05:20	05:46	06:08	08:22	09:11	10:02
30°	05:23	05:51	06:15	08:10	08:54	09:43
35°	05:24	05:53	06:18	08:03	08:45	09:32
40°	05:24	05:55	06:23	07:56	08:35	09:19
45°	05:24	05:58	06:27	07:47	08:22	09:03
S 50°	05:23	06:01	06:33	07:36	08:07	08:45
52°	05:23	06:02	06:36	07:32	08:00	08:36
54°	05:22	06:03	06:39	07:26	07:53	08:26
56°	05:22	06:05	06:42	07:20	07:44	08:15
58°	05:21	06:06	06:45	07:14	07:35	08:02
S 60°	05:19	06:07	06:49	07:06	07:24	07:48
S 62°	05:18	06:09	06:54	06:58	07:11	07:30

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 1	Moonset 2	Moonset 3
N 72°	19:52	21:18	-	17:19	-	-
N 70°	19:39	20:53	23:24	17:51	17:14	-
68°	19:29	20:33	22:15	18:14	18:02	17:32
66°	19:20	20:18	21:41	18:33	18:34	18:38
64°	19:13	20:06	21:17	18:48	18:57	19:14
62°	19:07	19:55	20:59	19:00	19:16	19:40
60°	19:02	19:46	20:44	19:11	19:31	20:00
N 58°	18:57	19:39	20:32	19:21	19:44	20:17
56°	18:53	19:32	20:21	19:29	19:56	20:31
54°	18:49	19:26	20:12	19:36	20:06	20:44
52°	18:46	19:21	20:04	19:43	20:15	20:54
50°	18:43	19:16	19:57	19:49	20:23	21:04
45°	18:36	19:06	19:43	20:02	20:40	21:24
N 40°	18:31	18:58	19:31	20:13	20:54	21:41
35°	18:26	18:52	19:22	20:22	21:06	21:55
30°	18:22	18:46	19:15	20:30	21:17	22:07
20°	18:15	18:37	19:03	20:44	21:35	22:28
N 10°	18:09	18:30	18:55	20:57	21:50	22:46
0°	18:03	18:24	18:48	21:08	22:05	23:03
S 10°	17:58	18:19	18:43	21:20	22:20	23:20
20°	17:52	18:14	18:40	21:32	22:36	23:38
30°	17:45	18:09	18:37	21:47	22:54	23:59
35°	17:42	18:07	18:36	21:55	23:05	24:11
40°	17:38	18:05	18:36	22:05	23:17	24:26
45°	17:33	18:02	18:36	22:16	23:32	24:42
S 50°	17:27	18:00	18:37	22:29	23:49	25:03
52°	17:25	17:59	18:38	22:36	23:58	25:13
54°	17:22	17:57	18:38	22:43	-	00:07
56°	17:19	17:56	18:39	22:51	-	00:18
58°	17:15	17:55	18:40	23:00	-	00:30
S 60°	17:11	17:53	18:42	23:10	-	00:44
S 62°	17:07	17:52	18:43	23:22	-	01:01

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
1	0 16	0 06	12:00	14:55	02:27	3d 16%
2	0 03	0 13	12:00	15:52	03:23	4d 26%
3	0 22	0 32	11:59	16:49	04:20	5d 36%

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2011 September 4, 5, 6 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
4 00	342° 46'.4	174° 54'.8	6° 44'.5 N	230° 21'.8	22° 35'.2 N	304° 25'.0	13° 35'.4 N	147° 36'.7	3° 59'.6 S
01	357° 48'.8	189° 54'.4	43'.3	245° 22'.6	35'.0	319° 27'.5	35'.3	162° 38'.9	59'.7
02	12° 51'.3	204° 54'.0	42'.1	260° 23'.3	34'.8	334° 30'.0	35'.3	177° 41'.1	59'.8
03	27° 53'.8	219° 53'.6	40'.9	275° 24'.1	34'.6	349° 32'.5	35'.3	192° 43'.3	59'.9
S 04	42° 56'.2	234° 53'.2	39'.7	290° 24'.9	34'.4	4° 35'.0	35'.3	207° 45'.5	4° 00'.1 S
u 05	57° 58'.7	249° 52'.8	38'.5	305° 25'.6	34'.2	19° 37'.5	35'.3	222° 47'.8	00'.2
n 06	73° 01'.1	264° 52'.4	37'.3	320° 26'.4	34'.0	34° 40'.0	35'.2	237° 50'.0	00'.3
07	88° 03'.6	279° 52'.0	36'.0	335° 27'.2	33'.8	49° 42'.5	35'.2	252° 52'.2	00'.4
a 08	103° 06'.1	294° 51'.6	34'.8	350° 27'.9	33'.6	64° 45'.0	35'.2	267° 54'.4	00'.5
09	118° 08'.5	309° 51'.2	33'.6	5° 28'.7	33'.4	79° 47'.5	35'.2	282° 56'.6	00'.6
y 10	133° 11'.0	324° 50'.8	32'.4	20° 29'.5	33'.2	94° 50'.0	35'.2	297° 58'.8	00'.7
11	148° 13'.5	339° 50'.4	31'.2	35° 30'.2	32'.9	109° 52'.5	35'.1	313° 01'.0	00'.8
12	163° 15'.9	354° 50'.0	6° 30'.0 N	50° 31'.0	22° 32'.7 N	124° 55'.0	13° 35'.1 N	328° 03'.3	4° 00'.9 S
13	178° 18'.4	9° 49'.5	28'.7	65° 31'.8	32'.5	139° 57'.5	35'.1	343° 05'.5	01'.0
14	193° 20'.9	24° 49'.1	27'.5	80° 32'.5	32'.3	155° 00'.0	35'.1	358° 07'.7	01'.1
15	208° 23'.3	39° 48'.7	26'.3	95° 33'.3	32'.1	170° 02'.5	35'.0	13° 09'.9	01'.2
16	223° 25'.8	54° 48'.3	25'.1	110° 34'.1	31'.9	185° 05'.0	35'.0	28° 12'.1	01'.4
17	238° 28'.2	69° 47'.9	23'.9	125° 34'.9	31'.7	200° 07'.5	35'.0	43° 14'.3	01'.5
18	253° 30'.7	84° 47'.5	22'.6	140° 35'.6	31'.5	215° 10'.0	35'.0	58° 16'.6	01'.6
19	268° 33'.2	99° 47'.1	21'.4	155° 36'.4	31'.3	230° 12'.5	35'.0	73° 18'.8	01'.7
20	283° 35'.6	114° 46'.7	20'.2	170° 37'.2	31'.1	245° 15'.1	34'.9	88° 21'.0	01'.8
21	298° 38'.1	129° 46'.3	19'.0	185° 37'.9	30'.8	260° 17'.6	34'.9	103° 23'.2	01'.9
22	313° 40'.6	144° 45'.9	17'.8	200° 38'.7	30'.6	275° 20'.1	34'.9	118° 25'.4	02'.0
23	328° 43'.0	159° 45'.5	16'.5	215° 39'.5	30'.4	290° 22'.6	34'.9	133° 27'.6	02'.1
5 00	343° 45'.5	174° 45'.1	6° 15'.3 N	230° 40'.2	22° 30'.2 N	305° 25'.1	13° 34'.8 N	148° 29'.8	4° 02'.2 S
01	358° 48'.0	189° 44'.7	14'.1	245° 41'.0	30'.0	320° 27'.6	34'.8	163° 32'.1	02'.3
02	13° 50'.4	204° 44'.3	12'.9	260° 41'.8	29'.8	335° 30'.1	34'.8	178° 34'.3	02'.4
M 03	28° 52'.9	219° 43'.9	11'.7	275° 42'.6	29'.6	350° 32'.6	34'.8	193° 36'.5	02'.5
o 04	43° 55'.4	234° 43'.5	10'.4	290° 43'.3	29'.4	5° 35'.1	34'.8	208° 38'.7	02'.7
n 05	58° 57'.8	249° 43'.1	09'.2	305° 44'.1	29'.1	20° 37'.6	34'.7	223° 40'.9	02'.8
06	74° 00'.3	264° 42'.7	08'.0	320° 44'.9	28'.9	35° 40'.1	34'.7	238° 43'.1	02'.9
d 07	89° 02'.7	279° 42'.3	06'.8	335° 45'.6	28'.7	50° 42'.6	34'.7	253° 45'.3	03'.0
a 08	104° 05'.2	294° 41'.9	05'.5	350° 46'.4	28'.5	65° 45'.1	34'.7	268° 47'.6	03'.1
y 09	119° 07'.7	309° 41'.5	04'.3	5° 47'.2	28'.3	80° 47'.7	34'.6	283° 49'.8	03'.2
10	134° 10'.1	324° 41'.1	03'.1	20° 48'.0	28'.1	95° 50'.2	34'.6	298° 52'.0	03'.3
11	149° 12'.6	339° 40'.7	01'.9	35° 48'.7	27'.9	110° 52'.7	34'.6	313° 54'.2	03'.4
12	164° 15'.1	354° 40'.3	6° 00'.6 N	50° 49'.5	22° 27'.6 N	125° 55'.2	13° 34'.6 N	328° 56'.4	4° 03'.5 S
13	179° 17'.5	9° 39'.9	5° 59'.4 N	65° 50'.3	27'.4	140° 57'.7	34'.5	343° 58'.6	03'.6
14	194° 20'.0	24° 39'.5	58'.2	80° 51'.1	27'.2	156° 00'.2	34'.5	359° 00'.8	03'.7
15	209° 22'.5	39° 39'.1	57'.0	95° 51'.8	27'.0	171° 02'.7	34'.5	14° 03'.1	03'.8
16	224° 24'.9	54° 38'.7	55'.7	110° 52'.6	26'.8	186° 05'.2	34'.5	29° 05'.3	04'.0
17	239° 27'.4	69° 38'.3	54'.5	125° 53'.4	26'.6	201° 07'.8	34'.4	44° 07'.5	04'.1
18	254° 29'.9	84° 37'.9	53'.3	140° 54'.1	26'.3	216° 10'.3	34'.4	59° 09'.7	04'.2
19	269° 32'.3	99° 37'.5	52'.1	155° 54'.9	26'.1	231° 12'.8	34'.4	74° 11'.9	04'.3
20	284° 34'.8	114° 37'.1	50'.8	170° 55'.7	25'.9	246° 15'.3	34'.4	89° 14'.1	04'.4
21	299° 37'.2	129° 36'.7	49'.6	185° 56'.5	25'.7	261° 17'.8	34'.4	104° 16'.3	04'.5
22	314° 39'.7	144° 36'.3	48'.4	200° 57'.2	25'.5	276° 20'.3	34'.3	119° 18'.6	04'.6
23	329° 42'.2	159° 35'.9	47'.1	215° 58'.0	25'.2	291° 22'.8	34'.3	134° 20'.8	04'.7
6 00	344° 44'.6	174° 35'.5	5° 45'.9 N	230° 58'.8	22° 25'.0 N	306° 25'.4	13° 34'.3 N	149° 23'.0	4° 04'.8 S
01	359° 47'.1	189° 35'.1	44'.7	245° 59'.6	24'.8	321° 27'.9	34'.3	164° 25'.2	04'.9
02	14° 49'.6	204° 34'.7	43'.5	261° 00'.4	24'.6	336° 30'.4	34'.2	179° 27'.4	05'.0
T 03	29° 52'.0	219° 34'.3	42'.2	276° 01'.1	24'.4	351° 32'.9	34'.2	194° 29'.6	05'.2
u 04	44° 54'.5	234° 33'.9	41'.0	291° 01'.9	24'.2	6° 35'.4	34'.2	209° 31'.8	05'.3
e 05	59° 57'.0	249° 33'.5	39'.8	306° 02'.7	23'.9	21° 37'.9	34'.1	224° 34'.0	05'.4
06	74° 59'.4	264° 33'.1	38'.5	321° 03'.5	23'.7	36° 40'.4	34'.1	239° 36'.3	05'.5
s 07	90° 01'.9	279° 32'.7	37'.3	336° 04'.2	23'.5	51° 43'.0	34'.1	254° 38'.5	05'.6
d 08	105° 04'.4	294° 32'.3	36'.1	351° 05'.0	23'.3	66° 45'.5	34'.1	269° 40'.7	05'.7
a 09	120° 06'.8	309° 31'.9	34'.8	6° 05'.8	23'.0	81° 48'.0	34'.0	284° 42'.9	05'.8
y 10	135° 09'.3	324° 31'.5	33'.6	21° 06'.6	22'.8	96° 50'.5	34'.0	299° 45'.1	05'.9
11	150° 11'.7	339° 31'.1	32'.4	36° 07'.4	22'.6	111° 53'.0	34'.0	314° 47'.3	06'.0
12	165° 14'.2	354° 30'.7	5° 31'.2 N	51° 08'.1	22° 22'.4 N	126° 55'.6	13° 34'.0 N	329° 49'.5	4° 06'.1 S
13	180° 16'.7	9° 30'.3	29'.9	66° 08'.9	22'.2	141° 58'.1	33'.9	344° 51'.7	06'.2
14	195° 19'.1	24° 29'.9	28'.7	81° 09'.7	21'.9	157° 00'.6	33'.9	359° 54'.0	06'.4
15	210° 21'.6	39° 29'.5	27'.5	96° 10'.5	21'.7	172° 03'.1	33'.9	14° 56'.2	06'.5
16	225° 24'.1	54° 29'.1	26'.2	111° 11'.2	21'.5	187° 05'.6	33'.9	29° 58'.4	06'.6
17	240° 26'.5	69° 28'.7	25'.0	126° 12'.0	21'.3	202° 08'.2	33'.8	45° 00'.6	06'.7
18	255° 29'.0	84° 28'.3	23'.8	141° 12'.8	21'.1	217° 10'.7	33'.8	60° 02'.8	06'.8
19	270° 31'.5	99° 28'.0	22'.5	156° 13'.6	20'.8	232° 13'.2	33'.8	75° 05'.0	06'.9
20	285° 33'.9	114° 27'.6	21'.3	171° 14'.4	20'.6	247° 15'.7	33'.8	90° 07'.2	07'.0
21	300° 36'.4	129° 27'.2	20'.1	186° 15'.2	20'.4	262° 18'.2	33'.7	105° 09'.4	07'.1
22	315° 38'.8	144° 26'.8	18'.8	201° 15'.9	20'.2	277° 20'.8	33'.7	120° 11'.7	07'.2
23	330° 41'.3	159° 26'.4	17'.6	216° 16'.7	19'.9	292° 23'.3	33'.7	135° 13'.9	07'.3
	M.P. 01:01	v -0'.4	d 1'.2	v 0'.8	d 0'.2	v 2'.5	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.1	40° 15'.2 S
Achernar	335° 27'.2	57° 10'.3 S
Acrux	173° 11'.5	63° 10'.0 S
Adhara	255° 13'.7	28° 59'.1 S
Aldebaran	290° 50'.8	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.9 N
Alkaid	153° 00'.2	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.7	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.8 N
Alpheratz	357° 44'.5	29° 09'.5 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 30'.8	69° 03'.1 S
Avior	234° 19'.1	59° 32'.7 S
Bellatrix	278° 33'.4	6° 21'.7 N
Betelgeuse	271° 02'.7	7° 24'.6 N
Canopus	263° 56'.9	52° 41'.9 S
Capella	280° 36'.4	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.6 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.2 N
Elnath	278° 14'.3	28° 36'.9 N
Eltanin	90° 46'.6	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.1	60° 26'.0 S
Hamal	328° 02'.0	23° 31'.1 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.4	74° 06'.7 N
Markab	13° 39'.3	15° 16'.3 N
Menkar	314° 16'.2	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.7 S
Miaplacidus	221° 40'.9	69° 45'.9 S
Mirfak	308° 42'.0	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 10'.9	89° 18'.7 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.3	8° 11'.2 S
Rigil Kent	139° 53'.8	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.8 S
Sirius	258° 35'.0	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.7 S
Vega	80° 39'.6	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	190° 59'.6	12:21
Mars	246° 54'.7	08:37
Jupiter	321° 39'.6	03:38
Saturn	164° 44'.3	14:04

SUN				MOON					
GHA	Dec			GHA	v	Dec	d	HP	
180° 10'.6	7° 23'.2 N			103° 30'.6	6'.1	22° 02'.0 S	4'.1	58'.9	
195° 10'.8	22'.3			117° 55'.7	6'.1	06'.1	4'.0	58'.8	
210° 11'.0	21'.4			132° 20'.8	6'.0	10'.1	3'.8		
225° 11'.2	20'.5			146° 45'.8	6'.1	13'.9	3'.8		
240° 11'.4	19'.6			161° 10'.9	6'.1	17'.7	3'.5		
255° 11'.6	18'.6			175° 36'.0	6'.2	21'.2	3'.4	58'.7	
270° 11'.8	17'.7			190° 01'.2	6'.1	24'.6	3'.3		
285° 12'.0	16'.8			204° 26'.3	6'.1	27'.9	3'.1		
300° 12'.2	15'.9			218° 51'.4	6'.1	31'.0	3'.0	58'.6	
315° 12'.5	15'.0			233° 16'.5	6'.2	34'.0	2'.8		
330° 12'.7	14'.0			247° 41'.7	6'.2	36'.8	2'.7		
345° 12'.9	13'.1			262° 06'.9	6'.1	39'.5	2'.5	58'.5	
0° 13'.1	7° 12'.2 N			276° 32'.0	6'.2	22° 42'.0 S	2'.4	58'.5	
15° 13'.3	11'.3			290° 57'.2	6'.2	44'.4	2'.3		
30° 13'.5	10'.4			305° 22'.4	6'.3	46'.7	2'.1		
45° 13'.7	09'.4			319° 47'.7	6'.2	48'.8	1'.9	58'.4	
60° 13'.9	08'.5			334° 12'.9	6'.3	50'.7	1'.8		
75° 14'.1	07'.6			348° 38'.2	6'.3	52'.5	1'.7		
90° 14'.3	06'.7			3° 03'.5	6'.3	54'.2	1'.5	58'.3	
105° 14'.5	05'.7			17° 28'.8	6'.3	55'.7	1'.3		
120° 14'.7	04'.8			31° 54'.1	6'.4	57'.0	1'.3		
135° 14'.9	03'.9			46° 19'.5	6'.4	58'.3	1'.0		
150° 15'.1	03'.0			60° 44'.9	6'.4	59'.3	1'.0	58'.2	
165° 15'.3	02'.1			75° 10'.3	6'.5	23° 00'.3 S	0'.8		
180° 15'.6	7° 01'.1 N			89° 35'.8	6'.4	23° 01'.1 S	0'.6	58'.2	
195° 15'.8	00'.2			104° 01'.2	6'.6	01'.7	0'.5	58'.1	
210° 16'.0	6° 59'.3 N			118° 26'.8	6'.5	02'.2	0'.4		
225° 16'.2	58'.4			132° 52'.3	6'.6	02'.6	0'.2		
240° 16'.4	57'.4			147° 17'.9	6'.6	02'.8	0'.0	58'.0	
255° 16'.6	56'.5			161° 43'.5	6'.6	02'.8	0'.0		
270° 16'.8	55'.6			176° 09'.1	6'.7	02'.8	0'.2		
285° 17'.0	54'.7			190° 34'.8	6'.8	02'.6	0'.4		
300° 17'.2	53'.7			205° 00'.6	6'.7	02'.2	0'.5	57'.9	
315° 17'.4	52'.8			219° 26'.3	6'.8	01'.7	0'.6		
330° 17'.6	51'.9			233° 52'.1	6'.9	01'.1	0'.8		
345° 17'.8	51'.0			248° 18'.0	6'.9	00'.3	0'.9	57'.8	
0° 18'.1	6° 50'.0 N			262° 43'.9	6'.9	22° 59'.4 S	1'.1	57'.8	
15° 18'.3	49'.1			277° 09'.8	7'.0	58'.3	1'.2		
30° 18'.5	48'.2			291° 35'.8	7'.1	57'.1	1'.3		
45° 18'.7	47'.2			306° 01'.9	7'.0	55'.8	1'.4	57'.7	
60° 18'.9	46'.3			320° 27'.9	7'.2	54'.4	1'.6		
75° 19'.1	45'.4			334° 54'.1	7'.1	52'.8	1'.8		
90° 19'.3	44'.5			349° 20'.2	7'.3	51'.0	1'.9	57'.6	
105° 19'.5	43'.5			3° 46'.5	7'.3	49'.1	2'.0		
120° 19'.7	42'.6			18° 12'.8	7'.3	47'.1	2'.1		
135° 19'.9	41'.7			32° 39'.1	7'.4	45'.0	2'.3		
150° 20'.1	40'.8			47° 05'.5	7'.4	42'.7	2'.4	57'.5	
165° 20'.4	39'.8			61° 31'.9	7'.5	40'.3	2'.5		
180° 20'.6	6° 38'.9 N			75° 58'.4	7'.6	22° 37'.8 S	2'.7	57'.5	
195° 20'.8	38'.0			90° 25'.0	7'.6	35'.1	2'.8	57'.4	
210° 21'.0	37'.0			104° 51'.6	7'.7	32'.3	2'.9		
225° 21'.2	36'.1			119° 18'.3	7'.7	29'.4	3'.1		
240° 21'.4	35'.2			133° 45'.0	7'.8	26'.3	3'.1		
255° 21'.6	34'.3			148° 11'.8	7'.8	23'.2	3'.4	57'.3	
270° 21'.8	33'.3			162° 38'.6	7'.9	19'.8	3'.4		
285° 22'.0	32'.4			177° 05'.5	8'.0	16'.4	3'.6		
300° 22'.2	31'.5			191° 32'.5	8'.1	12'.8	3'.6	57'.2	
315° 22'.5	30'.5			205° 59'.6	8'.1	09'.2	3'.9		
330° 22'.7	29'.6			220° 26'.7	8'.1	05'.3	3'.9		
345° 22'.9	28'.7			234° 53'.8	8'.3	01'.4	4'.0		
0° 23'.1	6° 27'.7 N			249° 21'.1	8'.3	21° 57'.4 S	4'.2	57'.1	
15° 23'.3	26'.8			263° 48'.4	8'.3	53'.2	4'.3		
30° 23'.5	25'.9			278° 15'.7	8'.4	48'.9	4'.4		
45° 23'.7	25'.0			292° 43'.1	8'.5	44'.5	4'.6		
60° 23'.9	24'.0			307° 10'.6	8'.6	39'.9	4'.6	57'.0	
75° 24'.2	23'.1			321° 38'.2	8'.6	35'.3	4'.8		
90° 24'.4	22'.2			336° 05'.8	8'.7	30'.5	4'.9		
105° 24'.6	21'.2			350° 33'.5	8'.8	25'.6	5'.0	56'.9	
120° 24'.8	20'.3			5° 01'.3	8'.8	20'.6	5'.1		
135° 25'.0	19'.4			19° 29'.1	9'.0	15'.5	5'.2		
150° 25'.2	18'.4			33° 57'.1	8'.9	10'.3	5'.3		
165° 25'.4	17'.5			48° 25'.0	9'.1	05'.0	5'.5	56'.8	
SD 15'.9	d 0'.9			SD 15'.9		15'.8		15'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 4	Moonrise 5	Moonrise 6
N 72°	-	02:56	04:19	-	-	-
N 70°	01:12	03:19	04:30	-	-	-
68°	02:01	03:36	04:39	-	-	18:49
66°	02:30	03:50	04:47	16:34	17:31	17:47
64°	02:52	04:01	04:53	15:44	16:42	17:13
62°	03:09	04:11	04:59	15:13	16:11	16:47
60°	03:23	04:19	05:03	14:49	15:48	16:27
N 58°	03:34	04:26	05:07	14:30	15:29	16:11
56°	03:44	04:32	05:11	14:15	15:13	15:57
54°	03:52	04:38	05:15	14:01	15:00	15:45
52°	04:00	04:43	05:18	13:49	14:48	15:34
50°	04:06	04:47	05:20	13:39	14:37	15:24
45°	04:20	04:56	05:26	13:17	14:15	15:04
N 40°	04:31	05:03	05:31	12:59	13:58	14:48
35°	04:39	05:10	05:35	12:45	13:43	14:34
30°	04:46	05:15	05:39	12:32	13:30	14:22
20°	04:57	05:23	05:45	12:10	13:08	14:01
N 10°	05:05	05:29	05:51	11:51	12:49	13:43
0°	05:11	05:35	05:56	11:33	12:31	13:26
S 10°	05:15	05:39	06:00	11:16	12:13	13:09
20°	05:18	05:43	06:05	10:57	11:54	12:51
30°	05:19	05:47	06:11	10:36	11:32	12:31
35°	05:20	05:49	06:14	10:23	11:19	12:18
40°	05:19	05:51	06:18	10:09	11:04	12:04
45°	05:19	05:53	06:22	09:51	10:47	11:48
S 50°	05:17	05:55	06:27	09:30	10:25	11:27
52°	05:16	05:55	06:29	09:20	10:14	11:17
54°	05:15	05:56	06:32	09:09	10:03	11:06
56°	05:14	05:57	06:34	08:56	09:49	10:54
58°	05:13	05:58	06:37	08:41	09:34	10:39
S 60°	05:11	05:59	06:41	08:23	09:15	10:22
S 62°	05:09	06:00	06:44	08:02	08:52	10:01

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 4	Moonset 5	Moonset 6
N 72°	19:35	20:57	-	-	-	-
N 70°	19:25	20:35	22:35	-	-	-
68°	19:16	20:18	21:51	-	-	20:37
66°	19:09	20:05	21:23	18:58	20:00	21:38
64°	19:03	19:54	21:02	19:48	20:49	22:13
62°	18:57	19:45	20:46	20:20	21:20	22:38
60°	18:53	19:37	20:33	20:43	21:43	22:57
N 58°	18:49	19:30	20:21	21:02	22:02	23:13
56°	18:45	19:24	20:12	21:18	22:18	23:27
54°	18:42	19:19	20:04	21:32	22:31	23:39
52°	18:39	19:14	19:56	21:44	22:43	23:49
50°	18:36	19:10	19:50	21:54	22:53	23:59
45°	18:31	19:01	19:36	22:16	23:15	24:18
N 40°	18:26	18:53	19:26	22:34	23:32	24:34
35°	18:22	18:47	19:18	22:49	23:47	24:47
30°	18:18	18:42	19:11	23:02	24:00	24:59
20°	18:12	18:34	19:00	23:24	-	00:21
N 10°	18:07	18:28	18:53	23:43	-	00:40
0°	18:02	18:23	18:47	-	00:01	00:58
S 10°	17:57	18:18	18:43	-	00:19	01:15
20°	17:52	18:15	18:40	-	00:38	01:34
30°	17:47	18:11	18:39	-	01:00	01:55
35°	17:44	18:09	18:39	00:11	01:13	02:08
40°	17:40	18:07	18:39	00:26	01:28	02:22
45°	17:36	18:06	18:40	00:42	01:45	02:39
S 50°	17:32	18:04	18:41	01:03	02:07	03:00
52°	17:29	18:03	18:42	01:13	02:18	03:10
54°	17:27	18:02	18:43	01:24	02:29	03:21
56°	17:24	18:02	18:45	01:37	02:43	03:34
58°	17:21	18:01	18:46	01:51	02:59	03:49
S 60°	17:18	18:00	18:48	02:09	03:17	04:06
S 62°	17:15	17:59	18:50	02:30	03:41	04:28

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
4	0 42	0 52	11:59	17:47	05:18	6d 48%
5	1 02	1 12	11:59	18:44	06:16	7d 58%
6	1 22	1 32	11:58	19:39	07:12	8d 69%

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2011 September 7, 8, 9 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
7 00	345° 43'.8	174° 26'.0	5° 16'.4 N	231° 17'.5	22° 19'.7 N	307° 25'.8	13° 33'.6 N	150° 16'.1	4° 07'.4 S
01	0° 46'.2	189° 25'.6	15'.1	246° 18'.3	19'.5	322° 28'.3	33'.6	165° 18'.3	07'.6
02	15° 48'.7	204° 25'.2	13'.9	261° 19'.1	19'.3	337° 30'.9	33'.6	180° 20'.5	07'.7
03	30° 51'.2	219° 24'.8	12'.6	276° 19'.8	19'.0	352° 33'.4	33'.6	195° 22'.7	07'.8
04	45° 53'.6	234° 24'.4	11'.4	291° 20'.6	18'.8	7° 35'.9	33'.5	210° 24'.9	07'.9
05	60° 56'.1	249° 24'.0	10'.2	306° 21'.4	18'.6	22° 38'.4	33'.5	225° 27'.1	08'.0
06	75° 58'.6	264° 23'.6	08'.9	321° 22'.2	18'.4	37° 41'.0	33'.5	240° 29'.3	08'.1
07	91° 01'.0	279° 23'.2	07'.7	336° 23'.0	18'.1	52° 43'.5	33'.4	255° 31'.6	08'.2
08	106° 03'.5	294° 22'.8	06'.5	351° 23'.8	17'.9	67° 46'.0	33'.4	270° 33'.8	08'.3
09	121° 06'.0	309° 22'.5	05'.2	6° 24'.5	17'.7	82° 48'.5	33'.4	285° 36'.0	08'.4
10	136° 08'.4	324° 22'.1	04'.0	21° 25'.3	17'.4	97° 51'.1	33'.4	300° 38'.2	08'.5
11	151° 10'.9	339° 21'.7	02'.7	36° 26'.1	17'.2	112° 53'.6	33'.3	315° 40'.4	08'.7
12	166° 13'.3	354° 21'.3	5° 01'.5 N	51° 26'.9	22° 17'.0 N	127° 56'.1	13° 33'.3 N	330° 42'.6	4° 08'.8 S
13	181° 15'.8	9° 20'.9	00'.3	66° 27'.7	16'.8	142° 58'.7	33'.3	345° 44'.8	08'.9
14	196° 18'.3	24° 20'.5	4° 59'.0 N	81° 28'.5	16'.5	158° 01'.2	33'.2	0° 47'.0	09'.0
15	211° 20'.7	39° 20'.1	57'.8	96° 29'.2	16'.3	173° 03'.7	33'.2	15° 49'.2	09'.1
16	226° 23'.2	54° 19'.7	56'.6	111° 30'.0	16'.1	188° 06'.2	33'.2	30° 51'.5	09'.2
17	241° 25'.7	69° 19'.3	55'.3	126° 30'.8	15'.8	203° 08'.8	33'.2	45° 53'.7	09'.3
18	256° 28'.1	84° 18'.9	54'.1	141° 31'.6	15'.6	218° 11'.3	33'.1	60° 55'.9	09'.4
19	271° 30'.6	99° 18'.6	52'.8	156° 32'.4	15'.4	233° 13'.8	33'.1	75° 58'.1	09'.5
20	286° 33'.1	114° 18'.2	51'.6	171° 33'.2	15'.2	248° 16'.4	33'.1	91° 00'.3	09'.6
21	301° 35'.5	129° 17'.8	50'.4	186° 34'.0	14'.9	263° 18'.9	33'.0	106° 02'.5	09'.7
22	316° 38'.0	144° 17'.4	49'.1	201° 34'.8	14'.7	278° 21'.4	33'.0	121° 04'.7	09'.9
23	331° 40'.5	159° 17'.0	47'.9	216° 35'.5	14'.5	293° 23'.9	33'.0	136° 06'.9	10'.0
8 00	346° 42'.9	174° 16'.6	4° 46'.6 N	231° 36'.3	22° 14'.2 N	308° 26'.5	13° 32'.9 N	151° 09'.1	4° 10'.1 S
01	1° 45'.4	189° 16'.2	45'.4	246° 37'.1	14'.0	323° 29'.0	32'.9	166° 11'.3	10'.2
02	16° 47'.8	204° 15'.8	44'.2	261° 37'.9	13'.8	338° 31'.5	32'.9	181° 13'.6	10'.3
03	31° 50'.3	219° 15'.4	42'.9	276° 38'.7	13'.5	353° 34'.1	32'.9	196° 15'.8	10'.4
04	46° 52'.8	234° 15'.1	41'.7	291° 39'.5	13'.3	8° 36'.6	32'.8	211° 18'.0	10'.5
05	61° 55'.2	249° 14'.7	40'.4	306° 40'.3	13'.1	23° 39'.1	32'.8	226° 20'.2	10'.6
06	76° 57'.7	264° 14'.3	39'.2	321° 41'.1	12'.8	38° 41'.7	32'.8	241° 22'.4	10'.7
07	92° 00'.2	279° 13'.9	37'.9	336° 41'.8	12'.6	53° 44'.2	32'.7	256° 24'.6	10'.8
08	107° 02'.6	294° 13'.5	36'.7	351° 42'.6	12'.4	68° 46'.7	32'.7	271° 26'.8	11'.0
09	122° 05'.1	309° 13'.1	35'.5	6° 43'.4	12'.1	83° 49'.3	32'.7	286° 29'.0	11'.1
10	137° 07'.6	324° 12'.7	34'.2	21° 44'.2	11'.9	98° 51'.8	32'.6	301° 31'.2	11'.2
11	152° 10'.0	339° 12'.3	33'.0	36° 45'.0	11'.7	113° 54'.3	32'.6	316° 33'.4	11'.3
12	167° 12'.5	354° 12'.0	4° 31'.7 N	51° 45'.8	22° 11'.4 N	128° 56'.9	13° 32'.6 N	331° 35'.6	4° 11'.4 S
13	182° 15'.0	9° 11'.6	30'.5	66° 46'.6	11'.2	143° 59'.4	32'.5	346° 37'.9	11'.5
14	197° 17'.4	24° 11'.2	29'.2	81° 47'.4	11'.0	159° 02'.0	32'.5	1° 40'.1	11'.6
15	212° 19'.9	39° 10'.8	28'.0	96° 48'.2	10'.7	174° 04'.5	32'.5	16° 42'.3	11'.7
16	227° 22'.3	54° 10'.4	26'.7	111° 49'.0	10'.5	189° 07'.0	32'.5	31° 44'.5	11'.8
17	242° 24'.8	69° 10'.0	25'.5	126° 49'.7	10'.3	204° 09'.6	32'.4	46° 46'.7	11'.9
18	257° 27'.3	84° 09'.6	24'.3	141° 50'.5	10'.0	219° 12'.1	32'.4	61° 48'.9	12'.1
19	272° 29'.7	99° 09'.3	23'.0	156° 51'.3	09'.8	234° 14'.6	32'.4	76° 51'.1	12'.2
20	287° 32'.2	114° 08'.9	21'.8	171° 52'.1	09'.6	249° 17'.2	32'.3	91° 53'.3	12'.3
21	302° 34'.7	129° 08'.5	20'.5	186° 52'.9	09'.3	264° 19'.7	32'.3	106° 55'.5	12'.4
22	317° 37'.1	144° 08'.1	19'.3	201° 53'.7	09'.1	279° 22'.3	32'.3	121° 57'.7	12'.5
23	332° 39'.6	159° 07'.7	18'.0	216° 54'.5	08'.9	294° 24'.8	32'.2	136° 59'.9	12'.6
9 00	347° 42'.1	174° 07'.3	4° 16'.8 N	231° 55'.3	22° 08'.6 N	309° 27'.3	13° 32'.2 N	152° 02'.2	4° 12'.7 S
01	2° 44'.5	189° 06'.9	15'.5	246° 56'.1	08'.4	324° 29'.9	32'.2	167° 04'.4	12'.8
02	17° 47'.0	204° 06'.6	14'.3	261° 56'.9	08'.2	339° 32'.4	32'.1	182° 06'.6	12'.9
03	32° 49'.4	219° 06'.2	13'.0	276° 57'.7	07'.9	354° 35'.0	32'.1	197° 08'.8	13'.0
04	47° 51'.9	234° 05'.8	11'.8	291° 58'.5	07'.7	9° 37'.5	32'.1	212° 11'.0	13'.2
05	62° 54'.4	249° 05'.4	10'.5	306° 59'.3	07'.4	24° 40'.0	32'.0	227° 13'.2	13'.3
06	77° 56'.8	264° 05'.0	09'.3	322° 00'.1	07'.2	39° 42'.6	32'.0	242° 15'.4	13'.4
07	92° 59'.3	279° 04'.6	08'.0	337° 00'.8	07'.0	54° 45'.1	32'.0	257° 17'.6	13'.5
08	108° 01'.8	294° 04'.3	06'.8	352° 01'.6	06'.7	69° 47'.7	31'.9	272° 19'.8	13'.6
09	123° 04'.2	309° 03'.9	05'.5	7° 02'.4	06'.5	84° 50'.2	31'.9	287° 22'.0	13'.7
10	138° 06'.7	324° 03'.5	04'.3	22° 03'.2	06'.2	99° 52'.7	31'.9	302° 24'.2	13'.8
11	153° 09'.2	339° 03'.1	03'.0	37° 04'.0	06'.0	114° 55'.3	31'.8	317° 26'.4	13'.9
12	168° 11'.6	354° 02'.7	4° 01'.8 N	52° 04'.8	22° 05'.8 N	129° 57'.8	13° 31'.8 N	332° 28'.6	4° 14'.0 S
13	183° 14'.1	9° 02'.3	00'.6	67° 05'.6	05'.5	145° 00'.4	31'.8	347° 30'.9	14'.2
14	198° 16'.6	24° 02'.0	3° 59'.3 N	82° 06'.4	05'.3	160° 02'.9	31'.7	2° 33'.1	14'.3
15	213° 19'.0	39° 01'.6	58'.1	97° 07'.2	05'.0	175° 05'.5	31'.7	17° 35'.3	14'.4
16	228° 21'.5	54° 01'.2	56'.8	112° 08'.0	04'.8	190° 08'.0	31'.7	32° 37'.5	14'.5
17	243° 23'.9	69° 00'.8	55'.6	127° 08'.8	04'.6	205° 10'.6	31'.6	47° 39'.7	14'.6
18	258° 26'.4	84° 00'.4	54'.3	142° 09'.6	04'.3	220° 13'.1	31'.6	62° 41'.9	14'.7
19	273° 28'.9	99° 00'.0	53'.0	157° 10'.4	04'.1	235° 15'.6	31'.6	77° 44'.1	14'.8
20	288° 31'.3	113° 59'.7	51'.8	172° 11'.2	03'.8	250° 18'.2	31'.5	92° 46'.3	14'.9
21	303° 33'.8	128° 59'.3	50'.5	187° 12'.0	03'.6	265° 20'.7	31'.5	107° 48'.5	15'.0
22	318° 36'.3	143° 58'.9	49'.3	202° 12'.8	03'.4	280° 23'.3	31'.5	122° 50'.7	15'.1
23	333° 38'.7	158° 58'.5	48'.0	217° 13'.6	03'.1	295° 25'.8	31'.4	137° 52'.9	15'.3
	M.P. 00:49	v -0'.4	d 1'.2	v 0'.8	d 0'.2	v 2'.5	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.0	40° 15'.2 S
Achernar	335° 27'.2	57° 10'.3 S
Acrux	173° 11'.5	63° 10'.0 S
Adhara	255° 13'.7	28° 59'.1 S
Aldebaran	290° 50'.8	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.9 N
Alkaid	153° 00'.2	49° 15'.5 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.7	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.5	29° 09'.5 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 30'.8	69° 03'.1 S
Avior	234° 19'.1	59° 32'.7 S
Bellatrix	278° 33'.4	6° 21'.7 N
Betelgeuse	271° 02'.7	7° 24'.6 N
Canopus	263° 56'.9	52° 41'.9 S
Capella	280° 36'.3	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.2 N
Elnath	278° 14'.2	28° 36'.9 N
Eltanin	90° 46'.6	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.9 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.2	60° 26'.0 S
Hamal	328° 01'.9	23° 31'.2 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.4	74° 06'.7 N
Markab	13° 39'.2	15° 16'.3 N
Menkar	314° 16'.2	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.7 S
Miaplacidus	221° 40'.9	69° 45'.8 S
Mirfak	308° 42'.0	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 09'.6	89° 18'.7 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 07'.5	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.3	8° 11'.2 S
Rigil Kent	139° 53'.8	60° 53'.2 S
Sabik	102° 13'.9	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.1 N
Shaula	96° 23'.5	37° 06'.8 S
Sirius	258° 35'.0	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.7 S
Vega	80° 39'.6	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	187° 33'.7	12:23
Mars	244° 53'.4	08:33
Jupiter	321° 43'.6	03:26
Saturn	164° 26'.2	13:53

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 25'.6	6° 16'.6 N	62° 53'.1	9'.1	20° 59'.5 S	5'.6	56'.8
195° 25'.8	15'.6	77° 21'.2	9'.2	53'.9	5'.6	
210° 26'.1	14'.7	91° 49'.4	9'.3	48'.3	5'.8	
225° 26'.3	13'.8	106° 17'.7	9'.3	42'.5	5'.9	56'.7
240° 26'.5	12'.8	120° 46'.0	9'.4	36'.6	6'.0	
255° 26'.7	11'.9	135° 14'.4	9'.5	30'.6	6'.1	
270° 26'.9	11'.0	149° 42'.9	9'.6	24'.5	6'.2	
285° 27'.1	10'.0	164° 11'.5	9'.6	18'.3	6'.3	56'.6
300° 27'.3	09'.1	178° 40'.1	9'.7	12'.0	6'.4	
315° 27'.6	08'.2	193° 08'.8	9'.8	05'.6	6'.5	
330° 27'.8	07'.2	207° 37'.6	9'.8	19° 59'.1 S	6'.6	
345° 28'.0	06'.3	222° 06'.4	10'.0	52'.5	6'.7	56'.5
0° 28'.2	6° 05'.4 N	236° 35'.4	10'.0	19° 45'.8 S	6'.8	56'.5
15° 28'.4	04'.4	251° 04'.4	10'.1	39'.0	6'.9	
30° 28'.6	03'.5	265° 33'.5	10'.1	32'.1	7'.0	
45° 28'.8	02'.6	280° 02'.6	10'.2	25'.1	7'.1	56'.4
60° 29'.0	01'.6	294° 31'.8	10'.3	18'.0	7'.2	
75° 29'.3	00'.7	309° 01'.1	10'.4	10'.8	7'.2	
90° 29'.5	5° 59'.7 N	323° 30'.5	10'.4	03'.6	7'.4	
105° 29'.7	58'.8	337° 59'.9	10'.6	18° 56'.2 S	7'.5	56'.3
120° 29'.9	57'.9	352° 29'.5	10'.6	48'.7	7'.5	
135° 30'.1	56'.9	6° 59'.1	10'.6	41'.2	7'.7	
150° 30'.3	56'.0	21° 28'.7	10'.8	33'.5	7'.7	
165° 30'.5	55'.1	35° 58'.5	10'.8	25'.8	7'.8	56'.2
180° 30'.8	5° 54'.1 N	50° 28'.3	10'.9	18° 18'.0 S	7'.9	56'.2
195° 31'.0	53'.2	64° 58'.2	10'.9	10'.1	8'.0	
210° 31'.2	52'.3	79° 28'.1	11'.1	02'.1	8'.1	
225° 31'.4	51'.3	93° 58'.2	11'.1	17° 54'.0 S	8'.1	
240° 31'.6	50'.4	108° 28'.3	11'.2	45'.9	8'.3	56'.1
255° 31'.8	49'.4	122° 58'.5	11'.2	37'.6	8'.3	
270° 32'.1	48'.5	137° 28'.7	11'.4	29'.3	8'.4	
285° 32'.3	47'.6	151° 59'.1	11'.4	20'.9	8'.5	
300° 32'.5	46'.6	166° 29'.5	11'.4	12'.4	8'.5	56'.0
315° 32'.7	45'.7	180° 59'.9	11'.6	03'.9	8'.7	
330° 32'.9	44'.7	195° 30'.5	11'.6	16° 55'.2 S	8'.7	
345° 33'.1	43'.8	210° 01'.1	11'.7	46'.5	8'.7	
0° 33'.3	5° 42'.9 N	224° 31'.8	11'.8	16° 37'.8 S	8'.9	56'.0
15° 33'.6	41'.9	239° 02'.6	11'.8	28'.9	8'.9	55'.9
30° 33'.8	41'.0	253° 33'.4	11'.9	20'.0	9'.0	
45° 34'.0	40'.1	268° 04'.3	12'.0	11'.0	9'.1	
60° 34'.2	39'.1	282° 35'.3	12'.0	01'.9	9'.1	
75° 34'.4	38'.2	297° 06'.3	12'.1	15° 52'.8 S	9'.3	55'.8
90° 34'.6	37'.2	311° 37'.4	12'.2	43'.5	9'.2	
105° 34'.9	36'.3	326° 08'.6	12'.2	34'.3	9'.4	
120° 35'.1	35'.4	340° 39'.8	12'.3	24'.9	9'.4	
135° 35'.3	34'.4	355° 11'.1	12'.4	15'.5	9'.5	
150° 35'.5	33'.5	9° 42'.5	12'.5	06'.0	9'.5	55'.7
165° 35'.7	32'.5	24° 14'.0	12'.5	14° 56'.5 S	9'.6	
180° 35'.9	5° 31'.6 N	38° 45'.5	12'.6	14° 46'.9 S	9'.7	55'.7
195° 36'.2	30'.7	53° 17'.1	12'.6	37'.2	9'.7	
210° 36'.4	29'.7	67° 48'.7	12'.7	27'.5	9'.8	
225° 36'.6	28'.8	82° 20'.4	12'.8	17'.7	9'.8	55'.6
240° 36'.8	27'.8	96° 52'.2	12'.8	07'.9	9'.9	
255° 37'.0	26'.9	111° 24'.0	12'.9	13° 58'.0 S	10'.0	
270° 37'.2	25'.9	125° 55'.9	13'.0	48'.0	10'.0	
285° 37'.5	25'.0	140° 27'.9	13'.0	38'.0	10'.1	
300° 37'.7	24'.1	154° 59'.9	13'.1	27'.9	10'.1	55'.5
315° 37'.9	23'.1	169° 32'.0	13'.2	17'.8	10'.2	
330° 38'.1	22'.2	184° 04'.2	13'.2	07'.6	10'.2	
345° 38'.3	21'.2	198° 36'.4	13'.3	12° 57'.4 S	10'.3	
0° 38'.5	5° 20'.3 N	213° 08'.7	13'.3	12° 47'.1 S	10'.3	55'.5
15° 38'.8	19'.3	227° 41'.0	13'.4	36'.8	10'.4	55'.4
30° 39'.0	18'.4	242° 13'.4	13'.4	26'.4	10'.4	
45° 39'.2	17'.5	256° 45'.8	13'.5	16'.0	10'.5	
60° 39'.4	16'.5	271° 18'.3	13'.6	05'.5	10'.5	
75° 39'.6	15'.6	285° 50'.9	13'.6	11° 55'.0 S	10'.6	
90° 39'.9	14'.6	300° 23'.5	13'.7	44'.4	10'.6	55'.3
105° 40'.1	13'.7	314° 56'.2	13'.7	33'.8	10'.7	
120° 40'.3	12'.7	329° 28'.9	13'.8	23'.1	10'.7	
135° 40'.5	11'.8	344° 01'.7	13'.8	12'.4	10'.7	
150° 40'.7	10'.9	358° 34'.5	13'.9	01'.7	10'.8	
165° 40'.9	09'.9	13° 07'.4	14'.0	10° 50'.9 S	10'.8	
SD 15'.9	d 0'.9	SD	15'.4	15'.2	15'.1	

MOON						
GHA	v	Dec	d	HP
62° 53'.1	9'.1	20° 59'.5 S	5'.6	56'.8
77° 21'.2	9'.2	53'.9	5'.6	
91° 49'.4	9'.3	48'.3	5'.8	
106° 17'.7	9'.3	42'.5	5'.9	56'.7
120° 46'.0	9'.4	36'.6	6'.0	
135° 14'.4	9'.5	30'.6	6'.1	
149° 42'.9	9'.6	24'.5	6'.2	
164° 11'.5	9'.6	18'.3	6'.3	56'.6
178° 40'.1	9'.7	12'.0	6'.4	
193° 08'.8	9'.8	05'.6	6'.5	
207° 37'.6	9'.8	19° 59'.1 S	6'.6	
222° 06'.4	10'.0	52'.5	6'.7	56'.5
236° 35'.4	10'.0	19° 45'.8 S	6'.8	56'.5
251° 04'.4	10'.1	39'.0	6'.9	
265° 33'.5	10'.1	32'.1	7'.0	
280° 02'.6	10'.2	25'.1	7'.1	56'.4
294° 31'.8	10'.3	18'.0	7'.2	
309° 01'.1	10'.4	10'.8	7'.2	
323° 30'.5	10'.4	03'.6	7'.4	
337° 59'.9	10'.6	18° 56'.2 S	7'.5	56'.3
352° 29'.5	10'.6	48'.7	7'.5	
6° 59'.1	10'.6	41'.2	7'.7	
21° 28'.7	10'.8	33'.5	7'.7	
35° 58'.5	10'.8	25'.8	7'.8	56'.2
50° 28'.3	10'.9	18° 18'.0 S	7'.9	56'.2
64° 58'.2	10'.9	10'.1	8'.0	
79° 28'.1	11'.1	02'.1	8'.1	
93° 58'.2	11'.1	17° 54'.0 S	8'.1	
108° 28'.3	11'.2	45'.9	8'.3	56'.1
122° 58'.5	11'.2	37'.6	8'.3	
137° 28'.7	11'.4	29'.3	8'.4	
151° 59'.1	11'.4	20'.9	8'.5	
166° 29'.5	11'.4	12'.4	8'.5	56'.0
180° 59'.9	11'.6	03'.9	8'.7	
195° 30'.5	11'.6	16° 55'.2 S	8'.7	
210° 01'.1	11'.7	46'.5	8'.7	
224° 31'.8	11'.8	16° 37'.8 S	8'.9	56'.0
239° 02'.6	11'.8	28'.9	8'.9	55'.9
253° 33'.4	11'.9	20'.0	9'.0	
268° 04'.3	12'.0	11'.0	9'.1	
282° 35'.3	12'.0	01'.9	9'.1	
297° 06'.3	12'.1	15° 52'.8 S	9'.3	55'.8
311° 37'.4	12'.2	43'.5	9'.2	
326° 08'.6	12'.2	34'.3	9'.4	
340° 39'.8	12'.3	24'.9	9'.4	
355° 11'.1	12'.4	15'.5	9'.5	
9° 42'.5	12'.5	06'.0	9'.5	55'.7
24° 14'.0	12'.5	14° 56'.5 S	9'.6	
38° 45'.5	12'.6	14° 46'.9 S	9'.7	55'.7
53° 17'.1	12'.6	37'.2	9'.7	
67° 48'.7	12'.7	27'.5	9'.8	
82° 20'.4	12'.8	17'.7	9'.8	55'.6
96° 52'.2	12'.8	07'.9	9'.9	
111° 24'.0	12'.9	13° 58'.0 S	10'.0	
125° 55'.9	13'.0	48'.0	10'.0	
140° 27'.9	13'.0	38'.0	10'.1	
154° 59'.9	13'.1	27'.9	10'.1	55'.5
169° 32'.0	13'.2	17'.8	10'.2	
184° 04'.2	13'.2	07'.6	10'.2	
198° 36'.4	13'.3	12° 57'.4 S	10'.3	
213° 08'.7	13'.3	12° 47'.1 S	10'.3	55'.5
227° 41'.0	13'.4	36'.8	10'.4	55'.4
242° 13'.4	13'.4	26'.4	10'.4	
256° 45'.8	13'.5	16'.0	10'.5	
271° 18'.3	13'.6	05'.5	10'.5	
285° 50'.9	13'.6	11° 55'.0 S	10'.6	
300° 23'.5	13'.7	44'.4	10'.6	55'.3
314° 56'.2	13'.7	33'.8	10'.7	
329° 28'.9	13'.8	23'.1	10'.7	
344° 01'.7	13'.8	12'.4	10'.7	
358° 34'.5	13'.9	01'.7	10'.8	
13° 07'.4	14'.0	10° 50'.9 S	10'.8	
SD 15'.4		15'.2	15'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 7	Moonrise 8	Moonrise 9
N 72°	00:23	03:14	04:33	-	19:14	18:39
N 70°	01:45	03:34	04:42	19:14	18:38	18:19
68°	02:21	03:49	04:50	18:23	18:12	18:04
66°	02:46	04:01	04:56	17:51	17:52	17:51
64°	03:04	04:11	05:02	17:28	17:36	17:40
62°	03:19	04:20	05:06	17:09	17:22	17:31
60°	03:32	04:27	05:10	16:53	17:11	17:23
N 58°	03:42	04:33	05:14	16:40	17:01	17:17
56°	03:51	04:39	05:17	16:29	16:52	17:10
54°	03:59	04:43	05:20	16:18	16:44	17:05
52°	04:06	04:48	05:22	16:10	16:37	17:00
50°	04:12	04:52	05:25	16:01	16:31	16:55
45°	04:24	05:00	05:30	15:44	16:17	16:46
N 40°	04:34	05:06	05:34	15:30	16:06	16:38
35°	04:42	05:12	05:37	15:18	15:57	16:30
30°	04:48	05:16	05:41	15:08	15:48	16:24
20°	04:58	05:24	05:46	14:50	15:33	16:13
N 10°	05:05	05:29	05:50	14:34	15:21	16:04
0°	05:10	05:34	05:55	14:19	15:08	15:55
S 10°	05:13	05:38	05:59	14:04	14:56	15:46
20°	05:15	05:41	06:03	13:48	14:43	15:37
30°	05:16	05:44	06:07	13:30	14:28	15:26
35°	05:16	05:45	06:10	13:19	14:20	15:19
40°	05:15	05:46	06:13	13:07	14:10	15:12
45°	05:13	05:47	06:16	12:52	13:58

2011 September 10, 11, 12 (Sat, Sun, Mon)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
10 Saturday 00	348° 41'.2	173° 58'.1	3° 46'.8 N	232° 14'.4	22° 02'.9 N	310° 28'.4	13° 31'.4 N	152° 55'.1	4° 15'.4 S
01	3° 43'.7	188° 57'.8	45'.5	247° 15'.2	02'.6	325° 30'.9	31'.3	167° 57'.3	15'.5
02	18° 46'.1	203° 57'.4	44'.3	262° 16'.0	02'.4	340° 33'.5	31'.3	182° 59'.6	15'.6
03	33° 48'.6	218° 57'.0	43'.0	277° 16'.8	02'.1	355° 36'.0	31'.3	198° 01'.8	15'.7
04	48° 51'.0	233° 56'.6	41'.8	292° 17'.6	01'.9	10° 38'.6	31'.2	213° 04'.0	15'.8
05	63° 53'.5	248° 56'.2	40'.5	307° 18'.4	01'.7	25° 41'.1	31'.2	228° 06'.2	15'.9
06	78° 56'.0	263° 55'.9	39'.3	322° 19'.2	01'.4	40° 43'.7	31'.2	243° 08'.4	16'.0
07	93° 58'.4	278° 55'.5	38'.0	337° 20'.0	01'.2	55° 46'.2	31'.1	258° 10'.6	16'.1
08	109° 00'.9	293° 55'.1	36'.8	352° 20'.8	00'.9	70° 48'.8	31'.1	273° 12'.8	16'.3
09	124° 03'.4	308° 54'.7	35'.5	7° 21'.6	00'.7	85° 51'.3	31'.1	288° 15'.0	16'.4
10	139° 05'.8	323° 54'.3	34'.3	22° 22'.4	00'.4	100° 53'.9	31'.0	303° 17'.2	16'.5
11	154° 08'.3	338° 54'.0	33'.0	37° 23'.2	00'.2	115° 56'.4	31'.0	318° 19'.4	16'.6
12	169° 10'.8	353° 53'.6	3° 31'.8 N	52° 24'.0	21° 59'.9 N	130° 59'.0	13° 31'.0 N	333° 21'.6	4° 16'.7 S
13	184° 13'.2	8° 53'.2	30'.5	67° 24'.8	59'.7	146° 01'.5	30'.9	348° 23'.8	16'.8
14	199° 15'.7	23° 52'.8	29'.2	82° 25'.6	59'.4	161° 04'.1	30'.9	3° 26'.0	16'.9
15	214° 18'.2	38° 52'.4	28'.0	97° 26'.4	59'.2	176° 06'.6	30'.8	18° 28'.2	17'.0
16	229° 20'.6	53° 52'.1	26'.7	112° 27'.2	59'.0	191° 09'.2	30'.8	33° 30'.4	17'.1
17	244° 23'.1	68° 51'.7	25'.5	127° 28'.0	58'.7	206° 11'.7	30'.8	48° 32'.6	17'.2
18	259° 25'.5	83° 51'.3	24'.2	142° 28'.8	58'.5	221° 14'.3	30'.7	63° 34'.9	17'.4
19	274° 28'.0	98° 50'.9	23'.0	157° 29'.6	58'.2	236° 16'.8	30'.7	78° 37'.1	17'.5
20	289° 30'.5	113° 50'.5	21'.7	172° 30'.4	58'.0	251° 19'.4	30'.7	93° 39'.3	17'.6
21	304° 32'.9	128° 50'.2	20'.5	187° 31'.2	57'.7	266° 22'.0	30'.6	108° 41'.5	17'.7
22	319° 35'.4	143° 49'.8	19'.2	202° 32'.0	57'.5	281° 24'.5	30'.6	123° 43'.7	17'.8
23	334° 37'.9	158° 49'.4	18'.0	217° 32'.8	57'.2	296° 27'.1	30'.5	138° 45'.9	17'.9
11 Sunday 00	349° 40'.3	173° 49'.0	3° 16'.7 N	232° 33'.6	21° 57'.0 N	311° 29'.6	13° 30'.5 N	153° 48'.1	4° 18'.0 S
01	4° 42'.8	188° 48'.7	15'.4	247° 34'.4	56'.7	326° 32'.2	30'.5	168° 50'.3	18'.1
02	19° 45'.3	203° 48'.3	14'.2	262° 35'.2	56'.5	341° 34'.7	30'.4	183° 52'.5	18'.2
03	34° 47'.7	218° 47'.9	12'.9	277° 36'.1	56'.2	356° 37'.3	30'.4	198° 54'.7	18'.4
04	49° 50'.2	233° 47'.5	11'.7	292° 36'.9	56'.0	11° 39'.8	30'.4	213° 56'.9	18'.5
05	64° 52'.7	248° 47'.1	10'.4	307° 37'.7	55'.7	26° 42'.4	30'.3	228° 59'.1	18'.6
06	79° 55'.1	263° 46'.8	09'.2	322° 38'.5	55'.5	41° 45'.0	30'.3	244° 01'.3	18'.7
07	94° 57'.6	278° 46'.4	07'.9	337° 39'.3	55'.2	56° 47'.5	30'.2	259° 03'.5	18'.8
08	110° 00'.0	293° 46'.0	06'.6	352° 40'.1	55'.0	71° 50'.1	30'.2	274° 05'.7	18'.9
09	125° 02'.5	308° 45'.6	05'.4	7° 40'.9	54'.7	86° 52'.6	30'.2	289° 07'.9	19'.0
10	140° 05'.0	323° 45'.3	04'.1	22° 41'.7	54'.5	101° 55'.2	30'.1	304° 10'.1	19'.1
11	155° 07'.4	338° 44'.9	02'.9	37° 42'.5	54'.2	116° 57'.8	30'.1	319° 12'.3	19'.2
12	170° 09'.9	353° 44'.5	3° 01'.6 N	52° 43'.3	21° 54'.0 N	132° 00'.3	13° 30'.0 N	334° 14'.5	4° 19'.4 S
13	185° 12'.4	8° 44'.1	00'.3	67° 44'.1	53'.7	147° 02'.9	30'.0	349° 16'.8	19'.5
14	200° 14'.8	23° 43'.8	2° 59'.1 N	82° 44'.9	53'.5	162° 05'.4	30'.0	4° 19'.0	19'.6
15	215° 17'.3	38° 43'.4	57'.8	97° 45'.7	53'.2	177° 08'.0	29'.9	19° 21'.2	19'.7
16	230° 19'.8	53° 43'.0	56'.6	112° 46'.5	53'.0	192° 10'.6	29'.9	34° 23'.4	19'.8
17	245° 22'.2	68° 42'.6	55'.3	127° 47'.3	52'.7	207° 13'.1	29'.9	49° 25'.6	19'.9
18	260° 24'.7	83° 42'.3	54'.1	142° 48'.2	52'.5	222° 15'.7	29'.8	64° 27'.8	20'.0
19	275° 27'.1	98° 41'.9	52'.8	157° 49'.0	52'.2	237° 18'.2	29'.8	79° 30'.0	20'.1
20	290° 29'.6	113° 41'.5	51'.5	172° 49'.8	52'.0	252° 20'.8	29'.7	94° 32'.2	20'.2
21	305° 32'.1	128° 41'.1	50'.3	187° 50'.6	51'.7	267° 23'.4	29'.7	109° 34'.4	20'.4
22	320° 34'.5	143° 40'.7	49'.0	202° 51'.4	51'.5	282° 25'.9	29'.7	124° 36'.6	20'.5
23	335° 37'.0	158° 40'.4	47'.8	217° 52'.2	51'.2	297° 28'.5	29'.6	139° 38'.8	20'.6
12 Monday 00	350° 39'.5	173° 40'.0	2° 46'.5 N	232° 53'.0	21° 50'.9 N	312° 31'.1	13° 29'.6 N	154° 41'.0	4° 20'.7 S
01	5° 41'.9	188° 39'.6	45'.2	247° 53'.8	50'.7	327° 33'.6	29'.5	169° 43'.2	20'.8
02	20° 44'.4	203° 39'.2	44'.0	262° 54'.6	50'.4	342° 36'.2	29'.5	184° 45'.4	20'.9
03	35° 46'.9	218° 38'.9	42'.7	277° 55'.4	50'.2	357° 38'.7	29'.5	199° 47'.6	21'.0
04	50° 49'.3	233° 38'.5	41'.4	292° 56'.3	49'.9	12° 41'.3	29'.4	214° 49'.8	21'.1
05	65° 51'.8	248° 38'.1	40'.2	307° 57'.1	49'.7	27° 43'.9	29'.4	229° 52'.0	21'.3
06	80° 54'.3	263° 37'.8	38'.9	322° 57'.9	49'.4	42° 46'.4	29'.3	244° 54'.2	21'.4
07	95° 56'.7	278° 37'.4	37'.7	337° 58'.7	49'.2	57° 49'.0	29'.3	259° 56'.4	21'.5
08	110° 59'.2	293° 37'.0	36'.4	352° 59'.5	48'.9	72° 51'.6	29'.3	274° 58'.6	21'.6
09	126° 01'.6	308° 36'.6	35'.1	8° 00'.3	48'.6	87° 54'.1	29'.2	290° 00'.8	21'.7
10	141° 04'.1	323° 36'.3	33'.9	23° 01'.1	48'.4	102° 56'.7	29'.2	305° 03'.0	21'.8
11	156° 06'.6	338° 35'.9	32'.6	38° 01'.9	48'.1	117° 59'.3	29'.1	320° 05'.2	21'.9
12	171° 09'.0	353° 35'.5	2° 31'.4 N	53° 02'.8	21° 47'.9 N	133° 01'.8	13° 29'.1 N	335° 07'.4	4° 22'.0 S
13	186° 11'.5	8° 35'.1	30'.1	68° 03'.6	47'.6	148° 04'.4	29'.0	350° 09'.7	22'.1
14	201° 14'.0	23° 34'.8	28'.8	83° 04'.4	47'.4	163° 07'.0	29'.0	5° 11'.9	22'.3
15	216° 16'.4	38° 34'.4	27'.6	98° 05'.2	47'.1	178° 09'.5	29'.0	20° 14'.1	22'.4
16	231° 18'.9	53° 34'.0	26'.3	113° 06'.0	46'.8	193° 12'.1	28'.9	35° 16'.3	22'.5
17	246° 21'.4	68° 33'.6	25'.0	128° 06'.8	46'.6	208° 14'.7	28'.9	50° 18'.5	22'.6
18	261° 23'.8	83° 33'.3	23'.8	143° 07'.6	46'.3	223° 17'.3	28'.8	65° 20'.7	22'.7
19	276° 26'.3	98° 32'.9	22'.5	158° 08'.5	46'.1	238° 19'.8	28'.8	80° 22'.9	22'.8
20	291° 28'.7	113° 32'.5	21'.3	173° 09'.3	45'.8	253° 22'.4	28'.8	95° 25'.1	22'.9
21	306° 31'.2	128° 32'.1	20'.0	188° 10'.1	45'.6	268° 25'.0	28'.7	110° 27'.3	23'.0
22	321° 33'.7	143° 31'.8	18'.7	203° 10'.9	45'.3	283° 27'.5	28'.7	125° 29'.5	23'.1
23	336° 36'.1	158° 31'.4	17'.5	218° 11'.7	45'.0	298° 30'.1	28'.6	140° 31'.7	23'.3
	M.P. 00:37	v -0'.4	d 1'.3	v 0'.8	d 0'.3	v 2'.6	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.0	40° 15'.2 S
Achernar	335° 27'.1	57° 10'.3 S
Acrux	173° 11'.5	63° 10'.0 S
Adhara	255° 13'.7	28° 59'.1 S
Aldebaran	290° 50'.8	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.9 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.7	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.5	29° 09'.5 N
Altair	62° 09'.2	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.8	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 30'.8	69° 03'.1 S
Avior	234° 19'.0	59° 32'.7 S
Bellatrix	278° 33'.4	6° 21'.7 N
Betelgeuse	271° 02'.7	7° 24'.6 N
Canopus	263° 56'.9	52° 41'.9 S
Capella	280° 36'.3	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.2 N
Elnath	278° 14'.2	28° 36'.9 N
Eltanin	90° 46'.6	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 24'.9	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.9 S
Hamal	328° 01'.9	23° 31'.2 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.5	74° 06'.7 N
Markab	13° 39'.2	15° 16'.3 N
Menkar	314° 16'.2	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.7 S
Miaplacidus	221° 40'.8	69° 45'.8 S
Mirfak	308° 41'.9	49° 54'.0 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 08'.5	89° 18'.7 N
Pollux	243° 29'.5	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 07'.6	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.2	8° 11'.2 S
Rigil Kent	139° 53'.8	60° 53'.2 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.2 N
Shaula	96° 23'.6	37° 06'.8 S
Sirius	258° 34'.9	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.8	43° 28'.7 S
Vega	80° 39'.7	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	184° 08'.7	12:25
Mars	242° 53'.3	08:29
Jupiter	321° 49'.3	03:13
Saturn	164° 07'.8	13:43

SUN						
GHA	Dec	GHA	v	Dec	d	HP
180° 41'.2	5° 09'.0 N	27° 40'.4	14'.0	10° 40'.1 S	10'.9	55'.2
195° 41'.4	08'.0	42° 13'.4	14'.0	29'.2	10'.9	
210° 41'.6	07'.1	56° 46'.4	14'.1	18'.3	10'.9	
225° 41'.8	06'.1	71° 19'.5	14'.2	07'.4	11'.0	
240° 42'.0	05'.2	85° 52'.7	14'.2	9° 56'.4 S	11'.0	
255° 42'.3	04'.2	100° 25'.9	14'.2	45'.4	11'.1	55'.1
270° 42'.5	03'.3	114° 59'.1	14'.3	34'.3	11'.0	
285° 42'.7	02'.4	129° 32'.4	14'.4	23'.3	11'.2	
300° 42'.9	01'.4	144° 05'.8	14'.4	12'.1	11'.1	
315° 43'.1	00'.5	158° 39'.2	14'.4	01'.0	11'.2	
330° 43'.3	4° 59'.5 N	173° 12'.6	14'.5	8° 49'.8 S	11'.2	
345° 43'.6	58'.6	187° 46'.1	14'.5	38'.6	11'.2	55'.0
0° 43'.8	4° 57'.6 N	202° 19'.6	14'.6	8° 27'.4 S	11'.3	55'.0
15° 44'.0	56'.7	216° 53'.2	14'.6	16'.1	11'.3	
30° 44'.2	55'.7	231° 26'.8	14'.6	04'.8	11'.3	
45° 44'.4	54'.8	246° 00'.4	14'.7	7° 53'.5 S	11'.4	
60° 44'.7	53'.8	260° 34'.1	14'.8	42'.1	11'.4	
75° 44'.9	52'.9	275° 07'.9	14'.7	30'.7	11'.4	54'.9
90° 45'.1	51'.9	289° 41'.6	14'.8	19'.3	11'.4	
105° 45'.3	51'.0	304° 15'.4	14'.9	07'.9	11'.4	
120° 45'.5	50'.0	318° 49'.3	14'.9	6° 56'.5 S	11'.5	
135° 45'.8	49'.1	333° 23'.2	14'.9	45'.0	11'.5	
150° 46'.0	48'.1	347° 57'.1	15'.0	33'.5	11'.5	
165° 46'.2	47'.2	2° 31'.1	15'.0	22'.0	11'.5	
180° 46'.4	4° 46'.3 N	17° 05'.1	15'.0	6° 10'.5 S	11'.6	54'.8
195° 46'.6	45'.3	31° 39'.1	15'.1	5° 58'.9 S	11'.5	
210° 46'.9	44'.4	46° 13'.2	15'.1	47'.4	11'.6	
225° 47'.1	43'.4	60° 47'.3	15'.1	35'.8	11'.6	
240° 47'.3	42'.5	75° 21'.4	15'.2	24'.2	11'.6	
255° 47'.5	41'.5	89° 55'.6	15'.2	12'.6	11'.7	
270° 47'.7	40'.6	104° 29'.8	15'.2	00'.9	11'.6	
285° 48'.0	39'.6	119° 04'.0	15'.3	4° 49'.3 S	11'.7	54'.7
300° 48'.2	38'.7	133° 38'.3	15'.3	37'.6	11'.7	
315° 48'.4	37'.7	148° 12'.6	15'.3	25'.9	11'.6	
330° 48'.6	36'.8	162° 46'.9	15'.3	14'.3	11'.7	
345° 48'.8	35'.8	177° 21'.2	15'.4	02'.6	11'.7	
0° 49'.1	4° 34'.9 N	191° 55'.6	15'.4	3° 50'.9 S	11'.8	54'.7
15° 49'.3	33'.9	206° 30'.0	15'.4	39'.1	11'.7	
30° 49'.5	33'.0	221° 04'.4	15'.4	27'.4	11'.7	54'.6
45° 49'.7	32'.0	235° 38'.8	15'.5	15'.7	11'.8	
60° 49'.9	31'.1	250° 13'.3	15'.5	03'.9	11'.7	
75° 50'.2	30'.1	264° 47'.8	15'.5	2° 52'.2 S	11'.8	
90° 50'.4	29'.2	279° 22'.3	15'.5	40'.4	11'.7	
105° 50'.6	28'.2	293° 56'.8	15'.6	28'.7	11'.8	
120° 50'.8	27'.3	308° 31'.4	15'.6	16'.9	11'.7	
135° 51'.0	26'.3	323° 06'.0	15'.6	05'.2	11'.8	
150° 51'.3	25'.4	337° 40'.6	15'.6	1° 53'.4 S	11'.8	54'.5
165° 51'.5	24'.4	352° 15'.2	15'.6	41'.6	11'.7	
180° 51'.7	4° 23'.5 N	6° 49'.8	15'.7	1° 29'.9 S	11'.8	54'.5
195° 51'.9	22'.5	21° 24'.5	15'.6	18'.1	11'.8	
210° 52'.2	21'.6	35° 59'.1	15'.7	06'.3	11'.7	
225° 52'.4	20'.6	50° 33'.8	15'.7	0° 54'.6 S	11'.8	
240° 52'.6	19'.7	65° 08'.5	15'.7	42'.8	11'.8	
255° 52'.8	18'.7	79° 43'.2	15'.7	31'.0	11'.7	
270° 53'.0	17'.7	94° 17'.9	15'.8	19'.3	11'.8	54'.4
285° 53'.3	16'.8	108° 52'.7	15'.7	07'.5	11'.7	
300° 53'.5	15'.8	123° 27'.4	15'.7	0° 04'.2 N	11'.8	
315° 53'.7	14'.9	138° 02'.1	15'.8	16'.0	11'.7	
330° 53'.9	13'.9	152° 36'.9	15'.8	27'.7	11'.8	
345° 54'.1	13'.0	167° 11'.7	15'.8	39'.5	11'.7	
0° 54'.4	4° 12'.0 N	181° 46'.5	15'.8	0° 51'.2 N	11'.7	54'.4
15° 54'.6	11'.1	196° 21'.3	15'.8	1° 02'.9 N	11'.7	
30° 54'.8	10'.1	210° 56'.1	15'.8	14'.6	11'.7	
45° 55'.0	09'.2	225° 30'.9	15'.8	26'.3	11'.7	54'.3
60° 55'.3	08'.2	240° 05'.7	15'.8	38'.0	11'.7	
75° 55'.5	07'.3	254° 40'.5	15'.8	49'.7	11'.6	
90° 55'.7	06'.3	269° 15'.3	15'.8	2° 01'.3 N	11'.7	
105° 55'.9	05'.4	283° 50'.1	15'.9	13'.0	11'.6	
120° 56'.1	04'.4	298° 25'.0	15'.8	24'.6	11'.6	
135° 56'.4	03'.5	312° 59'.8	15'.8	36'.2	11'.6	
150° 56'.6	02'.5	327° 34'.6	15'.8	47'.8	11'.6	
165° 56'.8	01'.5	342° 09'.4	15'.9	59'.4	11'.6	
SD 15'.9	d 0'.9	SD	15'.0	14'.9	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 10	Moonrise 11	Moonrise 12
N 72°	01:23	03:31	04:47	18:16	17:57	17:39
N 70°	02:09	03:48	04:55	18:05	17:53	17:42
68°	02:38	04:01	05:01	17:57	17:50	17:44
66°	03:00	04:12	05:06	17:49	17:48	17:46
64°	03:16	04:21	05:10	17:43	17:45	17:47
62°	03:30	04:28	05:14	17:38	17:43	17:48
60°	03:41	04:34	05:17	17:33	17:42	17:50
N 58°	03:50	04:40	05:20	17:29	17:40	17:51
56°	03:58	04:45	05:23	17:26	17:39	17:52
54°	04:05	04:49	05:25	17:22	17:38	17:52
52°	04:11	04:53	05:27	17:19	17:37	17:53
50°	04:17	04:56	05:29	17:17	17:36	17:54
45°	04:28	05:04	05:33	17:11	17:33	17:55
N 40°	04:37	05:09	05:37	17:06	17:32	17:57
35°	04:44	05:14	05:40	17:01	17:30	17:58
30°	04:50	05:18	05:42	16:57	17:28	17:59
20°	04:58	05:24	05:46	16:51	17:26	18:00
N 10°	05:05	05:29	05:50	16:45	17:24	18:02
0°	05:09	05:33	05:53	16:39	17:22	18:03
S 10°	05:11	05:36	05:57	16:34	17:20	18:05
20°	05:13	05:38	06:00	16:28	17:18	18:07
30°	05:12	05:40	06:04	16:21	17:15	18:08
35°	05:11	05:41	06:06	16:17	17:14	18:09
40°	05:10	05:41	06:08	16:13	17:12	18:11
45°	05:08	05:42	06:11	16:08	17:10	18:12
S 50°	05:04	05:42	06:14	16:01	17:08	18:14
52°	05:03	05:42	06:15	15:58	17:07	18:15
54°	05:01	05:42	06:17	15:55	17:06	18:15
56°	04:59	05:42	06:19	15:52	17:05	18:16
58°	04:56	05:41	06:21	15:48	17:03	18:17
S 60°	04:53	05:41	06:23	15:44	17:02	18:19
S 62°	04:49	05:41	06:25	15:39	17:00	18:20

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 10	Moonset 11	Moonset 12
N 72°	19:04	20:18	22:20	01:55	03:49	05:36
N 70°	18:56	20:02	21:38	02:12	03:57	05:37
68°	18:50	19:49	21:11	02:26	04:04	05:37
66°	18:46	19:39	20:50	02:38	04:09	05:38
64°	18:41	19:31	20:34	02:47	04:14	05:38
62°	18:38	19:24	20:21	02:55	04:18	05:38
60°	18:35	19:17	20:11	03:02	04:21	05:39
N 58°	18:32	19:12	20:01	03:08	04:24	05:39
56°	18:29	19:07	19:54	03:13	04:27	05:39
54°	18:27	19:03	19:47	03:18	04:29	05:39
52°	18:25	18:59	19:41	03:22	04:32	05:40
50°	18:23	18:56	19:35	03:26	04:34	05:40
45°	18:19	18:49	19:24	03:34	04:38	05:40
N 40°	18:16	18:43	19:16	03:41	04:41	05:40
35°	18:13	18:39	19:09	03:47	04:45	05:41
30°	18:11	18:35	19:03	03:52	04:47	05:41
20°	18:07	18:29	18:55	04:01	04:52	05:41
N 10°	18:03	18:24	18:49	04:09	04:56	05:42
0°	18:00	18:21	18:45	04:17	05:00	05:42
S 10°	17:57	18:18	18:42	04:24	05:04	05:42
20°	17:54	18:16	18:41	04:31	05:08	05:42
30°	17:50	18:14	18:42	04:40	05:12	05:43
35°	17:48	18:13	18:43	04:45	05:15	05:43
40°	17:46	18:13	18:44	04:51	05:18	05:43
45°	17:43	18:13	18:47	04:57	05:21	05:43
S 50°	17:40	18:13	18:50	05:05	05:25	05:44
52°	17:39	18:13	18:52	05:09	05:27	05:44
54°	17:38	18:13	18:54	05:12	05:29	05:44
56°	17:36	18:13	18:56	05:17	05:31	05:44
58°	17:34	18:13	18:59	05:22	05:33	05:44
S 60°	17:32	18:14	19:02	05:27	05:36	05:44
S 62°	17:30	18:14	19:06	05:33	05:39	05:44

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
10	2 44	2 55	11:57	22:50	10:28	12d 96%
11	3 05	3 16	11:57	23:32	11:11	13d 99%
12	3 26	3 37	11:56	24:13	11:53	14d Full

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2011 September 13, 14, 15 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
13 Tuesday 00	351° 38'.6	173° 31'.0	2° 16'.2 N	233° 12'.5	21° 44'.8 N	313° 32'.7	13° 28'.6 N	155° 33'.9	4° 23'.4 S
01	6° 41'.1	188° 30'.7	14'.9	248° 13'.4	44'.5	328° 35'.2	28'.5	170° 36'.1	23'.5
02	21° 43'.5	203° 30'.3	13'.7	263° 14'.2	44'.3	343° 37'.8	28'.5	185° 38'.3	23'.6
03	36° 46'.0	218° 29'.9	12'.4	278° 15'.0	44'.0	358° 40'.4	28'.5	200° 40'.5	23'.7
04	51° 48'.5	233° 29'.5	11'.1	293° 15'.8	43'.7	13° 43'.0	28'.4	215° 42'.7	23'.8
05	66° 50'.9	248° 29'.2	09'.9	308° 16'.6	43'.5	28° 45'.5	28'.4	230° 44'.9	23'.9
06	81° 53'.4	263° 28'.8	08'.6	323° 17'.4	43'.2	43° 48'.1	28'.3	245° 47'.1	24'.0
07	96° 55'.9	278° 28'.4	07'.3	338° 18'.3	43'.0	58° 50'.7	28'.3	260° 49'.3	24'.2
08	111° 58'.3	293° 28'.0	06'.1	353° 19'.1	42'.7	73° 53'.3	28'.2	275° 51'.5	24'.3
09	127° 00'.8	308° 27'.7	04'.8	8° 19'.9	42'.4	88° 55'.8	28'.2	290° 53'.7	24'.4
10	142° 03'.2	323° 27'.3	03'.5	23° 20'.7	42'.2	103° 58'.4	28'.2	305° 55'.9	24'.5
11	157° 05'.7	338° 26'.9	02'.3	38° 21'.5	41'.9	119° 01'.0	28'.1	320° 58'.1	24'.6
12	172° 08'.2	353° 26'.6	2° 01'.0 N	53° 22'.3	21° 41'.6 N	134° 03'.6	13° 28'.1 N	336° 00'.3	4° 24'.7 S
13	187° 10'.6	8° 26'.2	1° 59'.8 N	68° 23'.2	41'.4	149° 06'.1	28'.0	351° 02'.5	24'.8
14	202° 13'.1	23° 25'.8	58'.5	83° 24'.0	41'.1	164° 08'.7	28'.0	6° 04'.7	24'.9
15	217° 15'.6	38° 25'.4	57'.2	98° 24'.8	40'.9	179° 11'.3	27'.9	21° 06'.9	25'.1
16	232° 18'.0	53° 25'.1	56'.0	113° 25'.6	40'.6	194° 13'.9	27'.9	36° 09'.1	25'.2
17	247° 20'.5	68° 24'.7	54'.7	128° 26'.4	40'.3	209° 16'.4	27'.8	51° 11'.3	25'.3
18	262° 23'.0	83° 24'.3	53'.4	143° 27'.3	40'.1	224° 19'.0	27'.8	66° 13'.5	25'.4
19	277° 25'.4	98° 24'.0	52'.2	158° 28'.1	39'.8	239° 21'.6	27'.8	81° 15'.7	25'.5
20	292° 27'.9	113° 23'.6	50'.9	173° 28'.9	39'.5	254° 24'.2	27'.7	96° 17'.9	25'.6
21	307° 30'.3	128° 23'.2	49'.6	188° 29'.7	39'.3	269° 26'.8	27'.7	111° 20'.1	25'.7
22	322° 32'.8	143° 22'.8	48'.4	203° 30'.6	39'.0	284° 29'.3	27'.6	126° 22'.3	25'.8
23	337° 35'.3	158° 22'.5	47'.1	218° 31'.4	38'.7	299° 31'.9	27'.6	141° 24'.5	25'.9
14 Wednesday 00	352° 37'.7	173° 22'.1	1° 45'.8 N	233° 32'.2	21° 38'.5 N	314° 34'.5	13° 27'.5 N	156° 26'.7	4° 26'.1 S
01	7° 40'.2	188° 21'.7	44'.6	248° 33'.0	38'.2	329° 37'.1	27'.5	171° 28'.9	26'.2
02	22° 42'.7	203° 21'.4	43'.3	263° 33'.8	37'.9	344° 39'.6	27'.4	186° 31'.1	26'.3
03	37° 45'.1	218° 21'.0	42'.0	278° 34'.7	37'.7	359° 42'.2	27'.4	201° 33'.3	26'.4
04	52° 47'.6	233° 20'.6	40'.8	293° 35'.5	37'.4	14° 44'.8	27'.4	216° 35'.5	26'.5
05	67° 50'.1	248° 20'.2	39'.5	308° 36'.3	37'.1	29° 47'.4	27'.3	231° 37'.7	26'.6
06	82° 52'.5	263° 19'.9	38'.2	323° 37'.1	36'.9	44° 50'.0	27'.3	246° 39'.9	26'.7
07	97° 55'.0	278° 19'.5	36'.9	338° 38'.0	36'.6	59° 52'.6	27'.2	261° 42'.1	26'.8
08	112° 57'.5	293° 19'.1	35'.7	353° 38'.8	36'.3	74° 55'.1	27'.2	276° 44'.3	27'.0
09	127° 59'.9	308° 18'.8	34'.4	8° 39'.6	36'.1	89° 57'.7	27'.1	291° 46'.5	27'.1
10	143° 02'.4	323° 18'.4	33'.1	23° 40'.4	35'.8	105° 00'.3	27'.1	306° 48'.7	27'.2
11	158° 04'.8	338° 18'.0	31'.9	38° 41'.3	35'.5	120° 02'.9	27'.0	321° 50'.9	27'.3
12	173° 07'.3	353° 17'.7	1° 30'.6 N	53° 42'.1	21° 35'.3 N	135° 05'.5	13° 27'.0 N	336° 53'.1	4° 27'.4 S
13	188° 09'.8	8° 17'.3	29'.3	68° 42'.9	35'.0	150° 08'.1	26'.9	351° 55'.3	27'.5
14	203° 12'.2	23° 16'.9	28'.1	83° 43'.7	34'.7	165° 10'.6	26'.9	6° 57'.5	27'.6
15	218° 14'.7	38° 16'.5	26'.8	98° 44'.6	34'.5	180° 13'.2	26'.8	21° 59'.7	27'.7
16	233° 17'.2	53° 16'.2	25'.5	113° 45'.4	34'.2	195° 15'.8	26'.8	37° 01'.9	27'.9
17	248° 19'.6	68° 15'.8	24'.3	128° 46'.2	33'.9	210° 18'.4	26'.8	52° 04'.1	28'.0
18	263° 22'.1	83° 15'.4	23'.0	143° 47'.0	33'.7	225° 21'.0	26'.7	67° 06'.3	28'.1
19	278° 24'.6	98° 15'.1	21'.7	158° 47'.9	33'.4	240° 23'.6	26'.7	82° 08'.5	28'.2
20	293° 27'.0	113° 14'.7	20'.5	173° 48'.7	33'.1	255° 26'.1	26'.6	97° 10'.7	28'.3
21	308° 29'.5	128° 14'.3	19'.2	188° 49'.5	32'.9	270° 28'.7	26'.6	112° 12'.9	28'.4
22	323° 31'.9	143° 14'.0	17'.9	203° 50'.3	32'.6	285° 31'.3	26'.5	127° 15'.1	28'.5
23	338° 34'.4	158° 13'.6	16'.6	218° 51'.2	32'.3	300° 33'.9	26'.5	142° 17'.3	28'.6
15 Thursday 00	353° 36'.9	173° 13'.2	1° 15'.4 N	233° 52'.0	21° 32'.0 N	315° 36'.5	13° 26'.4 N	157° 19'.6	4° 28'.8 S
01	8° 39'.3	188° 12'.8	14'.1	248° 52'.8	31'.8	330° 39'.1	26'.4	172° 21'.7	28'.9
02	23° 41'.8	203° 12'.5	12'.8	263° 53'.7	31'.5	345° 41'.7	26'.3	187° 23'.9	29'.0
03	38° 44'.3	218° 12'.1	11'.6	278° 54'.5	31'.2	0° 44'.3	26'.3	202° 26'.1	29'.1
04	53° 46'.7	233° 11'.7	10'.3	293° 55'.3	31'.0	15° 46'.8	26'.2	217° 28'.3	29'.2
05	68° 49'.2	248° 11'.4	09'.0	308° 56'.1	30'.7	30° 49'.4	26'.2	232° 30'.5	29'.3
06	83° 51'.7	263° 11'.0	07'.8	323° 57'.0	30'.4	45° 52'.0	26'.1	247° 32'.7	29'.4
07	98° 54'.1	278° 10'.6	06'.5	338° 57'.8	30'.1	60° 54'.6	26'.1	262° 34'.9	29'.5
08	113° 56'.6	293° 10'.3	05'.2	353° 58'.6	29'.9	75° 57'.2	26'.0	277° 37'.1	29'.7
09	128° 59'.1	308° 09'.9	03'.9	8° 59'.5	29'.6	90° 59'.8	26'.0	292° 39'.3	29'.8
10	144° 01'.5	323° 09'.5	02'.7	24° 00'.3	29'.3	106° 02'.4	25'.9	307° 41'.5	29'.9
11	159° 04'.0	338° 09'.2	01'.4	39° 01'.1	29'.1	121° 05'.0	25'.9	322° 43'.7	30'.0
12	174° 06'.4	353° 08'.8	1° 00'.1 N	54° 02'.0	21° 28'.8 N	136° 07'.6	13° 25'.8 N	337° 45'.9	4° 30'.1 S
13	189° 08'.9	8° 08'.4	0° 58'.9 N	69° 02'.8	28'.5	151° 10'.2	25'.8	352° 48'.1	30'.2
14	204° 11'.4	23° 08'.0	57'.6	84° 03'.6	28'.2	166° 12'.7	25'.7	7° 50'.3	30'.3
15	219° 13'.8	38° 07'.7	56'.3	99° 04'.4	28'.0	181° 15'.3	25'.7	22° 52'.5	30'.4
16	234° 16'.3	53° 07'.3	55'.1	114° 05'.3	27'.7	196° 17'.9	25'.7	37° 54'.7	30'.6
17	249° 18'.8	68° 06'.9	53'.8	129° 06'.1	27'.4	211° 20'.5	25'.6	52° 56'.9	30'.7
18	264° 21'.2	83° 06'.6	52'.5	144° 06'.9	27'.1	226° 23'.1	25'.6	67° 59'.1	30'.8
19	279° 23'.7	98° 06'.2	51'.2	159° 07'.8	26'.9	241° 25'.7	25'.5	83° 01'.3	30'.9
20	294° 26'.2	113° 05'.8	50'.0	174° 08'.6	26'.6	256° 28'.3	25'.5	98° 03'.5	31'.0
21	309° 28'.6	128° 05'.5	48'.7	189° 09'.4	26'.3	271° 30'.9	25'.4	113° 05'.7	31'.1
22	324° 31'.1	143° 05'.1	47'.4	204° 10'.3	26'.0	286° 33'.5	25'.4	128° 07'.9	31'.2
23	339° 33'.6	158° 04'.7	46'.2	219° 11'.1	25'.8	301° 36'.1	25'.3	143° 10'.1	31'.3
	M.P. 00:25	v -0'.4	d 1'.3	v 0'.8	d 0'.3	v 2'.6	d 0'.0	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 19'.0	40° 15'.2 S
Achernar	335° 27'.1	57° 10'.3 S
Acrux	173° 11'.5	63° 10'.0 S
Adhara	255° 13'.6	28° 59'.1 S
Aldebaran	290° 50'.7	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.9 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.6	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.5	29° 09'.5 N
Altair	62° 09'.3	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.9	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 30'.9	69° 03'.1 S
Avior	234° 19'.0	59° 32'.7 S
Bellatrix	278° 33'.3	6° 21'.7 N
Betelgeuse	271° 02'.7	7° 24'.6 N
Canopus	263° 56'.8	52° 41'.9 S
Capella	280° 36'.3	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.2 N
Elnath	278° 14'.2	28° 36'.9 N
Eltanin	90° 46'.6	51° 29'.6 N
Enif	33° 48'.0	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.9 S
Hamal	328° 01'.9	23° 31'.2 N
Kaus Aust.	83° 45'.3	34° 22'.7 S
Kochab	137° 20'.5	74° 06'.7 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.2	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.8	69° 45'.8 S
Mirfak	308° 41'.9	49° 54'.1 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 07'.4	89° 18'.7 N
Pollux	243° 29'.4	27° 59'.8 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 07'.6	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.2	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 53'.2 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.2 N
Shaula	96° 23'.6	37° 06'.8 S
Sirius	258° 34'.9	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.7	43° 28'.7 S
Vega	80° 39'.7	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	180° 44'.4	12:27
Mars	240° 54'.5	08:25
Jupiter	321° 56'.7	03:01
Saturn	163° 49'.0	13:32

SUN

GHA	Dec
180° 57'.0	4° 00'.6 N
195° 57'.2	3° 59'.6 N
210° 57'.5	58'.7
225° 57'.7	57'.7
240° 57'.9	56'.8
255° 58'.1	55'.8
270° 58'.4	54'.9
285° 58'.6	53'.9
300° 58'.8	53'.0
315° 59'.0	52'.0
330° 59'.3	51'.0
345° 59'.5	50'.1
0° 59'.7	3° 49'.1 N
15° 59'.9	48'.2
31° 00'.1	47'.2
46° 00'.4	46'.3
61° 00'.6	45'.3
76° 00'.8	44'.3
91° 01'.0	43'.4
106° 01'.3	42'.4
121° 01'.5	41'.5
136° 01'.7	40'.5
151° 01'.9	39'.6
166° 02'.1	38'.6
181° 02'.4	3° 37'.6 N
196° 02'.6	36'.7
211° 02'.8	35'.7
226° 03'.0	34'.8
241° 03'.3	33'.8
256° 03'.5	32'.9
271° 03'.7	31'.9
286° 03'.9	30'.9
301° 04'.2	30'.0
316° 04'.4	29'.0
331° 04'.6	28'.1
346° 04'.8	27'.1
1° 05'.0	3° 26'.2 N
16° 05'.3	25'.2
31° 05'.5	24'.2
46° 05'.7	23'.3
61° 05'.9	22'.3
76° 06'.2	21'.4
91° 06'.4	20'.4
106° 06'.6	19'.4
121° 06'.8	18'.5
136° 07'.1	17'.5
151° 07'.3	16'.6
166° 07'.5	15'.6
181° 07'.7	3° 14'.6 N
196° 07'.9	13'.7
211° 08'.2	12'.7
226° 08'.4	11'.8
241° 08'.6	10'.8
256° 08'.8	09'.8
271° 09'.1	08'.9
286° 09'.3	07'.9
301° 09'.5	07'.0
316° 09'.7	06'.0
331° 10'.0	05'.0
346° 10'.2	04'.1
1° 10'.4	3° 03'.1 N
16° 10'.6	02'.2
31° 10'.9	01'.2
46° 11'.1	00'.2
61° 11'.3	2° 59'.3 N
76° 11'.5	58'.3
91° 11'.7	57'.3
106° 12'.0	56'.4
121° 12'.2	55'.4
136° 12'.4	54'.5
151° 12'.6	53'.5
166° 12'.9	52'.5
SD 15'.9	d 1'.0

MOON

GHA	v	Dec	d	HP
356° 44'.3	15'.8	3° 11'.0 N	11'.6	54'.3
11° 19'.1	15'.8	22'.6	11'.5	54'.2
25° 53'.9	15'.9	34'.1	11'.5	
40° 28'.8	15'.8	45'.6	11'.6	
55° 03'.6	15'.8	57'.2	11'.4	
69° 38'.4	15'.8	4° 08'.6 N	11'.5	
84° 13'.2	15'.8	20'.1	11'.5	
98° 48'.0	15'.8	31'.6	11'.4	
113° 22'.8	15'.8	43'.0	11'.4	
127° 57'.6	15'.8	54'.4	11'.4	
142° 32'.4	15'.8	5° 05'.8 N	11'.3	
157° 07'.2	15'.8	17'.1	11'.3	
171° 42'.0	15'.7	5° 28'.4 N	11'.4	54'.2
186° 16'.7	15'.8	39'.8	11'.2	
200° 51'.5	15'.7	51'.0	11'.3	54'.1
215° 26'.2	15'.8	6° 02'.3 N	11'.2	
230° 01'.0	15'.7	13'.5	11'.2	
244° 35'.7	15'.7	24'.7	11'.2	
259° 10'.4	15'.7	35'.9	11'.1	
273° 45'.1	15'.7	47'.0	11'.1	
288° 19'.8	15'.6	58'.1	11'.1	
302° 54'.4	15'.7	7° 09'.2 N	11'.1	
317° 29'.1	15'.6	20'.3	11'.0	
332° 03'.7	15'.6	31'.3	11'.0	
346° 38'.3	15'.7	7° 42'.3 N	10'.9	54'.1
1° 13'.0	15'.5	53'.2	10'.9	
15° 47'.5	15'.6	8° 04'.1 N	10'.9	
30° 22'.1	15'.5	15'.0	10'.9	
44° 56'.6	15'.6	25'.9	10'.8	
59° 31'.2	15'.5	36'.7	10'.8	
74° 05'.7	15'.5	47'.5	10'.7	
88° 40'.2	15'.4	58'.2	10'.7	
103° 14'.6	15'.5	9° 08'.9 N	10'.7	54'.0
117° 49'.1	15'.4	19'.6	10'.6	
132° 23'.5	15'.4	30'.2	10'.6	
146° 57'.9	15'.3	40'.8	10'.5	
161° 32'.2	15'.4	9° 51'.3 N	10'.5	54'.0
176° 06'.6	15'.3	10° 01'.8 N	10'.5	
190° 40'.9	15'.3	12'.3	10'.4	
205° 15'.2	15'.3	22'.7	10'.4	
219° 49'.5	15'.2	33'.1	10'.3	
234° 23'.7	15'.2	43'.4	10'.3	
248° 57'.9	15'.2	53'.7	10'.2	
263° 32'.1	15'.2	11° 03'.9 N	10'.2	
278° 06'.3	15'.1	14'.1	10'.2	
292° 40'.4	15'.1	24'.3	10'.1	
307° 14'.5	15'.1	34'.4	10'.0	
321° 48'.6	15'.0	44'.4	10'.1	
336° 22'.6	15'.0	11° 54'.5 N	9'.9	54'.0
350° 56'.6	15'.0	12° 04'.4 N	9'.9	
5° 30'.6	14'.9	14'.3	9'.9	
20° 04'.5	14'.9	24'.2	9'.8	
34° 38'.4	14'.9	34'.0	9'.7	
49° 12'.3	14'.8	43'.7	9'.7	
63° 46'.1	14'.8	53'.4	9'.7	
78° 19'.9	14'.8	13° 03'.1 N	9'.6	
92° 53'.7	14'.7	12'.7	9'.5	
107° 27'.4	14'.7	22'.2	9'.5	
122° 01'.1	14'.7	31'.7	9'.4	
136° 34'.8	14'.6	41'.1	9'.4	
151° 08'.4	14'.6	13° 50'.5 N	9'.3	54'.0
165° 42'.0	14'.5	59'.8	9'.3	
180° 15'.5	14'.5	14° 09'.1 N	9'.2	
194° 49'.0	14'.5	18'.3	9'.1	
209° 22'.5	14'.4	27'.4	9'.1	
223° 55'.9	14'.4	36'.5	9'.1	
238° 29'.3	14'.4	45'.6	8'.9	
253° 02'.7	14'.3	54'.5	8'.9	
267° 36'.0	14'.2	15° 03'.4 N	8'.8	
282° 09'.2	14'.3	12'.2	8'.8	
296° 42'.5	14'.1	21'.0	8'.7	
311° 15'.6	14'.2	29'.7	8'.7	
SD 14'.8		14'.7	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 13	Moonrise 14	Moonrise 15
N 72°	01:55	03:48	05:01	17:22	17:01	16:34
N 70°	02:30	04:02	05:07	17:31	17:18	17:03
68°	02:55	04:13	05:11	17:38	17:32	17:25
66°	03:13	04:22	05:15	17:44	17:43	17:42
64°	03:27	04:30	05:19	17:49	17:52	17:56
62°	03:39	04:36	05:22	17:54	18:00	18:08
60°	03:49	04:42	05:24	17:58	18:07	18:18
N 58°	03:58	04:47	05:27	18:01	18:13	18:27
56°	04:05	04:51	05:29	18:05	18:19	18:35
54°	04:11	04:55	05:31	18:07	18:24	18:42
52°	04:17	04:58	05:32	18:10	18:28	18:49
50°	04:22	05:01	05:34	18:12	18:32	18:54
45°	04:32	05:07	05:37	18:18	18:41	19:07
N 40°	04:40	05:12	05:40	18:22	18:48	19:17
35°	04:46	05:16	05:42	18:26	18:55	19:26
30°	04:52	05:20	05:44	18:29	19:00	19:34
20°	04:59	05:25	05:47	18:35	19:10	19:47
N 10°	05:04	05:29	05:50	18:40	19:19	19:59
0°	05:08	05:32	05:52	18:45	19:27	20:10
S 10°	05:09	05:34	05:55	18:50	19:35	20:22
20°	05:10	05:35	05:57	18:55	19:44	20:34
30°	05:09	05:36	06:00	19:01	19:54	20:47
35°	05:07	05:36	06:02	19:05	20:00	20:56
40°	05:05	05:36	06:03	19:09	20:07	21:05
45°	05:02	05:36	06:05	19:13	20:15	21:16
S 50°	04:58	05:35	06:07	19:19	20:24	21:29
52°	04:56	05:35	06:08	19:22	20:28	21:35
54°	04:53	05:34	06:10	19:24	20:33	21:42
56°	04:51	05:34	06:11	19:28	20:39	21:49
58°	04:47	05:33	06:12	19:31	20:45	21:58
S 60°	04:44	05:32	06:14	19:35	20:51	22:08
S 62°	04:39	05:31	06:15	19:40	20:59	22:19

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 13	Moonset 14	Moonset 15
N 72°	18:48	20:00	21:48	07:21	09:10	11:07
N 70°	18:42	19:46	21:16	07:15	08:54	10:39
68°	18:38	19:36	20:53	07:10	08:43	10:18
66°	18:34	19:27	20:35	07:05	08:33	10:02
64°	18:31	19:19	20:21	07:01	08:25	09:49
62°	18:28	19:13	20:10	06:58	08:18	09:37
60°	18:25	19:08	20:00	06:55	08:12	09:28
N 58°	18:23	19:03	19:52	06:53	08:06	09:20
56°	18:21	18:59	19:45	06:51	08:02	09:13
54°	18:20	18:55	19:38	06:49	07:58	09:06
52°	18:18	18:52	19:33	06:47	07:54	09:00
50°	18:17	18:49	19:28	06:45	07:50	08:55
45°	18:14	18:43	19:18	06:42	07:43	08:44
N 40°	18:11	18:38	19:10	06:39	07:37	08:35
35°	18:09	18:34	19:04	06:36	07:31	08:27
30°	18:07	18:31	18:59	06:34	07:27	08:20
20°	18:04	18:26	18:52	06:30	07:19	08:08
N 10°	18:01	18:22	18:47	06:27	07:12	07:57
0°	17:59	18:20	18:44	06:23	07:05	07:48
S 10°	17:57	18:18	18:42	06:20	06:59	07:38
20°	17:54	18:16	18:42	06:17	06:52	07:28
30°	17:52	18:16	18:43	06:13	06:44	07:16
35°	17:50	18:16	18:45	06:11	06:39	07:09
40°	17:49	18:16	18:47	06:08	06:34	07:01
45°	17:47	18:16	18:50	06:05	06:28	06:52
S 50°	17:45	18:17	18:55	06:02	06:21	06:42
52°	17:44	18:17	18:57	06:00	06:18	06:37
54°	17:43	18:18	18:59	05:59	06:14	06:31
56°	17:42	18:19	19:02	05:57	06:10	06:25
58°	17:40	18:20	19:05	05:55	06:06	06:18
S 60°	17:39	18:20	19:09	05:52	06:01	06:11
S 62°	17:37	18:22	19:14	05:50	05:55	06:02

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
13	3 48	3 58	11:56	00:13	12:34	15d 99%
14	4 09	4 20	11:56	00:55	13:16	16d 96%
15	4 30	4 41	11:55	01:37	13:59	17d 91%

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2011 September 16, 17, 18 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.4		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
16 00	354° 36'.0	173° 04'.4	0° 44'.9 N	234° 11'.9	21° 25'.5 N	316° 38'.7	13° 25'.3 N	158° 12'.3	4° 31'.5 S
01	9° 38'.5	188° 04'.0	43'.6	249° 12'.8	25'.2	331° 41'.3	25'.2	173° 14'.5	31'.6
02	24° 40'.9	203° 03'.6	42'.3	264° 13'.6	24'.9	346° 43'.9	25'.2	188° 16'.7	31'.7
03	39° 43'.4	218° 03'.3	41'.1	279° 14'.4	24'.7	1° 46'.5	25'.1	203° 18'.9	31'.8
Friday 04	54° 45'.9	233° 02'.9	39'.8	294° 15'.3	24'.4	16° 49'.1	25'.1	218° 21'.1	31'.9
05	69° 48'.3	248° 02'.5	38'.5	309° 16'.1	24'.1	31° 51'.7	25'.0	233° 23'.3	32'.0
06	84° 50'.8	263° 02'.2	37'.2	324° 17'.0	23'.8	46° 54'.3	25'.0	248° 25'.5	32'.1
07	99° 53'.3	278° 01'.8	36'.0	339° 17'.8	23'.5	61° 56'.9	24'.9	263° 27'.7	32'.2
08	114° 55'.7	293° 01'.4	34'.7	354° 18'.6	23'.3	76° 59'.5	24'.9	278° 29'.9	32'.4
09	129° 58'.2	308° 01'.0	33'.4	9° 19'.5	23'.0	92° 02'.0	24'.8	293° 32'.1	32'.5
10	145° 00'.7	323° 00'.7	32'.2	24° 20'.3	22'.7	107° 04'.6	24'.8	308° 34'.3	32'.6
11	160° 03'.1	338° 00'.3	30'.9	39° 21'.1	22'.4	122° 07'.2	24'.7	323° 36'.5	32'.7
12	175° 05'.6	352° 59'.9	0° 29'.6 N	54° 22'.0	21° 22'.2 N	137° 09'.8	13° 24'.6 N	338° 38'.7	4° 32'.8 S
13	190° 08'.0	7° 59'.6	28'.3	69° 22'.8	21'.9	152° 12'.4	24'.6	353° 40'.9	32'.9
14	205° 10'.5	22° 59'.2	27'.1	84° 23'.6	21'.6	167° 15'.0	24'.5	8° 43'.1	33'.0
15	220° 13'.0	37° 58'.8	25'.8	99° 24'.5	21'.3	182° 17'.6	24'.5	23° 45'.3	33'.1
16	235° 15'.4	52° 58'.5	24'.5	114° 25'.3	21'.0	197° 20'.2	24'.4	38° 47'.5	33'.3
17	250° 17'.9	67° 58'.1	23'.2	129° 26'.2	20'.8	212° 22'.8	24'.4	53° 49'.7	33'.4
18	265° 20'.4	82° 57'.7	22'.0	144° 27'.0	20'.5	227° 25'.4	24'.3	68° 51'.9	33'.5
19	280° 22'.8	97° 57'.4	20'.7	159° 27'.8	20'.2	242° 28'.0	24'.3	83° 54'.1	33'.6
20	295° 25'.3	112° 57'.0	19'.4	174° 28'.7	19'.9	257° 30'.6	24'.2	98° 56'.3	33'.7
21	310° 27'.8	127° 56'.6	18'.2	189° 29'.5	19'.6	272° 33'.2	24'.2	113° 58'.5	33'.8
22	325° 30'.2	142° 56'.3	16'.9	204° 30'.4	19'.4	287° 35'.9	24'.1	129° 00'.7	33'.9
23	340° 32'.7	157° 55'.9	15'.6	219° 31'.2	19'.1	302° 38'.5	24'.1	144° 02'.9	34'.1
17 00	355° 35'.2	172° 55'.5	0° 14'.3 N	234° 32'.0	21° 18'.8 N	317° 41'.1	13° 24'.0 N	159° 05'.1	4° 34'.2 S
01	10° 37'.6	187° 55'.2	13'.1	249° 32'.9	18'.5	332° 43'.7	24'.0	174° 07'.3	34'.3
02	25° 40'.1	202° 54'.8	11'.8	264° 33'.7	18'.2	347° 46'.3	23'.9	189° 09'.5	34'.4
03	40° 42'.5	217° 54'.4	10'.5	279° 34'.6	17'.9	2° 48'.9	23'.9	204° 11'.7	34'.5
Saturday 04	55° 45'.0	232° 54'.1	09'.2	294° 35'.4	17'.7	17° 51'.5	23'.8	219° 13'.9	34'.6
05	70° 47'.5	247° 53'.7	08'.0	309° 36'.2	17'.4	32° 54'.1	23'.8	234° 16'.1	34'.7
06	85° 49'.9	262° 53'.3	06'.7	324° 37'.1	17'.1	47° 56'.7	23'.7	249° 18'.3	34'.8
07	100° 52'.4	277° 52'.9	05'.4	339° 37'.9	16'.8	62° 59'.3	23'.7	264° 20'.5	35'.0
08	115° 54'.9	292° 52'.6	04'.1	354° 38'.8	16'.5	78° 01'.9	23'.6	279° 22'.7	35'.1
09	130° 57'.3	307° 52'.2	02'.9	9° 39'.6	16'.3	93° 04'.5	23'.6	294° 24'.9	35'.2
10	145° 59'.8	322° 51'.8	01'.6	24° 40'.4	16'.0	108° 07'.1	23'.5	309° 27'.1	35'.3
11	161° 02'.3	337° 51'.5	00'.3	39° 41'.3	15'.7	123° 09'.7	23'.4	324° 29'.3	35'.4
12	176° 04'.7	352° 51'.1	0° 00'.9 S	54° 42'.1	21° 15'.4 N	138° 12'.3	13° 23'.4 N	339° 31'.5	4° 35'.5 S
13	191° 07'.2	7° 50'.7	02'.2	69° 43'.0	15'.1	153° 14'.9	23'.3	354° 33'.7	35'.6
14	206° 09'.6	22° 50'.4	03'.5	84° 43'.8	14'.8	168° 17'.5	23'.3	9° 35'.9	35'.7
15	221° 12'.1	37° 50'.0	04'.8	99° 44'.7	14'.6	183° 20'.1	23'.2	24° 38'.0	35'.9
16	236° 14'.6	52° 49'.6	06'.0	114° 45'.5	14'.3	198° 22'.7	23'.2	39° 40'.2	36'.0
17	251° 17'.0	67° 49'.3	07'.3	129° 46'.3	14'.0	213° 25'.4	23'.1	54° 42'.4	36'.1
18	266° 19'.5	82° 48'.9	08'.6	144° 47'.2	13'.7	228° 28'.0	23'.1	69° 44'.6	36'.2
19	281° 22'.0	97° 48'.5	09'.9	159° 48'.0	13'.4	243° 30'.6	23'.0	84° 46'.8	36'.3
20	296° 24'.4	112° 48'.2	11'.1	174° 48'.9	13'.1	258° 33'.2	23'.0	99° 49'.0	36'.4
21	311° 26'.9	127° 47'.8	12'.4	189° 49'.7	12'.8	273° 35'.8	22'.9	114° 51'.2	36'.5
22	326° 29'.4	142° 47'.4	13'.7	204° 50'.6	12'.6	288° 38'.4	22'.9	129° 53'.4	36'.7
23	341° 31'.8	157° 47'.1	15'.0	219° 51'.4	12'.3	303° 41'.0	22'.8	144° 55'.6	36'.8
18 00	356° 34'.3	172° 46'.7	0° 16'.2 S	234° 52'.3	21° 12'.0 N	318° 43'.6	13° 22'.7 N	159° 57'.8	4° 36'.9 S
01	11° 36'.8	187° 46'.3	17'.5	249° 53'.1	11'.7	333° 46'.2	22'.7	175° 00'.0	37'.0
02	26° 39'.2	202° 46'.0	18'.8	264° 54'.0	11'.4	348° 48'.8	22'.6	190° 02'.2	37'.1
03	41° 41'.7	217° 45'.6	20'.1	279° 54'.8	11'.1	3° 51'.4	22'.6	205° 04'.4	37'.2
Sunday 04	56° 44'.1	232° 45'.2	21'.3	294° 55'.7	10'.8	18° 54'.1	22'.5	220° 06'.6	37'.3
05	71° 46'.6	247° 44'.9	22'.6	309° 56'.5	10'.5	33° 56'.7	22'.5	235° 08'.8	37'.4
06	86° 49'.1	262° 44'.5	23'.9	324° 57'.3	10'.3	48° 59'.3	22'.4	250° 11'.0	37'.6
07	101° 51'.5	277° 44'.1	25'.2	339° 58'.2	10'.0	64° 01'.9	22'.4	265° 13'.2	37'.7
08	116° 54'.0	292° 43'.7	26'.4	354° 59'.0	09'.7	79° 04'.5	22'.3	280° 15'.4	37'.8
09	131° 56'.5	307° 43'.4	27'.7	9° 59'.9	09'.4	94° 07'.1	22'.3	295° 17'.6	37'.9
10	146° 58'.9	322° 43'.0	29'.0	25° 00'.7	09'.1	109° 09'.7	22'.2	310° 19'.8	38'.0
11	162° 01'.4	337° 42'.6	30'.3	40° 01'.6	08'.8	124° 12'.4	22'.1	325° 22'.0	38'.1
12	177° 03'.9	352° 42'.3	0° 31'.5 S	55° 02'.4	21° 08'.5 N	139° 15'.0	13° 22'.1 N	340° 24'.2	4° 38'.2 S
13	192° 06'.3	7° 41'.9	32'.8	70° 03'.3	08'.2	154° 17'.6	22'.0	355° 26'.4	38'.4
14	207° 08'.8	22° 41'.5	34'.1	85° 04'.1	08'.0	169° 20'.2	22'.0	10° 28'.6	38'.5
15	222° 11'.3	37° 41'.2	35'.4	100° 05'.0	07'.7	184° 22'.8	21'.9	25° 30'.8	38'.6
16	237° 13'.7	52° 40'.8	36'.6	115° 05'.8	07'.4	199° 25'.4	21'.9	40° 33'.0	38'.7
17	252° 16'.2	67° 40'.4	37'.9	130° 06'.7	07'.1	214° 28'.0	21'.8	55° 35'.2	38'.8
18	267° 18'.6	82° 40'.1	39'.2	145° 07'.5	06'.8	229° 30'.7	21'.8	70° 37'.3	38'.9
19	282° 21'.1	97° 39'.7	40'.5	160° 08'.4	06'.5	244° 33'.3	21'.7	85° 39'.5	39'.0
20	297° 23'.6	112° 39'.3	41'.7	175° 09'.2	06'.2	259° 35'.9	21'.6	100° 41'.7	39'.2
21	312° 26'.0	127° 39'.0	43'.0	190° 10'.1	05'.9	274° 38'.5	21'.6	115° 43'.9	39'.3
22	327° 28'.5	142° 38'.6	44'.3	205° 10'.9	05'.6	289° 41'.1	21'.5	130° 46'.1	39'.4
23	342° 31'.0	157° 38'.2	45'.6	220° 11'.8	05'.3	304° 43'.7	21'.5	145° 48'.3	39'.5
	M.P. 00:14	v -0'.4	d 1'.3	v 0'.8	d 0'.3	v 2'.6	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.0	40° 15'.2 S
Achernar	335° 27'.1	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.6	28° 59'.1 S
Aldebaran	290° 50'.7	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.8 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.6	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.5 N
Altair	62° 09'.3	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.9	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 30'.9	69° 03'.1 S
Avior	234° 19'.0	59° 32'.7 S
Bellatrix	278° 33'.3	6° 21'.7 N
Betelgeuse	271° 02'.7	7° 24'.6 N
Canopus	263° 56'.8	52° 41'.9 S
Capella	280° 36'.2	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.8	61° 41'.2 N
Elnath	278° 14'.2	28° 36'.9 N
Eltanin	90° 46'.7	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.9 S
Hamal	328° 01'.9	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.6	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.1	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.8	69° 45'.8 S
Mirfak	308° 41'.9	49° 54'.1 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.7	56° 41'.8 S
Polaris	318° 06'.1	89° 18'.7 N
Pollux	243° 29'.4	27° 59'.7 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 07'.6	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.2	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 53'.1 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.2 N
Shaula	96° 23'.6	37° 06'.8 S
Sirius	258° 34'.9	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.7	43° 28'.7 S
Vega	80° 39'.7	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	177° 20'.4	12:29
Mars	238° 56'.9	08:21
Jupiter	322° 05'.9	02:49
Saturn	163° 29'.9	13:22

SUN						
GHA	Dec	GHA	v	Dec	d	HP
181° 13'.1	2° 51'.6 N	325° 48'.8	14'.1	15° 38'.4 N	8'.6	54'.0
196° 13'.3	50'.6	340° 21'.9	14'.0	47'.0	8'.5	
211° 13'.5	49'.6	354° 54'.9	14'.0	55'.5	8'.4	
226° 13'.8	48'.7	9° 27'.9	14'.0	16° 03'.9 N	8'.4	
241° 14'.0	47'.7	24° 00'.9	13'.9	12'.3	8'.3	
256° 14'.2	46'.8	38° 33'.8	13'.9	20'.6	8'.3	54'.1
271° 14'.4	45'.8	53° 06'.7	13'.9	28'.9	8'.2	
286° 14'.7	44'.8	67° 39'.6	13'.7	37'.1	8'.1	
301° 14'.9	43'.9	82° 12'.3	13'.8	45'.2	8'.0	
316° 15'.1	42'.9	96° 45'.1	13'.7	53'.2	8'.0	
331° 15'.3	41'.9	111° 17'.8	13'.6	17° 01'.2 N	7'.9	
346° 15'.6	41'.0	125° 50'.4	13'.6	09'.1	7'.8	
1° 15'.8	2° 40'.0 N	140° 23'.0	13'.6	17° 16'.9 N	7'.7	54'.1
16° 16'.0	39'.1	154° 55'.6	13'.5	24'.6	7'.7	
31° 16'.2	38'.1	169° 28'.1	13'.5	32'.3	7'.6	
46° 16'.4	37'.1	184° 00'.6	13'.4	39'.9	7'.5	
61° 16'.7	36'.2	198° 33'.0	13'.4	47'.4	7'.5	
76° 16'.9	35'.2	213° 05'.4	13'.3	54'.9	7'.4	
91° 17'.1	34'.2	227° 37'.7	13'.3	18° 02'.3 N	7'.3	
106° 17'.3	33'.3	242° 10'.0	13'.2	09'.6	7'.2	
121° 17'.6	32'.3	256° 42'.2	13'.2	16'.8	7'.1	
136° 17'.8	31'.3	271° 14'.4	13'.1	23'.9	7'.1	54'.2
151° 18'.0	30'.4	285° 46'.5	13'.1	31'.0	7'.0	
166° 18'.2	29'.4	300° 18'.6	13'.0	38'.0	6'.9	
181° 18'.5	2° 28'.4 N	314° 50'.6	13'.0	18° 44'.9 N	6'.8	54'.2
196° 18'.7	27'.5	329° 22'.6	12'.9	51'.7	6'.8	
211° 18'.9	26'.5	343° 54'.5	12'.9	58'.5	6'.6	
226° 19'.1	25'.6	358° 26'.4	12'.8	19° 05'.1 N	6'.6	
241° 19'.4	24'.6	12° 58'.2	12'.8	11'.7	6'.5	
256° 19'.6	23'.6	27° 30'.0	12'.8	18'.2	6'.4	
271° 19'.8	22'.7	42° 01'.8	12'.6	24'.6	6'.4	
286° 20'.0	21'.7	56° 33'.4	12'.7	31'.0	6'.2	54'.3
301° 20'.3	20'.7	71° 05'.1	12'.6	37'.2	6'.2	
316° 20'.5	19'.8	85° 36'.7	12'.5	43'.4	6'.0	
331° 20'.7	18'.8	100° 08'.2	12'.5	49'.4	6'.0	
346° 20'.9	17'.8	114° 39'.7	12'.4	55'.4	5'.9	
1° 21'.1	2° 16'.9 N	129° 11'.1	12'.4	20° 01'.3 N	5'.8	54'.3
16° 21'.4	15'.9	143° 42'.5	12'.4	07'.1	5'.7	
31° 21'.6	14'.9	158° 13'.9	12'.2	12'.8	5'.7	
46° 21'.8	14'.0	172° 45'.1	12'.3	18'.5	5'.5	
61° 22'.0	13'.0	187° 16'.4	12'.2	24'.0	5'.4	54'.4
76° 22'.3	12'.0	201° 47'.6	12'.1	29'.4	5'.4	
91° 22'.5	11'.1	216° 18'.7	12'.1	34'.8	5'.3	
106° 22'.7	10'.1	230° 49'.8	12'.0	40'.1	5'.1	
121° 22'.9	09'.1	245° 20'.8	12'.0	45'.2	5'.1	
136° 23'.2	08'.2	259° 51'.8	12'.0	50'.3	5'.0	
151° 23'.4	07'.2	274° 22'.8	11'.8	55'.3	4'.9	
166° 23'.6	06'.2	288° 53'.6	11'.9	21° 00'.2 N	4'.8	54'.5
181° 23'.8	2° 05'.3 N	303° 24'.5	11'.8	21° 05'.0 N	4'.7	54'.5
196° 24'.1	04'.3	317° 55'.3	11'.7	09'.7	4'.6	
211° 24'.3	03'.3	332° 26'.0	11'.7	14'.3	4'.5	
226° 24'.5	02'.4	346° 56'.7	11'.7	18'.8	4'.4	
241° 24'.7	01'.4	1° 27'.4	11'.6	23'.2	4'.3	
256° 24'.9	00'.4	15° 58'.0	11'.5	27'.5	4'.2	54'.6
271° 25'.2	1° 59'.5 N	30° 28'.5	11'.5	31'.7	4'.1	
286° 25'.4	58'.5	44° 59'.0	11'.5	35'.8	4'.1	
301° 25'.6	57'.5	59° 29'.5	11'.4	39'.9	3'.9	
316° 25'.8	56'.6	73° 59'.9	11'.3	43'.8	3'.8	
331° 26'.1	55'.6	88° 30'.2	11'.3	47'.6	3'.7	
346° 26'.3	54'.6	103° 00'.5	11'.3	51'.3	3'.6	54'.7
1° 26'.5	1° 53'.7 N	117° 30'.8	11'.2	21° 54'.9 N	3'.5	54'.7
16° 26'.7	52'.7	132° 01'.0	11'.2	58'.4	3'.4	
31° 27'.0	51'.7	146° 31'.2	11'.1	22° 01'.8 N	3'.3	
46° 27'.2	50'.8	161° 01'.3	11'.1	05'.1	3'.2	
61° 27'.4	49'.8	175° 31'.4	11'.0	08'.3	3'.1	54'.8
76° 27'.6	48'.8	190° 01'.4	11'.0	11'.4	3'.0	
91° 27'.9	47'.9	204° 31'.4	11'.0	14'.4	2'.9	
106° 28'.1	46'.9	219° 01'.4	10'.9	17'.3	2'.7	
121° 28'.3	45'.9	233° 31'.3	10'.8	20'.0	2'.7	
136° 28'.5	45'.0	248° 01'.1	10'.8	22'.7	2'.5	54'.9
151° 28'.7	44'.0	262° 30'.9	10'.8	25'.2	2'.5	
166° 29'.0	43'.0	277° 00'.7	10'.7	27'.7	2'.3	
SD 15'.9	d 1'.0	SD	14'.7	14'.8	14'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 16	Moonrise 17	Moonrise 18
N 72°	02:21	04:03	05:14	15:32	-	-
N 70°	02:49	04:15	05:19	16:40	-	-
68°	03:09	04:25	05:22	17:17	17:05	-
66°	03:25	04:32	05:25	17:43	17:47	17:58
64°	03:38	04:39	05:27	18:03	18:15	18:37
62°	03:49	04:44	05:30	18:20	18:37	19:04
60°	03:58	04:49	05:31	18:33	18:54	19:25
N 58°	04:05	04:53	05:33	18:45	19:09	19:42
56°	04:12	04:57	05:35	18:56	19:22	19:57
54°	04:17	05:00	05:36	19:05	19:33	20:09
52°	04:22	05:03	05:37	19:13	19:43	20:20
50°	04:27	05:06	05:38	19:20	19:52	20:30
45°	04:36	05:11	05:40	19:36	20:10	20:51
N 40°	04:43	05:15	05:42	19:49	20:26	21:08
35°	04:49	05:19	05:44	20:00	20:39	21:22
30°	04:53	05:21	05:45	20:10	20:50	21:35
20°	05:00	05:26	05:48	20:27	21:09	21:56
N 10°	05:04	05:29	05:50	20:41	21:26	22:14
0°	05:07	05:31	05:51	20:55	21:42	22:31
S 10°	05:08	05:32	05:53	21:09	21:58	22:49
20°	05:07	05:33	05:55	21:24	22:15	23:07
30°	05:05	05:32	05:56	21:41	22:35	23:29
35°	05:03	05:32	05:57	21:51	22:47	23:41
40°	05:00	05:31	05:58	22:03	23:00	23:56
45°	04:56	05:30	05:59	22:16	23:16	24:13
S 50°	04:51	05:29	06:01	22:33	23:35	24:34
52°	04:49	05:28	06:01	22:41	23:45	24:45
54°	04:46	05:27	06:02	22:50	23:55	24:56
56°	04:42	05:26	06:03	22:59	-	00:07
58°	04:39	05:25	06:04	23:11	-	00:21
S 60°	04:34	05:23	06:04	23:24	-	00:37
S 62°	04:29	05:21	06:05	23:39	-	00:56

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 16	Moonset 17	Moonset 18
N 72°	18:32	19:43	21:22	13:41	-	-
N 70°	18:28	19:31	20:56	12:34	-	-
68°	18:25	19:22	20:36	11:58	13:46	-
66°	18:22	19:15	20:21	11:33	13:05	14:35
64°	18:20	19:08	20:08	11:13	12:37	13:56
62°	18:18	19:03	19:58	10:57	12:16	13:29
60°	18:16	18:58	19:50	10:44	11:59	13:08
N 58°	18:15	18:54	19:42	10:33	11:44	12:51
56°	18:13	18:51	19:36	10:23	11:32	12:37
54°	18:12	18:48	19:30	10:14	11:21	12:25
52°	18:11	18:45	19:25	10:07	11:12	12:14
50°	18:10	18:43	19:21	10:00	11:03	12:04
45°	18:08	18:37	19:12	09:45	10:45	11:44
N 40°	18:06	18:33	19:05	09:33	10:31	11:27
35°	18:05	18:30	19:00	09:22	10:18	11:13
30°	18:03	18:27	18:55	09:13	10:07	11:01
20°	18:01	18:23	18:49	08:58	09:49	10:40
N 10°	17:59	18:20	18:45	08:44	09:33	10:22
0°	17:58	18:19	18:43	08:32	09:18	10:06
S 10°	17:56	18:17	18:42	08:19	09:03	09:49
20°	17:55	18:17	18:42	08:06	08:47	09:31
30°	17:53	18:17	18:45	07:50	08:28	09:11
35°	17:52	18:18	18:47	07:42	08:18	08:59
40°	17:52	18:19	18:50	07:32	08:06	08:45
45°	17:50	18:20	18:54	07:20	07:51	08:29
S 50°	17:49	18:21	18:59	07:06	07:34	08:09
52°	17:49	18:22	19:02	06:59	07:26	07:59
54°	17:48	18:23	19:05	06:52	07:17	07:48
56°	17:47	18:25	19:08	06:43	07:06	07:36
58°	17:47	18:26	19:12	06:34	06:55	07:22
S 60°	17:46	18:27	19:17	06:24	06:41	07:06
S 62°	17:45	18:29	19:22	06:11	06:25	06:46

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
16	4 52	5 03	11:55	02:21	14:43	18d 85%
17	5 13	5 24	11:55	03:06	15:30	19d 78%
18	5 35	5 46	11:54	03:54	16:19	20d 70%

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2011 September 19, 20, 21 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
19 Monday 00	357° 33'.4	172° 37'.9	0° 46'.8 S	235° 12'.6	21° 05'.0 N	319° 46'.4	13° 21'.4 N	160° 50'.5	4° 39'.6 S
01	12° 35'.9	187° 37'.5	48'.1	250° 13'.5	04'.8	334° 49'.0	21'.4	175° 52'.7	39'.7
02	27° 38'.4	202° 37'.1	49'.4	265° 14'.3	04'.5	349° 51'.6	21'.3	190° 54'.9	39'.8
03	42° 40'.8	217° 36'.8	50'.7	280° 15'.2	04'.2	4° 54'.2	21'.2	205° 57'.1	39'.9
04	57° 43'.3	232° 36'.4	51'.9	295° 16'.1	03'.9	19° 56'.8	21'.2	220° 59'.3	40'.1
05	72° 45'.8	247° 36'.0	53'.2	310° 16'.9	03'.6	34° 59'.5	21'.1	236° 01'.5	40'.2
06	87° 48'.2	262° 35'.6	54'.5	325° 17'.8	03'.3	50° 02'.1	21'.1	251° 03'.7	40'.3
07	102° 50'.7	277° 35'.3	55'.8	340° 18'.6	03'.0	65° 04'.7	21'.0	266° 05'.9	40'.4
08	117° 53'.1	292° 34'.9	57'.0	355° 19'.5	02'.7	80° 07'.3	21'.0	281° 08'.1	40'.5
09	132° 55'.6	307° 34'.5	58'.3	10° 20'.3	02'.4	95° 09'.9	20'.9	296° 10'.3	40'.6
10	147° 58'.1	322° 34'.2	59'.6	25° 21'.2	02'.1	110° 12'.6	20'.8	311° 12'.5	40'.7
11	163° 00'.5	337° 33'.8	1° 00'.9 S	40° 22'.0	01'.8	125° 15'.2	20'.8	326° 14'.7	40'.9
12	178° 03'.0	352° 33'.4	1° 02'.1 S	55° 22'.9	21° 01'.5 N	140° 17'.8	13° 20'.7 N	341° 16'.9	4° 41'.0 S
13	193° 05'.5	7° 33'.1	03'.4	70° 23'.7	01'.2	155° 20'.4	20'.7	356° 19'.1	41'.1
14	208° 07'.9	22° 32'.7	04'.7	85° 24'.6	00'.9	170° 23'.0	20'.6	11° 21'.2	41'.2
15	223° 10'.4	37° 32'.3	06'.0	100° 25'.5	00'.7	185° 25'.7	20'.5	26° 23'.4	41'.3
16	238° 12'.9	52° 32'.0	07'.2	115° 26'.3	00'.4	200° 28'.3	20'.5	41° 25'.6	41'.4
17	253° 15'.3	67° 31'.6	08'.5	130° 27'.2	00'.1	215° 30'.9	20'.4	56° 27'.8	41'.5
18	268° 17'.8	82° 31'.2	09'.8	145° 28'.0	20° 59'.8 N	230° 33'.5	20'.4	71° 30'.0	41'.7
19	283° 20'.2	97° 30'.9	11'.1	160° 28'.9	59'.5	245° 36'.2	20'.3	86° 32'.2	41'.8
20	298° 22'.7	112° 30'.5	12'.3	175° 29'.7	59'.2	260° 38'.8	20'.3	101° 34'.4	41'.9
21	313° 25'.2	127° 30'.1	13'.6	190° 30'.6	58'.9	275° 41'.4	20'.2	116° 36'.6	42'.0
22	328° 27'.6	142° 29'.7	14'.9	205° 31'.5	58'.6	290° 44'.0	20'.1	131° 38'.8	42'.1
23	343° 30'.1	157° 29'.4	16'.2	220° 32'.3	58'.3	305° 46'.7	20'.1	146° 41'.0	42'.2
20 Tuesday 00	358° 32'.6	172° 29'.0	1° 17'.4 S	235° 33'.2	20° 58'.0 N	320° 49'.3	13° 20'.0 N	161° 43'.2	4° 42'.3 S
01	13° 35'.0	187° 28'.6	18'.7	250° 34'.0	57'.7	335° 51'.9	20'.0	176° 45'.4	42'.4
02	28° 37'.5	202° 28'.3	20'.0	265° 34'.9	57'.4	350° 54'.5	19'.9	191° 47'.6	42'.6
03	43° 40'.0	217° 27'.9	21'.3	280° 35'.7	57'.1	5° 57'.2	19'.8	206° 49'.8	42'.7
04	58° 42'.4	232° 27'.5	22'.5	295° 36'.6	56'.8	20° 59'.8	19'.8	221° 52'.0	42'.8
05	73° 44'.9	247° 27'.2	23'.8	310° 37'.5	56'.5	36° 02'.4	19'.7	236° 54'.2	42'.9
06	88° 47'.4	262° 26'.8	25'.1	325° 38'.3	56'.2	51° 05'.0	19'.7	251° 56'.4	43'.0
07	103° 49'.8	277° 26'.4	26'.4	340° 39'.2	55'.9	66° 07'.7	19'.6	266° 58'.5	43'.1
08	118° 52'.3	292° 26'.1	27'.6	355° 40'.0	55'.6	81° 10'.3	19'.5	282° 00'.7	43'.2
09	133° 54'.7	307° 25'.7	28'.9	10° 40'.9	55'.3	96° 12'.9	19'.5	297° 02'.9	43'.4
10	148° 57'.2	322° 25'.3	30'.2	25° 41'.8	55'.0	111° 15'.6	19'.4	312° 05'.1	43'.5
11	163° 59'.7	337° 24'.9	31'.5	40° 42'.6	54'.7	126° 18'.2	19'.4	327° 07'.3	43'.6
12	179° 02'.1	352° 24'.6	1° 32'.7 S	55° 43'.5	20° 54'.4 N	141° 20'.8	13° 19'.3 N	342° 09'.5	4° 43'.7 S
13	194° 04'.6	7° 24'.2	34'.0	70° 44'.3	54'.1	156° 23'.4	19'.2	357° 11'.7	43'.8
14	209° 07'.1	22° 23'.8	35'.3	85° 45'.2	53'.8	171° 26'.1	19'.2	12° 13'.9	43'.9
15	224° 09'.5	37° 23'.5	36'.6	100° 46'.1	53'.5	186° 28'.7	19'.1	27° 16'.1	44'.0
16	239° 12'.0	52° 23'.1	37'.8	115° 46'.9	53'.2	201° 31'.3	19'.1	42° 18'.3	44'.2
17	254° 14'.5	67° 22'.7	39'.1	130° 47'.8	52'.9	216° 34'.0	19'.0	57° 20'.5	44'.3
18	269° 16'.9	82° 22'.4	40'.4	145° 48'.7	52'.6	231° 36'.6	18'.9	72° 22'.7	44'.4
19	284° 19'.4	97° 22'.0	41'.7	160° 49'.5	52'.3	246° 39'.2	18'.9	87° 24'.9	44'.5
20	299° 21'.9	112° 21'.6	42'.9	175° 50'.4	52'.0	261° 41'.9	18'.8	102° 27'.1	44'.6
21	314° 24'.3	127° 21'.2	44'.2	190° 51'.3	51'.7	276° 44'.5	18'.8	117° 29'.3	44'.7
22	329° 26'.8	142° 20'.9	45'.5	205° 52'.1	51'.4	291° 47'.1	18'.7	132° 31'.4	44'.8
23	344° 29'.2	157° 20'.5	46'.8	220° 53'.0	51'.1	306° 49'.8	18'.6	147° 33'.6	45'.0
21 Wednesday 00	359° 31'.7	172° 20'.1	1° 48'.0 S	235° 53'.8	20° 50'.8 N	321° 52'.4	13° 18'.6 N	162° 35'.8	4° 45'.1 S
01	14° 34'.2	187° 19'.8	49'.3	250° 54'.7	50'.5	336° 55'.0	18'.5	177° 38'.0	45'.2
02	29° 36'.6	202° 19'.4	50'.6	265° 55'.6	50'.2	351° 57'.7	18'.4	192° 40'.2	45'.3
03	44° 39'.1	217° 19'.0	51'.9	280° 56'.4	49'.9	7° 00'.3	18'.4	207° 42'.4	45'.4
04	59° 41'.6	232° 18'.6	53'.1	295° 57'.3	49'.6	22° 02'.9	18'.3	222° 44'.6	45'.5
05	74° 44'.0	247° 18'.3	54'.4	310° 58'.2	49'.3	37° 05'.6	18'.3	237° 46'.8	45'.6
06	89° 46'.5	262° 17'.9	55'.7	325° 59'.0	49'.0	52° 08'.2	18'.2	252° 49'.0	45'.8
07	104° 49'.0	277° 17'.5	57'.0	340° 59'.9	48'.7	67° 10'.8	18'.1	267° 51'.2	45'.9
08	119° 51'.4	292° 17'.2	58'.2	356° 00'.8	48'.4	82° 13'.5	18'.1	282° 53'.4	46'.0
09	134° 53'.9	307° 16'.8	59'.5	11° 01'.6	48'.1	97° 16'.1	18'.0	297° 55'.6	46'.1
10	149° 56'.4	322° 16'.4	2° 00'.8 S	26° 02'.5	47'.8	112° 18'.7	17'.9	312° 57'.8	46'.2
11	164° 58'.8	337° 16'.1	02'.1	41° 03'.4	47'.5	127° 21'.4	17'.9	328° 00'.0	46'.3
12	180° 01'.3	352° 15'.7	2° 03'.3 S	56° 04'.2	20° 47'.2 N	142° 24'.0	13° 17'.8 N	343° 02'.1	4° 46'.4 S
13	195° 03'.7	7° 15'.3	04'.6	71° 05'.1	46'.9	157° 26'.6	17'.8	358° 04'.3	46'.6
14	210° 06'.2	22° 14'.9	05'.9	86° 06'.0	46'.6	172° 29'.3	17'.7	13° 06'.5	46'.7
15	225° 08'.7	37° 14'.6	07'.1	101° 06'.8	46'.3	187° 31'.9	17'.6	28° 08'.7	46'.8
16	240° 11'.1	52° 14'.2	08'.4	116° 07'.7	46'.0	202° 34'.6	17'.6	43° 10'.9	46'.9
17	255° 13'.6	67° 13'.8	09'.7	131° 08'.6	45'.7	217° 37'.2	17'.5	58° 13'.1	47'.0
18	270° 16'.1	82° 13'.5	11'.0	146° 09'.4	45'.4	232° 39'.8	17'.4	73° 15'.3	47'.1
19	285° 18'.5	97° 13'.1	12'.2	161° 10'.3	45'.1	247° 42'.5	17'.4	88° 17'.5	47'.2
20	300° 21'.0	112° 12'.7	13'.5	176° 11'.2	44'.8	262° 45'.1	17'.3	103° 19'.7	47'.4
21	315° 23'.5	127° 12'.3	14'.8	191° 12'.1	44'.5	277° 47'.8	17'.3	118° 21'.9	47'.5
22	330° 25'.9	142° 12'.0	16'.1	206° 12'.9	44'.2	292° 50'.4	17'.2	133° 24'.1	47'.6
23	345° 28'.4	157° 11'.6	17'.3	221° 13'.8	43'.8	307° 53'.0	17'.1	148° 26'.3	47'.7
	M.P. 00:02	v -0'.4	d 1'.3	v 0'.9	d 0'.3	v 2'.6	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 19'.0	40° 15'.2 S
Achernar	335° 27'.1	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.6	28° 59'.1 S
Aldebaran	290° 50'.7	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.8 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.6	1° 11'.6 S
Alphard	217° 57'.6	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.5 N
Altair	62° 09'.3	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.3 S
Antares	112° 27'.9	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.0	69° 03'.1 S
Avior	234° 19'.0	59° 32'.6 S
Bellatrix	278° 33'.3	6° 21'.7 N
Betelgeuse	271° 02'.6	7° 24'.6 N
Canopus	263° 56'.8	52° 41'.9 S
Capella	280° 36'.2	46° 00'.4 N
Deneb	49° 32'.0	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.2 N
Elnath	278° 14'.1	28° 36'.9 N
Eltanin	90° 46'.7	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.9 S
Hamal	328° 01'.9	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.6	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.1	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.7	69° 45'.8 S
Mirfak	308° 41'.9	49° 54'.1 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.8 S
Polaris	318° 04'.8	89° 18'.7 N
Pollux	243° 29'.4	27° 59'.7 N
Procyon	245° 01'.2	5° 11'.7 N
Rasalhague	96° 07'.6	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.2	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 53'.1 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.2 N
Shaula	96° 23'.6	37° 06'.7 S
Sirius	258° 34'.9	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.7	43° 28'.7 S
Vega	80° 39'.7	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	173° 56'.4	12:30
Mars	237° 00'.6	08:17
Jupiter	322° 16'.7	02:36
Saturn	163° 10'.6	13:11

SUN				MOON					
GHA	Dec	GHA	v	Dec	d	HP
181° 29'.2	1° 42'.0 N	291° 30'.4	10'.7	22° 30'.0 N	2'.3	54'.9
196° 29'.4	41'.1	306° 00'.1	10'.7	32'.3	2'.1	
211° 29'.6	40'.1	320° 29'.8	10'.6	34'.4	2'.0	55'.0
226° 29'.9	39'.1	334° 59'.4	10'.5	36'.4	1'.9	
241° 30'.1	38'.2	349° 28'.9	10'.5	38'.3	1'.8	
256° 30'.3	37'.2	3° 58'.4	10'.5	40'.1	1'.7	
271° 30'.5	36'.2	18° 27'.9	10'.5	41'.8	1'.6	
286° 30'.8	35'.3	32° 57'.4	10'.4	43'.4	1'.4	55'.1
301° 31'.0	34'.3	47° 26'.8	10'.3	44'.8	1'.4	
316° 31'.2	33'.3	61° 56'.1	10'.4	46'.2	1'.2	
331° 31'.4	32'.4	76° 25'.5	10'.3	47'.4	1'.1	
346° 31'.6	31'.4	90° 54'.8	10'.2	48'.5	1'.0	55'.2
1° 31'.9	1° 30'.4 N	105° 24'.0	10'.2	22° 49'.5 N	0'.9	55'.2
16° 32'.1	29'.5	119° 53'.2	10'.2	50'.4	0'.8	
31° 32'.3	28'.5	134° 22'.4	10'.2	51'.2	0'.7	
46° 32'.5	27'.5	148° 51'.6	10'.1	51'.9	0'.5	55'.3
61° 32'.8	26'.5	163° 20'.7	10'.0	52'.4	0'.4	
76° 33'.0	25'.6	177° 49'.7	10'.1	52'.8	0'.4	
91° 33'.2	24'.6	192° 18'.8	10'.0	53'.2	0'.1	
106° 33'.4	23'.6	206° 47'.8	10'.0	53'.3	0'.1	55'.4
121° 33'.7	22'.7	221° 16'.8	9'.9	53'.4	0'.0	
136° 33'.9	21'.7	235° 45'.7	9'.9	53'.4	0'.2	
151° 34'.1	20'.7	250° 14'.6	9'.9	53'.2	0'.2	55'.5
166° 34'.3	19'.8	264° 43'.5	9'.9	53'.0	0'.4	
181° 34'.5	1° 18'.8 N	279° 12'.4	9'.8	22° 52'.6 N	0'.5	55'.5
196° 34'.8	17'.8	293° 41'.2	9'.8	52'.1	0'.6	
211° 35'.0	16'.8	308° 10'.0	9'.7	51'.5	0'.8	55'.6
226° 35'.2	15'.9	322° 38'.7	9'.8	50'.7	0'.8	
241° 35'.4	14'.9	337° 07'.5	9'.7	49'.9	1'.0	
256° 35'.7	13'.9	351° 36'.2	9'.7	48'.9	1'.1	55'.7
271° 35'.9	13'.0	6° 04'.9	9'.6	47'.8	1'.3	
286° 36'.1	12'.0	20° 33'.5	9'.7	46'.5	1'.3	
301° 36'.3	11'.0	35° 02'.2	9'.6	45'.2	1'.5	
316° 36'.5	10'.1	49° 30'.8	9'.6	43'.7	1'.5	55'.8
331° 36'.8	09'.1	63° 59'.4	9'.5	42'.2	1'.7	
346° 37'.0	08'.1	78° 27'.9	9'.6	40'.5	1'.9	
1° 37'.2	1° 07'.1 N	92° 56'.5	9'.5	22° 38'.6 N	1'.9	55'.9
16° 37'.4	06'.2	107° 25'.0	9'.5	36'.7	2'.1	
31° 37'.7	05'.2	121° 53'.5	9'.5	34'.6	2'.2	
46° 37'.9	04'.2	136° 22'.0	9'.4	32'.4	2'.3	56'.0
61° 38'.1	03'.3	150° 50'.4	9'.5	30'.1	2'.4	
76° 38'.3	02'.3	165° 18'.9	9'.4	27'.7	2'.6	
91° 38'.5	01'.3	179° 47'.3	9'.4	25'.1	2'.6	56'.1
106° 38'.8	00'.4	194° 15'.7	9'.4	22'.5	2'.8	
121° 39'.0	0° 59'.4 N	208° 44'.1	9'.3	19'.7	3'.0	
136° 39'.2	58'.4	223° 12'.4	9'.4	16'.7	3'.0	56'.2
151° 39'.4	57'.4	237° 40'.8	9'.3	13'.7	3'.2	
166° 39'.7	56'.5	252° 09'.1	9'.3	10'.5	3'.2	
181° 39'.9	0° 55'.5 N	266° 37'.4	9'.3	22° 07'.3 N	3'.5	56'.3
196° 40'.1	54'.5	281° 05'.7	9'.3	03'.8	3'.5	
211° 40'.3	53'.6	295° 34'.0	9'.3	00'.3	3'.6	
226° 40'.5	52'.6	310° 02'.3	9'.3	21° 56'.7 N	3'.8	56'.4
241° 40'.8	51'.6	324° 30'.6	9'.2	52'.9	3'.9	
256° 41'.0	50'.6	338° 58'.8	9'.3	49'.0	4'.0	
271° 41'.2	49'.7	353° 27'.1	9'.2	45'.0	4'.2	56'.5
286° 41'.4	48'.7	7° 55'.3	9'.2	40'.8	4'.2	
301° 41'.7	47'.7	22° 23'.5	9'.2	36'.6	4'.4	
316° 41'.9	46'.8	36° 51'.7	9'.2	32'.2	4'.5	56'.6
331° 42'.1	45'.8	51° 19'.9	9'.2	27'.7	4'.7	
346° 42'.3	44'.8	65° 48'.1	9'.2	23'.0	4'.7	
1° 42'.5	0° 43'.8 N	80° 16'.3	9'.2	21° 18'.3 N	4'.9	56'.7
16° 42'.8	42'.9	94° 44'.5	9'.2	13'.4	5'.0	
31° 43'.0	41'.9	109° 12'.7	9'.1	08'.4	5'.1	
46° 43'.2	40'.9	123° 40'.8	9'.2	03'.3	5'.3	56'.8
61° 43'.4	39'.9	138° 09'.0	9'.2	20° 58'.0 N	5'.3	
76° 43'.6	39'.0	152° 37'.2	9'.1	52'.7	5'.5	56'.9
91° 43'.9	38'.0	167° 05'.3	9'.2	47'.2	5'.6	
106° 44'.1	37'.0	181° 33'.5	9'.1	41'.6	5'.7	
121° 44'.3	36'.1	196° 01'.6	9'.2	35'.9	5'.9	57'.0
136° 44'.5	35'.1	210° 29'.8	9'.1	30'.0	5'.9	
151° 44'.7	34'.1	224° 57'.9	9'.1	24'.1	6'.1	
166° 45'.0	33'.1	239° 26'.0	9'.2	18'.0	6'.2	57'.1
SD 15'.9	d 1'.0	SD	15'.0		15'.2	15'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 19	Moonrise 20	Moonrise 21
N 72°	02:42	04:18	05:28	-	-	-
N 70°	03:06	04:28	05:30	-	-	-
68°	03:23	04:36	05:33	-	-	20:28
66°	03:37	04:42	05:34	18:29	19:38	21:13
64°	03:49	04:48	05:36	19:16	20:19	21:42
62°	03:58	04:53	05:37	19:46	20:47	22:04
60°	04:06	04:57	05:38	20:09	21:08	22:22
N 58°	04:12	05:00	05:39	20:27	21:26	22:37
56°	04:18	05:03	05:40	20:42	21:40	22:50
54°	04:23	05:06	05:41	20:56	21:53	23:01
52°	04:28	05:08	05:42	21:07	22:04	23:11
50°	04:32	05:10	05:43	21:18	22:14	23:19
45°	04:40	05:15	05:44	21:39	22:35	23:38
N 40°	04:46	05:18	05:45	21:57	22:52	23:53
35°	04:51	05:21	05:46	22:11	23:06	24:06
30°	04:55	05:23	05:47	22:24	23:18	24:17
20°	05:01	05:26	05:48	22:46	23:39	24:36
N 10°	05:04	05:28	05:49	23:05	23:57	24:52
0°	05:06	05:30	05:50	23:22	-	00:15
S 10°	05:06	05:30	05:51	23:40	-	00:32
20°	05:04	05:30	05:52	23:59	-	00:50
30°	05:01	05:29	05:53	-	00:21	01:11
35°	04:58	05:28	05:53	-	00:34	01:23
40°	04:55	05:26	05:53	-	00:48	01:37
45°	04:50	05:25	05:54	00:13	01:06	01:54
S 50°	04:44	05:22	05:54	00:34	01:28	02:14
52°	04:41	05:21	05:54	00:45	01:38	02:24
54°	04:38	05:19	05:55	00:56	01:50	02:35
56°	04:34	05:18	05:55	01:09	02:03	02:47
58°	04:30	05:16	05:55	01:25	02:19	03:02
S 60°	04:25	05:14	05:55	01:43	02:38	03:19
S 62°	04:19	05:12	05:56	02:05	03:01	03:39

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 19	Moonset 20	Moonset 21
N 72°	18:17	19:26	20:59	-	-	-
N 70°	18:14	19:16	20:37	-	-	-
68°	18:12	19:09	20:20	-	-	17:28
66°	18:11	19:02	20:07	15:48	16:28	16:43
64°	18:09	18:57	19:56	15:02	15:47	16:13
62°	18:08	18:53	19:47	14:32	15:19	15:50
60°	18:07	18:49	19:39	14:09	14:57	15:32
N 58°	18:06	18:46	19:33	13:51	14:39	15:17
56°	18:05	18:43	19:27	13:35	14:24	15:03
54°	18:05	18:40	19:22	13:22	14:11	14:52
52°	18:04	18:38	19:18	13:10	14:00	14:42
50°	18:03	18:36	19:14	13:00	13:50	14:33
45°	18:02	18:32	19:06	12:39	13:29	14:14
N 40°	18:01	18:28	19:00	12:21	13:12	13:58
35°	18:00	18:26	18:55	12:07	12:57	13:45
30°	18:00	18:24	18:51	11:54	12:45	13:33
20°	17:58	18:20	18:46	11:32	12:23	13:13
N 10°	17:58	18:19	18:43	11:13	12:05	12:56
0°	17:57	18:17	18:41	10:56	11:47	12:40
S 10°	17:56	18:17	18:41	10:38	11:30	12:23
20°	17:55	18:17	18:43	10:19	11:11	12:06
30°	17:55	18:19	18:47	09:58	10:49	11:46
35°	17:55	18:20	18:49	09:45	10:37	11:34
40°	17:54	18:21	18:53	09:30	10:22	11:20
45°	17:54	18:23	18:58	09:13	10:05	11:04
S 50°	17:54	18:26	19:04	08:51	09:43	10:44
52°	17:54	18:27	19:07	08:41	09:33	10:34
54°	17:53	18:29	19:10	08:29	09:21	10:24
56°	17:53	18:30	19:14	08:16	09:08	10:11
58°	17:53	18:32	19:19	08:01	08:52	09:57
S 60°	17:53	18:35	19:24	07:42	08:33	09:41
S 62°	17:53	18:37	19:30	07:19	08:10	09:20

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
19	5 56	6 07	11:54	04:44	17:09	21d 61%
20	6 18	6 28	11:54	05:35	18:01	22d 51%
21	6 39	6 50	11:53	06:27	18:54	23d 41%

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2011 September 22, 23, 24 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
22 Thursday 00	0° 30'.8	172° 11'.2	2° 18'.6 S	236° 14'.7	20° 43'.5 N	322° 55'.7	13° 17'.1 N	163° 28'.5	4° 47'.8 S
01	15° 33'.3	187° 10'.8	19'.9	251° 15'.5	43'.2	337° 58'.3	17'.0	178° 30'.6	47'.9
02	30° 35'.8	202° 10'.5	21'.2	266° 16'.4	42'.9	353° 01'.0	16'.9	193° 32'.8	48'.0
03	45° 38'.2	217° 10'.1	22'.4	281° 17'.3	42'.6	8° 03'.6	16'.9	208° 35'.0	48'.2
04	60° 40'.7	232° 09'.7	23'.7	296° 18'.2	42'.3	23° 06'.2	16'.8	223° 37'.2	48'.3
05	75° 43'.2	247° 09'.4	25'.0	311° 19'.0	42'.0	38° 08'.9	16'.7	238° 39'.4	48'.4
06	90° 45'.6	262° 09'.0	26'.3	326° 19'.9	41'.7	53° 11'.5	16'.7	253° 41'.6	48'.5
07	105° 48'.1	277° 08'.6	27'.5	341° 20'.8	41'.4	68° 14'.2	16'.6	268° 43'.8	48'.6
08	120° 50'.6	292° 08'.2	28'.8	356° 21'.6	41'.1	83° 16'.8	16'.6	283° 46'.0	48'.7
09	135° 53'.0	307° 07'.9	30'.1	11° 22'.5	40'.8	98° 19'.4	16'.5	298° 48'.2	48'.8
10	150° 55'.5	322° 07'.5	31'.3	26° 23'.4	40'.5	113° 22'.1	16'.4	313° 50'.4	49'.0
11	165° 58'.0	337° 07'.1	32'.6	41° 24'.3	40'.2	128° 24'.7	16'.4	328° 52'.6	49'.1
12	181° 00'.4	352° 06'.7	2° 33'.9 S	56° 25'.1	20° 39'.9 N	143° 27'.4	13° 16'.3 N	343° 54'.8	4° 49'.2 S
13	196° 02'.9	7° 06'.4	35'.2	71° 26'.0	39'.5	158° 30'.0	16'.2	358° 56'.9	49'.3
14	211° 05'.3	22° 06'.0	36'.4	86° 26'.9	39'.2	173° 32'.7	16'.2	13° 59'.1	49'.4
15	226° 07'.8	37° 05'.6	37'.7	101° 27'.8	38'.9	188° 35'.3	16'.1	29° 01'.3	49'.5
16	241° 10'.3	52° 05'.2	39'.0	116° 28'.6	38'.6	203° 38'.0	16'.0	44° 03'.5	49'.6
17	256° 12'.7	67° 04'.9	40'.3	131° 29'.5	38'.3	218° 40'.6	16'.0	59° 05'.7	49'.8
18	271° 15'.2	82° 04'.5	41'.5	146° 30'.4	38'.0	233° 43'.2	15'.9	74° 07'.9	49'.9
19	286° 17'.7	97° 04'.1	42'.8	161° 31'.3	37'.7	248° 45'.9	15'.8	89° 10'.1	50'.0
20	301° 20'.1	112° 03'.8	44'.1	176° 32'.1	37'.4	263° 48'.5	15'.8	104° 12'.3	50'.1
21	316° 22'.6	127° 03'.4	45'.3	191° 33'.0	37'.1	278° 51'.2	15'.7	119° 14'.5	50'.2
22	331° 25'.1	142° 03'.0	46'.6	206° 33'.9	36'.8	293° 53'.8	15'.6	134° 16'.7	50'.3
23	346° 27'.5	157° 02'.6	47'.9	221° 34'.8	36'.5	308° 56'.5	15'.6	149° 18'.9	50'.4
23 Friday 00	1° 30'.0	172° 02'.3	2° 49'.2 S	236° 35'.6	20° 36'.1 N	323° 59'.1	13° 15'.5 N	164° 21'.0	4° 50'.6 S
01	16° 32'.5	187° 01'.9	50'.4	251° 36'.5	35'.8	339° 01'.8	15'.4	179° 23'.2	50'.7
02	31° 34'.9	202° 01'.5	51'.7	266° 37'.4	35'.5	354° 04'.4	15'.4	194° 25'.4	50'.8
03	46° 37'.4	217° 01'.1	53'.0	281° 38'.3	35'.2	9° 07'.1	15'.3	209° 27'.6	50'.9
04	61° 39'.8	232° 00'.8	54'.3	296° 39'.2	34'.9	24° 09'.7	15'.2	224° 29'.8	51'.0
05	76° 42'.3	247° 00'.4	55'.5	311° 40'.0	34'.6	39° 12'.4	15'.2	239° 32'.0	51'.1
06	91° 44'.8	262° 00'.0	56'.8	326° 40'.9	34'.3	54° 15'.0	15'.1	254° 34'.2	51'.2
07	106° 47'.2	276° 59'.6	58'.1	341° 41'.8	34'.0	69° 17'.7	15'.0	269° 36'.4	51'.4
08	121° 49'.7	291° 59'.3	59'.3	356° 42'.7	33'.7	84° 20'.3	15'.0	284° 38'.6	51'.5
09	136° 52'.2	306° 58'.9	3° 00'.6 S	11° 43'.5	33'.3	99° 23'.0	14'.9	299° 40'.8	51'.6
10	151° 54'.6	321° 58'.5	01'.9	26° 44'.4	33'.0	114° 25'.6	14'.8	314° 43'.0	51'.7
11	166° 57'.1	336° 58'.1	03'.2	41° 45'.3	32'.7	129° 28'.3	14'.8	329° 45'.1	51'.8
12	181° 59'.6	351° 57'.8	3° 04'.4 S	56° 46'.2	20° 32'.4 N	144° 30'.9	13° 14'.7 N	344° 47'.3	4° 51'.9 S
13	197° 02'.0	6° 57'.4	05'.7	71° 47'.1	32'.1	159° 33'.6	14'.6	359° 49'.5	52'.0
14	212° 04'.5	21° 57'.0	07'.0	86° 48'.0	31'.8	174° 36'.2	14'.6	14° 51'.7	52'.2
15	227° 06'.9	36° 56'.6	08'.2	101° 48'.8	31'.5	189° 38'.9	14'.5	29° 53'.9	52'.3
16	242° 09'.4	51° 56'.3	09'.5	116° 49'.7	31'.2	204° 41'.5	14'.4	44° 56'.1	52'.4
17	257° 11'.9	66° 55'.9	10'.8	131° 50'.6	30'.8	219° 44'.2	14'.4	59° 58'.3	52'.5
18	272° 14'.3	81° 55'.5	12'.1	146° 51'.5	30'.5	234° 46'.8	14'.3	75° 00'.5	52'.6
19	287° 16'.8	96° 55'.1	13'.3	161° 52'.4	30'.2	249° 49'.5	14'.2	90° 02'.7	52'.7
20	302° 19'.3	111° 54'.7	14'.6	176° 53'.2	29'.9	264° 52'.1	14'.2	105° 04'.9	52'.8
21	317° 21'.7	126° 54'.4	15'.9	191° 54'.1	29'.6	279° 54'.8	14'.1	120° 07'.0	53'.0
22	332° 24'.2	141° 54'.0	17'.1	206° 55'.0	29'.3	294° 57'.5	14'.0	135° 09'.2	53'.1
23	347° 26'.7	156° 53'.6	18'.4	221° 55'.9	29'.0	310° 00'.1	14'.0	150° 11'.4	53'.2
24 Saturday 00	2° 29'.1	171° 53'.2	3° 19'.7 S	236° 56'.8	20° 28'.6 N	325° 02'.8	13° 13'.9 N	165° 13'.6	4° 53'.3 S
01	17° 31'.6	186° 52'.9	20'.9	251° 57'.7	28'.3	340° 05'.4	13'.8	180° 15'.8	53'.4
02	32° 34'.1	201° 52'.5	22'.2	266° 58'.5	28'.0	355° 08'.1	13'.8	195° 18'.0	53'.5
03	47° 36'.5	216° 52'.1	23'.5	281° 59'.4	27'.7	10° 10'.7	13'.7	210° 20'.2	53'.7
04	62° 39'.0	231° 51'.7	24'.8	297° 00'.3	27'.4	25° 13'.4	13'.6	225° 22'.4	53'.8
05	77° 41'.4	246° 51'.4	26'.0	312° 01'.2	27'.1	40° 16'.0	13'.6	240° 24'.6	53'.9
06	92° 43'.9	261° 51'.0	27'.3	327° 02'.1	26'.8	55° 18'.7	13'.5	255° 26'.8	54'.0
07	107° 46'.4	276° 50'.6	28'.6	342° 03'.0	26'.4	70° 21'.4	13'.4	270° 28'.9	54'.1
08	122° 48'.8	291° 50'.2	29'.8	357° 03'.9	26'.1	85° 24'.0	13'.3	285° 31'.1	54'.2
09	137° 51'.3	306° 49'.8	31'.1	12° 04'.7	25'.8	100° 26'.7	13'.3	300° 33'.3	54'.3
10	152° 53'.8	321° 49'.5	32'.4	27° 05'.6	25'.5	115° 29'.3	13'.2	315° 35'.5	54'.5
11	167° 56'.2	336° 49'.1	33'.6	42° 06'.5	25'.2	130° 32'.0	13'.1	330° 37'.7	54'.6
12	182° 58'.7	351° 48'.7	3° 34'.9 S	57° 07'.4	20° 24'.9 N	145° 34'.6	13° 13'.1 N	345° 39'.9	4° 54'.7 S
13	198° 01'.2	6° 48'.3	36'.2	72° 08'.3	24'.5	160° 37'.3	13'.0	0° 42'.1	54'.8
14	213° 03'.6	21° 47'.9	37'.4	87° 09'.2	24'.2	175° 40'.0	12'.9	15° 44'.3	54'.9
15	228° 06'.1	36° 47'.6	38'.7	102° 10'.1	23'.9	190° 42'.6	12'.9	30° 46'.5	55'.0
16	243° 08'.6	51° 47'.2	40'.0	117° 10'.9	23'.6	205° 45'.3	12'.8	45° 48'.7	55'.1
17	258° 11'.0	66° 46'.8	41'.3	132° 11'.8	23'.3	220° 47'.9	12'.7	60° 50'.8	55'.3
18	273° 13'.5	81° 46'.4	42'.5	147° 12'.7	22'.9	235° 50'.6	12'.7	75° 53'.0	55'.4
19	288° 15'.9	96° 46'.0	43'.8	162° 13'.6	22'.6	250° 53'.3	12'.6	90° 55'.2	55'.5
20	303° 18'.4	111° 45'.7	45'.1	177° 14'.5	22'.3	265° 55'.9	12'.5	105° 57'.4	55'.6
21	318° 20'.9	126° 45'.3	46'.3	192° 15'.4	22'.0	280° 58'.6	12'.4	120° 59'.6	55'.7
22	333° 23'.3	141° 44'.9	47'.6	207° 16'.3	21'.7	296° 01'.2	12'.4	136° 01'.8	55'.8
23	348° 25'.8	156° 44'.5	48'.9	222° 17'.2	21'.4	311° 03'.9	12'.3	151° 04'.0	55'.9
	M.P. 23:50	v -0'.4	d 1'.3	v 0'.9	d 0'.3	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.9	40° 15'.2 S
Achernar	335° 27'.1	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.6	28° 59'.1 S
Aldebaran	290° 50'.7	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.8 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.6	1° 11'.6 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.5 N
Altair	62° 09'.3	8° 54'.2 N
Ankaa	353° 16'.4	42° 14'.3 S
Antares	112° 27'.9	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.0	69° 03'.1 S
Avior	234° 18'.9	59° 32'.6 S
Bellatrix	278° 33'.3	6° 21'.7 N
Betelgeuse	271° 02'.6	7° 24'.6 N
Canopus	263° 56'.7	52° 41'.8 S
Capella	280° 36'.2	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.1 N
Elnath	278° 14'.1	28° 36'.9 N
Eltanin	90° 46'.7	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 24'.9	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.9 S
Hamal	328° 01'.9	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.7	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.1	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.7	69° 45'.8 S
Mirfak	308° 41'.8	49° 54'.1 N
Nunki	75° 59'.7	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.8 S
Polaris	318° 03'.7	89° 18'.7 N
Pollux	243° 29'.4	27° 59'.7 N
Procyon	245° 01'.1	5° 11'.7 N
Rasalhague	96° 07'.6	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.2	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 53'.1 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.2 N
Shaula	96° 23'.6	37° 06'.7 S
Sirius	258° 34'.9	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.7	43° 28'.7 S
Vega	80° 39'.7	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	170° 32'.3	12:32
Mars	235° 05'.7	08:13
Jupiter	322° 29'.1	02:24
Saturn	162° 51'.1	13:01

SUN						
GHA	Dec	GHA	v	Dec	d	HP
181° 45'.2	0° 32'.2 N	253° 54'.2	9'.1	20° 11'.8 N	6'.4	57'.1
196° 45'.4	31'.2	268° 22'.3	9'.1	05'.4	6'.4	57'.2
211° 45'.6	30'.2	282° 50'.4	9'.2	19° 59'.0 N	6'.6	
226° 45'.9	29'.3	297° 18'.6	9'.1	52'.4	6'.6	
241° 46'.1	28'.3	311° 46'.7	9'.1	45'.8	6'.8	57'.3
256° 46'.3	27'.3	326° 14'.8	9'.2	39'.0	7'.0	
271° 46'.5	26'.3	340° 43'.0	9'.1	32'.0	7'.0	
286° 46'.7	25'.4	355° 11'.1	9'.1	25'.0	7'.1	57'.4
301° 47'.0	24'.4	9° 39'.2	9'.2	17'.9	7'.3	
316° 47'.2	23'.4	24° 07'.4	9'.1	10'.6	7'.4	57'.5
331° 47'.4	22'.4	38° 35'.5	9'.2	03'.2	7'.5	
346° 47'.6	21'.5	53° 03'.7	9'.1	18° 55'.7 N	7'.6	
1° 47'.8	0° 20'.5 N	67° 31'.8	9'.2	18° 48'.1 N	7'.8	57'.6
16° 48'.1	19'.5	82° 00'.0	9'.1	40'.3	7'.8	
31° 48'.3	18'.6	96° 28'.1	9'.2	32'.5	8'.0	57'.7
46° 48'.5	17'.6	110° 56'.3	9'.1	24'.5	8'.0	
61° 48'.7	16'.6	125° 24'.4	9'.2	16'.5	8'.2	
76° 48'.9	15'.6	139° 52'.6	9'.2	08'.3	8'.3	57'.8
91° 49'.2	14'.7	154° 20'.8	9'.1	18° 00'.0 N	8'.5	
106° 49'.4	13'.7	168° 48'.9	9'.2	51'.5	8'.5	57'.9
121° 49'.6	12'.7	183° 17'.1	9'.2	43'.0	8'.6	
136° 49'.8	11'.7	197° 45'.3	9'.2	34'.4	8'.8	
151° 50'.0	10'.8	212° 13'.5	9'.2	25'.6	8'.8	58'.0
166° 50'.3	09'.8	226° 41'.7	9'.2	16'.8	9'.0	
181° 50'.5	0° 08'.8 N	241° 09'.9	9'.2	17° 07'.8 N	9'.1	58'.1
196° 50'.7	07'.9	255° 38'.1	9'.2	16° 58'.7 N	9'.2	
211° 50'.9	06'.9	270° 06'.3	9'.2	49'.5	9'.3	
226° 51'.1	05'.9	284° 34'.5	9'.3	40'.2	9'.4	58'.2
241° 51'.4	04'.9	299° 02'.8	9'.2	30'.8	9'.5	
256° 51'.6	04'.0	313° 31'.0	9'.2	21'.3	9'.6	58'.3
271° 51'.8	03'.0	327° 59'.2	9'.3	11'.7	9'.7	
286° 52'.0	02'.0	342° 27'.5	9'.2	02'.0	9'.8	
301° 52'.2	01'.0	356° 55'.7	9'.3	15° 52'.2 N	10'.0	58'.4
316° 52'.4	00'.1	11° 24'.0	9'.2	42'.2	10'.0	
331° 52'.7	0° 00'.9 S	25° 52'.2	9'.3	32'.2	10'.1	58'.5
346° 52'.9	01'.9	40° 20'.5	9'.3	22'.1	10'.2	
1° 53'.1	0° 02'.9 S	54° 48'.8	9'.2	15° 11'.9 N	10'.4	58'.5
16° 53'.3	03'.8	69° 17'.0	9'.3	01'.5	10'.4	58'.6
31° 53'.5	04'.8	83° 45'.3	9'.3	14° 51'.1 N	10'.5	
46° 53'.8	05'.8	98° 13'.6	9'.3	40'.6	10'.7	58'.7
61° 54'.0	06'.7	112° 41'.9	9'.3	29'.9	10'.7	
76° 54'.2	07'.7	127° 10'.2	9'.3	19'.2	10'.8	
91° 54'.4	08'.7	141° 38'.5	9'.3	08'.4	11'.0	58'.8
106° 54'.6	09'.7	156° 06'.8	9'.4	13° 57'.4 N	11'.0	
121° 54'.9	10'.6	170° 35'.2	9'.3	46'.4	11'.1	58'.9
136° 55'.1	11'.6	185° 03'.5	9'.3	35'.3	11'.2	
151° 55'.3	12'.6	199° 31'.8	9'.3	24'.1	11'.3	
166° 55'.5	13'.6	214° 00'.1	9'.4	12'.8	11'.4	59'.0
181° 55'.7	0° 14'.5 S	228° 28'.5	9'.3	13° 01'.4 N	11'.4	59'.0
196° 55'.9	15'.5	242° 56'.8	9'.4	12° 50'.0 N	11'.6	59'.1
211° 56'.2	16'.5	257° 25'.2	9'.3	38'.4	11'.7	
226° 56'.4	17'.5	271° 53'.5	9'.4	26'.7	11'.7	
241° 56'.6	18'.4	286° 21'.9	9'.3	15'.0	11'.8	59'.2
256° 56'.8	19'.4	300° 50'.2	9'.4	03'.2	11'.9	
271° 57'.0	20'.4	315° 18'.6	9'.4	11° 51'.3 N	12'.0	59'.3
286° 57'.3	21'.3	329° 47'.0	9'.3	39'.3	12'.1	
301° 57'.5	22'.3	344° 15'.3	9'.4	27'.2	12'.2	
316° 57'.7	23'.3	358° 43'.7	9'.4	15'.0	12'.2	59'.4
331° 57'.9	24'.3	13° 12'.1	9'.3	02'.8	12'.3	
346° 58'.1	25'.2	27° 40'.4	9'.4	10° 50'.5 N	12'.4	
1° 58'.3	0° 26'.2 S	42° 08'.8	9'.4	10° 38'.1 N	12'.5	59'.5
16° 58'.6	27'.2	56° 37'.2	9'.3	25'.6	12'.6	
31° 58'.8	28'.2	71° 05'.5	9'.4	13'.0	12'.6	59'.6
46° 59'.0	29'.1	85° 33'.9	9'.4	00'.4	12'.7	
61° 59'.2	30'.1	100° 02'.3	9'.4	9° 47'.7 N	12'.8	
76° 59'.4	31'.1	114° 30'.7	9'.3	34'.9	12'.8	59'.7
91° 59'.6	32'.1	128° 59'.0	9'.4	22'.1	12'.9	
106° 59'.9	33'.0	143° 27'.4	9'.4	09'.2	13'.0	
122° 00'.1	34'.0	157° 55'.8	9'.3	8° 56'.2 N	13'.1	59'.8
137° 00'.3	35'.0	172° 24'.1	9'.4	43'.1	13'.1	
152° 00'.5	36'.0	186° 52'.5	9'.3	30'.0	13'.2	
167° 00'.7	36'.9	201° 20'.8	9'.4	16'.8	13'.3	59'.9
SD 15'.9	d 1'.0	SD 15'.7		16'.0		16'.2

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 22	Moonrise 23	Moonrise 24
N 72°	03:02	04:33	05:41	20:46	23:46	-
N 70°	03:22	04:41	05:42	21:56	-	00:12
68°	03:37	04:47	05:43	22:32	-	00:31
66°	03:49	04:52	05:44	22:58	-	00:46
64°	03:59	04:57	05:45	23:18	-	00:58
62°	04:07	05:01	05:45	23:34	-	01:09
60°	04:14	05:04	05:46	23:47	-	01:18
N 58°	04:20	05:07	05:46	23:58	-	01:25
56°	04:25	05:09	05:46	-	00:08	01:32
54°	04:29	05:11	05:47	-	00:17	01:38
52°	04:33	05:13	05:47	-	00:25	01:44
50°	04:37	05:15	05:47	-	00:32	01:49
45°	04:44	05:18	05:48	-	00:47	01:59
N 40°	04:49	05:21	05:48	-	00:59	02:08
35°	04:54	05:23	05:48	00:06	01:09	02:16
30°	04:57	05:25	05:49	00:17	01:18	02:22
20°	05:01	05:27	05:49	00:36	01:34	02:34
N 10°	05:04	05:28	05:49	00:52	01:47	02:44
0°	05:05	05:29	05:49	01:07	02:00	02:53
S 10°	05:04	05:28	05:49	01:23	02:13	03:02
20°	05:02	05:27	05:49	01:39	02:26	03:12
30°	04:57	05:25	05:49	01:58	02:42	03:23
35°	04:54	05:23	05:49	02:09	02:51	03:30
40°	04:50	05:21	05:48	02:21	03:01	03:37
45°	04:44	05:19	05:48	02:36	03:13	03:45
S 50°	04:37	05:15	05:48	02:54	03:27	03:55
52°	04:34	05:14	05:47	03:02	03:34	04:00
54°	04:30	05:12	05:47	03:11	03:41	04:05
56°	04:26	05:10	05:47	03:22	03:49	04:11
58°	04:21	05:07	05:47	03:34	03:58	04:17
S 60°	04:15	05:05	05:46	03:48	04:09	04:24
S 62°	04:08	05:02	05:46	04:05	04:21	04:33

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 22	Moonset 23	Moonset 24
N 72°	18:01	19:09	20:38	19:03	17:54	17:24
N 70°	18:01	19:02	20:20	17:52	17:27	17:10
68°	18:00	18:56	20:05	17:15	17:06	16:59
66°	17:59	18:50	19:53	16:48	16:49	16:49
64°	17:59	18:46	19:44	16:27	16:36	16:41
62°	17:58	18:43	19:36	16:11	16:24	16:34
60°	17:58	18:40	19:29	15:56	16:14	16:28
N 58°	17:58	18:37	19:24	15:44	16:06	16:23
56°	17:57	18:35	19:19	15:34	15:58	16:18
54°	17:57	18:32	19:14	15:25	15:51	16:14
52°	17:57	18:31	19:10	15:16	15:45	16:10
50°	17:57	18:29	19:07	15:09	15:40	16:06
45°	17:57	18:26	19:00	14:53	15:28	15:59
N 40°	17:56	18:23	18:55	14:40	15:17	15:52
35°	17:56	18:21	18:51	14:29	15:09	15:47
30°	17:56	18:20	18:48	14:19	15:01	15:41
20°	17:56	18:18	18:43	14:02	14:48	15:33
N 10°	17:56	18:17	18:41	13:47	14:36	15:25
0°	17:56	18:16	18:40	13:33	14:25	15:18
S 10°	17:56	18:17	18:41	13:18	14:14	15:10
20°	17:56	18:18	18:44	13:03	14:02	15:02
30°	17:57	18:20	18:48	12:46	13:49	14:53
35°	17:57	18:22	18:52	12:36	13:41	14:48
40°	17:57	18:24	18:56	12:24	13:31	14:42
45°	17:58	18:27	19:01	12:10	13:21	14:35
S 50°	17:58	18:31	19:09	11:53	13:08	14:26
52°	17:59	18:32	19:12	11:45	13:02	14:22
54°	17:59	18:34	19:16	11:36	12:55	14:18
56°	17:59	18:36	19:21	11:26	12:47	14:13
58°	18:00	18:39	19:26	11:14	12:39	14:08
S 60°	18:00	18:42	19:32	11:01	12:29	14:02
S 62°	18:01	18:45	19:39	10:45	12:17	13:55

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
22	7 00	7 11	11:53	07:20	19:46	24d 31%
23	7 21	7 32	11:52	08:13	20:39	25d 21%
24	7 42	7 53	11:52	09:05	21:31	26d 13%

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2011 September 25, 26, 27 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
25 Sunday 00	3° 28'.3	171° 44'.1	3° 50'.1 S	237° 18'.1	20° 21'.0 N	326° 06'.6	13° 12'.2 N	166° 06'.2	4° 56'.1 S
01	18° 30'.7	186° 43'.8	51'.4	252° 18'.9	20'.7	341° 09'.2	12'.2	181° 08'.4	56'.2
02	33° 33'.2	201° 43'.4	52'.7	267° 19'.8	20'.4	356° 11'.9	12'.1	196° 10'.5	56'.3
03	48° 35'.7	216° 43'.0	53'.9	282° 20'.7	20'.1	11° 14'.5	12'.0	211° 12'.7	56'.4
04	63° 38'.1	231° 42'.6	55'.2	297° 21'.6	19'.8	26° 17'.2	11'.9	226° 14'.9	56'.5
05	78° 40'.6	246° 42'.2	56'.5	312° 22'.5	19'.4	41° 19'.9	11'.9	241° 17'.1	56'.6
06	93° 43'.0	261° 41'.9	57'.7	327° 23'.4	19'.1	56° 22'.5	11'.8	256° 19'.3	56'.7
07	108° 45'.5	276° 41'.5	59'.0	342° 24'.3	18'.8	71° 25'.2	11'.7	271° 21'.5	56'.9
08	123° 48'.0	291° 41'.1	4° 00'.3 S	357° 25'.2	18'.5	86° 27'.9	11'.7	286° 23'.7	57'.0
09	138° 50'.4	306° 40'.7	01'.5	12° 26'.1	18'.2	101° 30'.5	11'.6	301° 25'.9	57'.1
10	153° 52'.9	321° 40'.3	02'.8	27° 27'.0	17'.8	116° 33'.2	11'.5	316° 28'.1	57'.2
11	168° 55'.4	336° 40'.0	04'.1	42° 27'.9	17'.5	131° 35'.9	11'.5	331° 30'.2	57'.3
12	183° 57'.8	351° 39'.6	4° 05'.3 S	57° 28'.8	20° 17'.2 N	146° 38'.5	13° 11'.4 N	346° 32'.4	4° 57'.4 S
13	199° 00'.3	6° 39'.2	06'.6	72° 29'.7	16'.9	161° 41'.2	11'.3	1° 34'.6	57'.6
14	214° 02'.8	21° 38'.8	07'.9	87° 30'.5	16'.5	176° 43'.9	11'.2	16° 36'.8	57'.7
15	229° 05'.2	36° 38'.4	09'.1	102° 31'.4	16'.2	191° 46'.5	11'.2	31° 39'.0	57'.8
16	244° 07'.7	51° 38'.0	10'.4	117° 32'.3	15'.9	206° 49'.2	11'.1	46° 41'.2	57'.9
17	259° 10'.2	66° 37'.7	11'.7	132° 33'.2	15'.6	221° 51'.9	11'.0	61° 43'.4	58'.0
18	274° 12'.6	81° 37'.3	12'.9	147° 34'.1	15'.3	236° 54'.5	10'.9	76° 45'.6	58'.1
19	289° 15'.1	96° 36'.9	14'.2	162° 35'.0	14'.9	251° 57'.2	10'.9	91° 47'.8	58'.2
20	304° 17'.5	111° 36'.5	15'.5	177° 35'.9	14'.6	266° 59'.9	10'.8	106° 49'.9	58'.4
21	319° 20'.0	126° 36'.1	16'.7	192° 36'.8	14'.3	282° 02'.5	10'.7	121° 52'.1	58'.5
22	334° 22'.5	141° 35'.8	18'.0	207° 37'.7	14'.0	297° 05'.2	10'.7	136° 54'.3	58'.6
23	349° 24'.9	156° 35'.4	19'.3	222° 38'.6	13'.6	312° 07'.9	10'.6	151° 56'.5	58'.7
26 Monday 00	4° 27'.4	171° 35'.0	4° 20'.5 S	237° 39'.5	20° 13'.3 N	327° 10'.5	13° 10'.5 N	166° 58'.7	4° 58'.8 S
01	19° 29'.9	186° 34'.6	21'.8	252° 40'.4	13'.0	342° 13'.2	10'.4	182° 00'.9	58'.9
02	34° 32'.3	201° 34'.2	23'.0	267° 41'.3	12'.7	357° 15'.9	10'.4	197° 03'.1	59'.0
03	49° 34'.8	216° 33'.8	24'.3	282° 42'.2	12'.3	12° 18'.5	10'.3	212° 05'.3	59'.2
04	64° 37'.3	231° 33'.4	25'.6	297° 43'.1	12'.0	27° 21'.2	10'.2	227° 07'.4	59'.3
05	79° 39'.7	246° 33'.1	26'.8	312° 44'.0	11'.7	42° 23'.9	10'.2	242° 09'.6	59'.4
06	94° 42'.2	261° 32'.7	28'.1	327° 44'.9	11'.4	57° 26'.6	10'.1	257° 11'.8	59'.5
07	109° 44'.6	276° 32'.3	29'.4	342° 45'.8	11'.1	72° 29'.2	10'.0	272° 14'.0	59'.6
08	124° 47'.1	291° 31'.9	30'.6	357° 46'.7	10'.7	87° 31'.9	09'.9	287° 16'.2	59'.7
09	139° 49'.6	306° 31'.5	31'.9	12° 47'.6	10'.4	102° 34'.6	09'.9	302° 18'.4	59'.9
10	154° 52'.0	321° 31'.1	33'.2	27° 48'.5	10'.1	117° 37'.2	09'.8	317° 20'.6	5° 00'.0 S
11	169° 54'.5	336° 30'.8	34'.4	42° 49'.4	09'.8	132° 39'.9	09'.7	332° 22'.8	00'.1
12	184° 57'.0	351° 30'.4	4° 35'.7 S	57° 50'.3	20° 09'.4 N	147° 42'.6	13° 09'.6 N	347° 24'.9	5° 00'.2 S
13	199° 59'.4	6° 30'.0	36'.9	72° 51'.2	09'.1	162° 45'.3	09'.6	2° 27'.1	00'.3
14	215° 01'.9	21° 29'.6	38'.2	87° 52'.1	08'.8	177° 47'.9	09'.5	17° 29'.3	00'.4
15	230° 04'.4	36° 29'.2	39'.5	102° 53'.0	08'.4	192° 50'.6	09'.4	32° 31'.5	00'.5
16	245° 06'.8	51° 28'.8	40'.7	117° 53'.9	08'.1	207° 53'.3	09'.3	47° 33'.7	00'.7
17	260° 09'.3	66° 28'.4	42'.0	132° 54'.8	07'.8	222° 55'.9	09'.3	62° 35'.9	00'.8
18	275° 11'.8	81° 28'.0	43'.3	147° 55'.7	07'.5	237° 58'.6	09'.2	77° 38'.1	00'.9
19	290° 14'.2	96° 27'.7	44'.5	162° 56'.6	07'.1	253° 01'.3	09'.1	92° 40'.3	01'.0
20	305° 16'.7	111° 27'.3	45'.8	177° 57'.5	06'.8	268° 04'.0	09'.0	107° 42'.4	01'.1
21	320° 19'.1	126° 26'.9	47'.0	192° 58'.4	06'.5	283° 06'.6	09'.0	122° 44'.6	01'.2
22	335° 21'.6	141° 26'.5	48'.3	207° 59'.3	06'.2	298° 09'.3	08'.9	137° 46'.8	01'.3
23	350° 24'.1	156° 26'.1	49'.6	223° 00'.2	05'.8	313° 12'.0	08'.8	152° 49'.0	01'.5
27 Tuesday 00	5° 26'.5	171° 25'.7	4° 50'.8 S	238° 01'.1	20° 05'.5 N	328° 14'.7	13° 08'.7 N	167° 51'.2	5° 01'.6 S
01	20° 29'.0	186° 25'.3	52'.1	253° 02'.0	05'.2	343° 17'.3	08'.7	182° 53'.4	01'.7
02	35° 31'.5	201° 25'.0	53'.4	268° 02'.9	04'.8	358° 20'.0	08'.6	197° 55'.6	01'.8
03	50° 33'.9	216° 24'.6	54'.6	283° 03'.8	04'.5	13° 22'.7	08'.5	212° 57'.8	01'.9
04	65° 36'.4	231° 24'.2	55'.9	298° 04'.7	04'.2	28° 25'.4	08'.4	227° 59'.9	02'.0
05	80° 38'.9	246° 23'.8	57'.1	313° 05'.6	03'.9	43° 28'.0	08'.4	243° 02'.1	02'.2
06	95° 41'.3	261° 23'.4	58'.4	328° 06'.5	03'.5	58° 30'.7	08'.3	258° 04'.3	02'.3
07	110° 43'.8	276° 23'.0	59'.7	343° 07'.4	03'.2	73° 33'.4	08'.2	273° 06'.5	02'.4
08	125° 46'.2	291° 22'.6	5° 00'.9 S	358° 08'.3	02'.9	88° 36'.1	08'.1	288° 08'.7	02'.5
09	140° 48'.7	306° 22'.2	02'.2	13° 09'.2	02'.5	103° 38'.8	08'.1	303° 10'.9	02'.6
10	155° 51'.2	321° 21'.8	03'.4	28° 10'.1	02'.2	118° 41'.4	08'.0	318° 13'.1	02'.7
11	170° 53'.6	336° 21'.5	04'.7	43° 11'.0	01'.9	133° 44'.1	07'.9	333° 15'.3	02'.8
12	185° 56'.1	351° 21'.1	5° 05'.9 S	58° 12'.0	20° 01'.6 N	148° 46'.8	13° 07'.8 N	348° 17'.4	5° 03'.0 S
13	200° 58'.6	6° 20'.7	07'.2	73° 12'.9	01'.2	163° 49'.5	07'.8	3° 19'.6	03'.1
14	216° 01'.0	21° 20'.3	08'.5	88° 13'.8	00'.9	178° 52'.2	07'.7	18° 21'.8	03'.2
15	231° 03'.5	36° 19'.9	09'.7	103° 14'.7	00'.6	193° 54'.8	07'.6	33° 24'.0	03'.3
16	246° 06'.0	51° 19'.5	11'.0	118° 15'.6	00'.2	208° 57'.5	07'.5	48° 26'.2	03'.4
17	261° 08'.4	66° 19'.1	12'.2	133° 16'.5	19° 59'.9 N	224° 00'.2	07'.5	63° 28'.4	03'.5
18	276° 10'.9	81° 18'.7	13'.5	148° 17'.4	59'.6	239° 02'.9	07'.4	78° 30'.6	03'.6
19	291° 13'.4	96° 18'.3	14'.8	163° 18'.3	59'.2	254° 05'.6	07'.3	93° 32'.8	03'.8
20	306° 15'.8	111° 17'.9	16'.0	178° 19'.2	58'.9	269° 08'.2	07'.2	108° 34'.9	03'.9
21	321° 18'.3	126° 17'.5	17'.3	193° 20'.1	58'.6	284° 10'.9	07'.2	123° 37'.1	04'.0
22	336° 20'.7	141° 17'.2	18'.5	208° 21'.0	58'.3	299° 13'.6	07'.1	138° 39'.3	04'.1
23	351° 23'.2	156° 16'.8	19'.8	223° 21'.9	57'.9	314° 16'.3	07'.0	153° 41'.5	04'.2
	M.P. 23:38	v -0'.4	d 1'.3	v 0'.9	d 0'.3	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.9	40° 15'.2 S
Achernar	335° 27'.1	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.6	28° 59'.1 S
Aldebaran	290° 50'.6	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.8 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.1 S
Alnilam	275° 47'.5	1° 11'.6 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.2	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.5 N
Altair	62° 09'.3	8° 54'.2 N
Ankaa	353° 16'.4	42° 14'.3 S
Antares	112° 27'.9	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.0	69° 03'.1 S
Avior	234° 18'.9	59° 32'.6 S
Bellatrix	278° 33'.2	6° 21'.7 N
Betelgeuse	271° 02'.6	7° 24'.6 N
Canopus	263° 56'.7	52° 41'.8 S
Capella	280° 36'.1	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.1 N
Elnath	278° 14'.1	28° 37'.0 N
Eltanin	90° 46'.7	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.9 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.7	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.1	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.7	69° 45'.8 S
Mirfak	308° 41'.8	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.9 S
Polaris	318° 02'.8	89° 18'.7 N
Pollux	243° 29'.3	27° 59'.7 N
Procyon	245° 01'.1	5° 11'.7 N
Rasalhague	96° 07'.6	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.1	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 53'.1 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.2 N
Shaula	96° 23'.6	37° 06'.7 S
Sirius	258° 34'.8	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.7	43° 28'.7 S
Vega	80° 39'.7	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	167° 07'.6	12:34
Mars	233° 12'.1	08:09
Jupiter	322° 43'.1	02:11
Saturn	162° 31'.3	12:50

SUN										
GHA	Dec	GHA	v	Dec	d	HP
182° 00'.9	0° 37'.9 S	215° 49'.2	9'.3	8° 03'.5 N	13'.3	59'.9
197° 01'.2	38'.9	230° 17'.5	9'.4	7° 50'.2 N	13'.4	60'.0
212° 01'.4	39'.9	244° 45'.9	9'.3	36'.8	13'.4	
227° 01'.6	40'.8	259° 14'.2	9'.4	23'.4	13'.5	
242° 01'.8	41'.8	273° 42'.6	9'.3	09'.9	13'.5	60'.1
257° 02'.0	42'.8	288° 10'.9	9'.3	6° 56'.4 N	13'.7	
272° 02'.2	43'.7	302° 39'.2	9'.3	42'.7	13'.6	
287° 02'.5	44'.7	317° 07'.5	9'.3	29'.1	13'.7	60'.2
302° 02'.7	45'.7	331° 35'.8	9'.3	15'.4	13'.8	
317° 02'.9	46'.7	346° 04'.1	9'.3	01'.6	13'.8	
332° 03'.1	47'.6	0° 32'.4	9'.3	5° 47'.8 N	13'.9	
347° 03'.3	48'.6	15° 00'.7	9'.2	33'.9	13'.9	60'.3
2° 03'.5	0° 49'.6 S	29° 28'.9	9'.3	5° 20'.0 N	14'.0	60'.3
17° 03'.7	50'.6	43° 57'.2	9'.2	06'.0	14'.0	
32° 04'.0	51'.5	58° 25'.4	9'.2	4° 52'.0 N	14'.0	60'.4
47° 04'.2	52'.5	72° 53'.6	9'.2	38'.0	14'.1	
62° 04'.4	53'.5	87° 21'.8	9'.2	23'.9	14'.2	
77° 04'.6	54'.5	101° 50'.0	9'.2	09'.7	14'.2	60'.5
92° 04'.8	55'.4	116° 18'.2	9'.2	3° 55'.5 N	14'.2	
107° 05'.0	56'.4	130° 46'.4	9'.1	41'.3	14'.2	
122° 05'.3	57'.4	145° 14'.5	9'.2	27'.1	14'.3	
137° 05'.5	58'.4	159° 42'.7	9'.1	12'.8	14'.3	60'.6
152° 05'.7	59'.3	174° 10'.8	9'.1	2° 58'.5 N	14'.3	
167° 05'.9	1° 00'.3 S	188° 38'.9	9'.1	44'.2	14'.4	
182° 06'.1	1° 01'.3 S	203° 07'.0	9'.1	2° 29'.8 N	14'.4	60'.7
197° 06'.3	02'.3	217° 35'.1	9'.0	15'.4	14'.4	
212° 06'.5	03'.2	232° 03'.1	9'.0	01'.0	14'.5	
227° 06'.8	04'.2	246° 31'.1	9'.0	1° 46'.5 N	14'.5	
242° 07'.0	05'.2	260° 59'.1	9'.0	32'.0	14'.5	60'.8
257° 07'.2	06'.2	275° 27'.1	9'.0	17'.5	14'.5	
272° 07'.4	07'.1	289° 55'.1	8'.9	03'.0	14'.5	
287° 07'.6	08'.1	304° 23'.0	8'.9	0° 48'.5 N	14'.6	
302° 07'.8	09'.1	318° 50'.9	8'.9	33'.9	14'.5	60'.9
317° 08'.0	10'.0	333° 18'.8	8'.9	19'.4	14'.6	
332° 08'.3	11'.0	347° 46'.7	8'.8	04'.8	14'.6	
347° 08'.5	12'.0	2° 14'.5	8'.9	0° 09'.8 S	14'.6	
2° 08'.7	1° 13'.0 S	16° 42'.4	8'.7	0° 24'.4 S	14'.6	60'.9
17° 08'.9	13'.9	31° 10'.1	8'.8	39'.0	14'.6	61'.0
32° 09'.1	14'.9	45° 37'.9	8'.7	53'.6	14'.6	
47° 09'.3	15'.9	60° 05'.6	8'.7	1° 08'.2 S	14'.6	
62° 09'.5	16'.9	74° 33'.3	8'.7	22'.8	14'.6	
77° 09'.8	17'.8	89° 01'.0	8'.7	37'.4	14'.6	
92° 10'.0	18'.8	103° 28'.7	8'.6	52'.0	14'.7	61'.1
107° 10'.2	19'.8	117° 56'.3	8'.6	2° 06'.7 S	14'.6	
122° 10'.4	20'.8	132° 23'.9	8'.5	21'.3	14'.6	
137° 10'.6	21'.7	146° 51'.4	8'.5	35'.9	14'.5	
152° 10'.8	22'.7	161° 18'.9	8'.5	50'.4	14'.6	
167° 11'.0	23'.7	175° 46'.4	8'.5	3° 05'.0 S	14'.6	
182° 11'.2	1° 24'.7 S	190° 13'.9	8'.4	3° 19'.6 S	14'.5	61'.1
197° 11'.5	25'.6	204° 41'.3	8'.4	34'.1	14'.6	61'.2
212° 11'.7	26'.6	219° 08'.7	8'.3	48'.7	14'.5	
227° 11'.9	27'.6	233° 36'.0	8'.3	4° 03'.2 S	14'.5	
242° 12'.1	28'.6	248° 03'.3	8'.3	17'.7	14'.5	
257° 12'.3	29'.5	262° 30'.6	8'.2	32'.2	14'.4	
272° 12'.5	30'.5	276° 57'.8	8'.2	46'.6	14'.5	
287° 12'.7	31'.5	291° 25'.0	8'.2	5° 01'.1 S	14'.4	
302° 12'.9	32'.4	305° 52'.2	8'.1	15'.5	14'.3	
317° 13'.2	33'.4	320° 19'.3	8'.1	29'.8	14'.4	61'.3
332° 13'.4	34'.4	334° 46'.4	8'.1	44'.2	14'.3	
347° 13'.6	35'.4	349° 13'.5	8'.0	58'.5	14'.3	
2° 13'.8	1° 36'.3 S	3° 40'.5	7'.9	6° 12'.8 S	14'.2	61'.3
17° 14'.0	37'.3	18° 07'.4	7'.9	27'.0	14'.2	
32° 14'.2	38'.3	32° 34'.3	7'.9	41'.2	14'.2	
47° 14'.4	39'.3	47° 01'.2	7'.9	55'.4	14'.1	
62° 14'.6	40'.2	61° 28'.1	7'.7	7° 09'.5 S	14'.1	
77° 14'.8	41'.2	75° 54'.8	7'.8	23'.6	14'.0	
92° 15'.1	42'.2	90° 21'.6	7'.7	37'.6	14'.0	
107° 15'.3	43'.2	104° 48'.3	7'.7	51'.6	13'.9	
122° 15'.5	44'.1	119° 15'.0	7'.6	8° 05'.5 S	13'.9	
137° 15'.7	45'.1	133° 41'.6	7'.6	19'.4	13'.8	
152° 15'.9	46'.1	148° 08'.2	7'.5	33'.2	13'.8	
167° 16'.1	47'.0	162° 34'.7	7'.5	47'.0	13'.7	
SD 16'.0	d 1'.0	SD 16'.4		16'.6		16'.7

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27
N 72°	03:20	04:47	05:54	02:07	04:21	06:37
N 70°	03:36	04:53	05:54	02:18	04:23	06:30
68°	03:49	04:58	05:54	02:28	04:25	06:24
66°	04:00	05:02	05:53	02:35	04:26	06:19
64°	04:08	05:06	05:53	02:42	04:27	06:14
62°	04:15	05:09	05:53	02:47	04:28	06:11
60°	04:21	05:11	05:53	02:52	04:29	06:07
N 58°	04:27	05:13	05:52	02:56	04:29	06:05
56°	04:31	05:15	05:52	03:00	04:30	06:02
54°	04:35	05:17	05:52	03:03	04:31	06:00
52°	04:39	05:18	05:52	03:06	04:31	05:58
50°	04:42	05:19	05:52	03:09	04:32	05:56
45°	04:48	05:22	05:51	03:15	04:33	05:52
N 40°	04:52	05:24	05:51	03:20	04:33	05:49
35°	04:56	05:25	05:51	03:24	04:34	05:46
30°	04:59	05:26	05:50	03:28	04:35	05:43
20°	05:02	05:28	05:50	03:34	04:36	05:39
N 10°	05:04	05:28	05:49	03:40	04:37	05:35
0°	05:04	05:28	05:48	03:45	04:38	05:32
S 10°	05:02	05:26	05:47	03:51	04:39	05:28
20°	04:59	05:24	05:46	03:56	04:40	05:25
30°	04:53	05:21	05:45	04:03	04:41	05:21
35°	04:50	05:19	05:44	04:06	04:42	05:19
40°	04:45	05:16	05:43	04:10	04:43	05:16
45°	04:39	05:13	05:42	04:15	04:44	05:13
S 50°	04:30	05:09	05:41	04:21	04:45	05:10
52°	04:27	05:07	05:40	04:24	04:46	05:08
54°	04:22	05:04	05:40	04:27	04:46	05:06
56°	04:17	05:02	05:39	04:30	04:47	05:04
58°	04:11	04:59	05:38	04:33	04:48	05:02
S 60°	04:05	04:55	05:37	04:37	04:48	05:00
S 62°	03:57	04:52	05:36	04:42	04:49	04:57

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 25	Moonset 26	Moonset 27
N 72°	17:46	18:53	20:19	17:02	16:42	16:20
N 70°	17:47	18:47	20:03	16:57	16:44	16:31
68°	17:47	18:43	19:51	16:52	16:46	16:39
66°	17:48	18:39	19:41	16:49	16:48	16:47
64°	17:48	18:35	19:32	16:45	16:49	16:53
62°	17:49	18:33	19:25	16:43	16:50	16:58
60°	17:49	18:30	19:20	16:40	16:51	17:03
N 58°	17:49	18:28	19:15	16:38	16:52	17:07
56°	17:50	18:26	19:10	16:36	16:53	17:11
54°	17:50	18:25	19:06	16:34	16:54	17:14
52°	17:50	18:24	19:03	16:33	16:54	17:17
50°	17:50	18:22	19:00	16:31	16:55	17:20
45°	17:51	18:20	18:54	16:28	16:56	17:26
N 40°	17:51	18:18	18:50	16:25	16:58	17:31
35°	17:52	18:17	18:46	16:23	16:58	17:36
30°	17:52	18:16	18:44	16:20	16:59	17:39
20°	17:53	18:15	18:41	16:17	17:01	17:46
N 10°	17:54	18:15	18:39	16:13	17:02	17:52
0°	17:55	18:15	18:39	16:10	17:03	17:58
S 10°	17:56	18:17	18:41	16:07	17:05	18:03
20°	17:57	18:19	18:44	16:04	17:06	18:09
30°	17:58	18:22	18:50	16:00	17:07	18:16
35°	17:59	18:24	18:54	15:57	17:08	18:20
40°	18:00	18:27	18:59	15:55	17:09	18:25
45°	18:01	18:31	19:05	15:52	17:10	18:30
S 50°	18:03	18:35	19:14	15:48	17:11	18:36
52°	18:03	18:37	19:18	15:46	17:12	18:39
54°	18:04	18:40	19:22	15:44	17:12	18:42
56°	18:05	18:42	19:27	15:42	17:13	18:46
58°	18:06	18:46	19:33	15:40	17:14	18:50
S 60°	18:07	18:49	19:40	15:37	17:15	18:54
S 62°	18:08	18:53	19:48	15:34	17:16	18:59

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
25	8 03	8 14	11:52	09:58	22:24	27d 6%
26	8 24	8 34	11:51	10:51	23:18	28d 2%
27	8 45	8 55	11:51	11:45	24:12	0d 0%

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2011 September 28, 29, 30 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
28 00	6° 25'.7	171° 16'.4	5° 21'.0 S	238° 22'.9	19° 57'.6 N	329° 19'.0	13° 06'.9 N	168° 43'.7	5° 04'.3 S
01	21° 28'.1	186° 16'.0	22'.3	253° 23'.8	57'.3	344° 21'.6	06'.9	183° 45'.9	04'.5
02	36° 30'.6	201° 15'.6	23'.6	268° 24'.7	56'.9	359° 24'.3	06'.8	198° 48'.1	04'.6
03	51° 33'.1	216° 15'.2	24'.8	283° 25'.6	56'.6	14° 27'.0	06'.7	213° 50'.2	04'.7
04	66° 35'.5	231° 14'.8	26'.1	298° 26'.5	56'.3	29° 29'.7	06'.6	228° 52'.4	04'.8
05	81° 38'.0	246° 14'.4	27'.3	313° 27'.4	55'.9	44° 32'.4	06'.5	243° 54'.6	04'.9
06	96° 40'.5	261° 14'.0	28'.6	328° 28'.3	55'.6	59° 35'.1	06'.5	258° 56'.8	05'.0
07	111° 42'.9	276° 13'.6	29'.8	343° 29'.2	55'.3	74° 37'.7	06'.4	273° 59'.0	05'.1
08	126° 45'.4	291° 13'.2	31'.1	358° 30'.1	54'.9	89° 40'.4	06'.3	289° 01'.2	05'.3
09	141° 47'.8	306° 12'.8	32'.4	13° 31'.1	54'.6	104° 43'.1	06'.2	304° 03'.4	05'.4
10	156° 50'.3	321° 12'.4	33'.6	28° 32'.0	54'.3	119° 45'.8	06'.2	319° 05'.5	05'.5
11	171° 52'.8	336° 12'.0	34'.9	43° 32'.9	53'.9	134° 48'.5	06'.1	334° 07'.7	05'.6
12	186° 55'.2	351° 11'.7	5° 36'.1 S	58° 33'.8	19° 53'.6 N	149° 51'.2	13° 06'.0 N	349° 09'.9	5° 05'.7 S
13	201° 57'.7	6° 11'.3	37'.4	73° 34'.7	53'.3	164° 53'.9	05'.9	4° 12'.1	05'.8
14	217° 00'.2	21° 10'.9	38'.6	88° 35'.6	52'.9	179° 56'.5	05'.8	19° 14'.3	06'.0
15	232° 02'.6	36° 10'.5	39'.9	103° 36'.5	52'.6	194° 59'.2	05'.8	34° 16'.5	06'.1
16	247° 05'.1	51° 10'.1	41'.1	118° 37'.4	52'.3	210° 01'.9	05'.7	49° 18'.7	06'.2
17	262° 07'.6	66° 09'.7	42'.4	133° 38'.4	51'.9	225° 04'.6	05'.6	64° 20'.8	06'.3
18	277° 10'.0	81° 09'.3	43'.6	148° 39'.3	51'.6	240° 07'.3	05'.5	79° 23'.0	06'.4
19	292° 12'.5	96° 08'.9	44'.9	163° 40'.2	51'.3	255° 10'.0	05'.5	94° 25'.2	06'.5
20	307° 15'.0	111° 08'.5	46'.1	178° 41'.1	50'.9	270° 12'.7	05'.4	109° 27'.4	06'.6
21	322° 17'.4	126° 08'.1	47'.4	193° 42'.0	50'.6	285° 15'.4	05'.3	124° 29'.6	06'.8
22	337° 19'.9	141° 07'.7	48'.7	208° 42'.9	50'.3	300° 18'.0	05'.2	139° 31'.8	06'.9
23	352° 22'.3	156° 07'.3	49'.9	223° 43'.9	49'.9	315° 20'.7	05'.1	154° 34'.0	07'.0
29 00	7° 24'.8	171° 06'.9	5° 51'.2 S	238° 44'.8	19° 49'.6 N	330° 23'.4	13° 05'.1 N	169° 36'.2	5° 07'.1 S
01	22° 27'.3	186° 06'.5	52'.4	253° 45'.7	49'.2	345° 26'.1	05'.0	184° 38'.3	07'.2
02	37° 29'.7	201° 06'.1	53'.7	268° 46'.6	48'.9	0° 28'.8	04'.9	199° 40'.5	07'.3
03	52° 32'.2	216° 05'.7	54'.9	283° 47'.5	48'.6	15° 31'.5	04'.8	214° 42'.7	07'.4
04	67° 34'.7	231° 05'.3	56'.2	298° 48'.4	48'.2	30° 34'.2	04'.8	229° 44'.9	07'.6
05	82° 37'.1	246° 04'.9	57'.4	313° 49'.4	47'.9	45° 36'.9	04'.7	244° 47'.1	07'.7
06	97° 39'.6	261° 04'.5	58'.7	328° 50'.3	47'.6	60° 39'.6	04'.6	259° 49'.3	07'.8
07	112° 42'.1	276° 04'.1	59'.9	343° 51'.2	47'.2	75° 42'.2	04'.5	274° 51'.5	07'.9
08	127° 44'.5	291° 03'.7	6° 01'.2 S	358° 52'.1	46'.9	90° 44'.9	04'.4	289° 53'.6	08'.0
09	142° 47'.0	306° 03'.3	02'.4	13° 53'.0	46'.6	105° 47'.6	04'.4	304° 55'.8	08'.1
10	157° 49'.5	321° 02'.9	03'.7	28° 54'.0	46'.2	120° 50'.3	04'.3	319° 58'.0	08'.3
11	172° 51'.9	336° 02'.5	04'.9	43° 54'.9	45'.9	135° 53'.0	04'.2	335° 00'.2	08'.4
12	187° 54'.4	351° 02'.1	6° 06'.2 S	58° 55'.8	19° 45'.5 N	150° 55'.7	13° 04'.1 N	350° 02'.4	5° 08'.5 S
13	202° 56'.8	6° 01'.7	07'.4	73° 56'.7	45'.2	165° 58'.4	04'.0	5° 04'.6	08'.6
14	217° 59'.3	21° 01'.3	08'.7	88° 57'.6	44'.9	181° 01'.1	04'.0	20° 06'.7	08'.7
15	233° 01'.8	36° 00'.9	09'.9	103° 58'.6	44'.5	196° 03'.8	03'.9	35° 08'.9	08'.8
16	248° 04'.2	51° 00'.5	11'.2	118° 59'.5	44'.2	211° 06'.5	03'.8	50° 11'.1	08'.9
17	263° 06'.7	66° 00'.1	12'.4	134° 00'.4	43'.9	226° 09'.2	03'.7	65° 13'.3	09'.1
18	278° 09'.2	80° 59'.7	13'.7	149° 01'.3	43'.5	241° 11'.9	03'.6	80° 15'.5	09'.2
19	293° 11'.6	95° 59'.3	14'.9	164° 02'.2	43'.2	256° 14'.6	03'.6	95° 17'.7	09'.3
20	308° 14'.1	110° 58'.9	16'.2	179° 03'.2	42'.8	271° 17'.2	03'.5	110° 19'.9	09'.4
21	323° 16'.6	125° 58'.5	17'.4	194° 04'.1	42'.5	286° 19'.9	03'.4	125° 22'.0	09'.5
22	338° 19'.0	140° 58'.1	18'.7	209° 05'.0	42'.2	301° 22'.6	03'.3	140° 24'.2	09'.6
23	353° 21'.5	155° 57'.7	19'.9	224° 05'.9	41'.8	316° 25'.3	03'.2	155° 26'.4	09'.8
30 00	8° 23'.9	170° 57'.3	6° 21'.2 S	239° 06'.9	19° 41'.5 N	331° 28'.0	13° 03'.2 N	170° 28'.6	5° 09'.9 S
01	23° 26'.4	185° 56'.9	22'.4	254° 07'.8	41'.1	346° 30'.7	03'.1	185° 30'.8	10'.0
02	38° 28'.9	200° 56'.5	23'.6	269° 08'.7	40'.8	1° 33'.4	03'.0	200° 33'.0	10'.1
03	53° 31'.3	215° 56'.1	24'.9	284° 09'.6	40'.5	16° 36'.1	02'.9	215° 35'.2	10'.2
04	68° 33'.8	230° 55'.7	26'.1	299° 10'.6	40'.1	31° 38'.8	02'.8	230° 37'.3	10'.3
05	83° 36'.3	245° 55'.3	27'.4	314° 11'.5	39'.8	46° 41'.5	02'.7	245° 39'.5	10'.4
06	98° 38'.7	260° 54'.9	28'.6	329° 12'.4	39'.4	61° 44'.2	02'.7	260° 41'.7	10'.6
07	113° 41'.2	275° 54'.5	29'.9	344° 13'.3	39'.1	76° 46'.9	02'.6	275° 43'.9	10'.7
08	128° 43'.7	290° 54'.1	31'.1	359° 14'.3	38'.8	91° 49'.6	02'.5	290° 46'.1	10'.8
09	143° 46'.1	305° 53'.7	32'.4	14° 15'.2	38'.4	106° 52'.3	02'.4	305° 48'.3	10'.9
10	158° 48'.6	320° 53'.3	33'.6	29° 16'.1	38'.1	121° 55'.0	02'.3	320° 50'.5	11'.0
11	173° 51'.1	335° 52'.9	34'.9	44° 17'.0	37'.7	136° 57'.7	02'.3	335° 52'.6	11'.1
12	188° 53'.5	350° 52'.5	6° 36'.1 S	59° 18'.0	19° 37'.4 N	152° 00'.4	13° 02'.2 N	350° 54'.8	5° 11'.3 S
13	203° 56'.0	5° 52'.1	37'.3	74° 18'.9	37'.1	167° 03'.1	02'.1	5° 57'.0	11'.4
14	218° 58'.4	20° 51'.7	38'.6	89° 19'.8	36'.7	182° 05'.8	02'.0	20° 59'.2	11'.5
15	234° 00'.9	35° 51'.3	39'.8	104° 20'.7	36'.4	197° 08'.5	01'.9	36° 01'.4	11'.6
16	249° 03'.4	50° 50'.9	41'.1	119° 21'.7	36'.0	212° 11'.2	01'.9	51° 03'.6	11'.7
17	264° 05'.8	65° 50'.5	42'.3	134° 22'.6	35'.7	227° 13'.9	01'.8	66° 05'.7	11'.8
18	279° 08'.3	80° 50'.1	43'.6	149° 23'.5	35'.3	242° 16'.6	01'.7	81° 07'.9	11'.9
19	294° 10'.8	95° 49'.7	44'.8	164° 24'.5	35'.0	257° 19'.3	01'.6	96° 10'.1	12'.1
20	309° 13'.2	110° 49'.2	46'.0	179° 25'.4	34'.7	272° 22'.0	01'.5	111° 12'.3	12'.2
21	324° 15'.7	125° 48'.8	47'.3	194° 26'.3	34'.3	287° 24'.7	01'.4	126° 14'.5	12'.3
22	339° 18'.2	140° 48'.4	48'.5	209° 27'.2	34'.0	302° 27'.4	01'.4	141° 16'.7	12'.4
23	354° 20'.6	155° 48'.0	49'.8	224° 28'.2	33'.6	317° 30'.1	01'.3	156° 18'.8	12'.5
	M.P. 23:26	v -0'.4	d 1'.2	v 0'.9	d 0'.3	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.9	40° 15'.2 S
Achernar	335° 27'.0	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.5	28° 59'.1 S
Aldebaran	290° 50'.6	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.8 N
Alkaid	153° 00'.2	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.2 S
Alnilam	275° 47'.5	1° 11'.6 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.3	8° 54'.2 N
Ankaa	353° 16'.4	42° 14'.3 S
Antares	112° 27'.9	26° 27'.5 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.1	69° 03'.1 S
Avior	234° 18'.9	59° 32'.6 S
Bellatrix	278° 33'.2	6° 21'.7 N
Betelgeuse	271° 02'.6	7° 24'.6 N
Canopus	263° 56'.7	52° 41'.8 S
Capella	280° 36'.1	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.1 N
Elnath	278° 14'.1	28° 36'.9 N
Eltanin	90° 46'.8	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.9 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.8	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.1	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.6	69° 45'.8 S
Mirfak	308° 41'.8	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.9 S
Polaris	318° 01'.7	89° 18'.8 N
Pollux	243° 29'.3	27° 59'.7 N
Procyon	245° 01'.1	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.1	11° 54'.6 N
Rigel	281° 13'.1	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 53'.1 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.3 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.8	16° 43'.8 S
Spica	158° 32'.9	11° 13'.3 S
Suhail	222° 53'.7	43° 28'.7 S
Vega	80° 39'.8	38° 48'.1 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	163° 42'.1	12:36
Mars	231° 20'.0	08:05
Jupiter	322° 58'.6	01:58
Saturn	162° 11'.3	12:40

SUN

GHA	Dec
182° 16'.3	1° 48'.0 S
197° 16'.5	49'.0
212° 16'.7	50'.0
227° 17'.0	50'.9
242° 17'.2	51'.9
257° 17'.4	52'.9
272° 17'.6	53'.9
287° 17'.8	54'.8
302° 18'.0	55'.8
317° 18'.2	56'.8
332° 18'.4	57'.8
347° 18'.6	58'.7
2° 18'.8	1° 59'.7 S
17° 19'.0	2° 00'.7 S
32° 19'.3	01'.6
47° 19'.5	02'.6
62° 19'.7	03'.6
77° 19'.9	04'.6
92° 20'.1	05'.5
107° 20'.3	06'.5
122° 20'.5	07'.5
137° 20'.7	08'.5
152° 20'.9	09'.4
167° 21'.1	10'.4
182° 21'.3	2° 11'.4 S
197° 21'.6	12'.3
212° 21'.8	13'.3
227° 22'.0	14'.3
242° 22'.2	15'.3
257° 22'.4	16'.2
272° 22'.6	17'.2
287° 22'.8	18'.2
302° 23'.0	19'.2
317° 23'.2	20'.1
332° 23'.4	21'.1
347° 23'.6	22'.1
2° 23'.8	2° 23'.0 S
17° 24'.0	24'.0
32° 24'.3	25'.0
47° 24'.5	26'.0
62° 24'.7	26'.9
77° 24'.9	27'.9
92° 25'.1	28'.9
107° 25'.3	29'.8
122° 25'.5	30'.8
137° 25'.7	31'.8
152° 25'.9	32'.8
167° 26'.1	33'.7
182° 26'.3	2° 34'.7 S
197° 26'.5	35'.7
212° 26'.7	36'.6
227° 26'.9	37'.6
242° 27'.1	38'.6
257° 27'.3	39'.6
272° 27'.5	40'.5
287° 27'.8	41'.5
302° 28'.0	42'.5
317° 28'.2	43'.4
332° 28'.4	44'.4
347° 28'.6	45'.4
2° 28'.8	2° 46'.4 S
17° 29'.0	47'.3
32° 29'.2	48'.3
47° 29'.4	49'.3
62° 29'.6	50'.2
77° 29'.8	51'.2
92° 30'.0	52'.2
107° 30'.2	53'.2
122° 30'.4	54'.1
137° 30'.6	55'.1
152° 30'.8	56'.1
167° 31'.0	57'.0
SD 16'.0	d 1'.0

MOON

GHA	v	Dec	d	HP
177° 01'.2	7'.4	9° 00'.7 S	13'.7	61'.3
191° 27'.6	7'.4	14'.4	13'.6	
205° 54'.0	7'.3	28'.0	13'.5	
220° 20'.3	7'.3	41'.5	13'.5	
234° 46'.6	7'.3	55'.0	13'.4	
249° 12'.9	7'.2	10° 08'.4 S	13'.3	
263° 39'.1	7'.2	21'.7	13'.3	
278° 05'.3	7'.1	35'.0	13'.2	
292° 31'.4	7'.0	48'.2	13'.1	
306° 57'.4	7'.0	11° 01'.3 S	13'.1	
321° 23'.4	7'.0	14'.4	12'.9	
335° 49'.4	6'.9	27'.3	12'.9	
350° 15'.3	6'.9	11° 40'.2 S	12'.8	61'.3
4° 41'.2	6'.8	53'.0	12'.8	
19° 07'.0	6'.8	12° 05'.8 S	12'.6	
33° 32'.8	6'.7	18'.4	12'.6	
47° 58'.5	6'.7	31'.0	12'.4	
62° 24'.2	6'.6	43'.4	12'.4	
76° 49'.8	6'.6	55'.8	12'.3	61'.2
91° 15'.4	6'.6	13° 08'.1 S	12'.2	
105° 41'.0	6'.5	20'.3	12'.1	
120° 06'.5	6'.4	32'.4	12'.0	
134° 31'.9	6'.4	44'.4	11'.9	
148° 57'.3	6'.3	56'.3	11'.9	
163° 22'.6	6'.3	14° 08'.2 S	11'.7	61'.2
177° 47'.9	6'.3	19'.9	11'.6	
192° 13'.2	6'.2	31'.5	11'.5	
206° 38'.4	6'.2	43'.0	11'.4	61'.1
221° 03'.6	6'.1	54'.4	11'.3	
235° 28'.7	6'.0	15° 05'.7 S	11'.2	
249° 53'.7	6'.1	16'.9	11'.0	
264° 18'.8	6'.0	27'.9	11'.0	
278° 43'.8	5'.9	38'.9	10'.8	
293° 08'.7	5'.9	49'.7	10'.8	61'.0
307° 33'.6	5'.8	16° 00'.5 S	10'.6	
321° 58'.4	5'.8	11'.1	10'.5	
336° 23'.2	5'.8	16° 21'.6 S	10'.4	61'.0
350° 48'.0	5'.7	32'.0	10'.2	
5° 12'.7	5'.7	42'.2	10'.2	60'.9
19° 37'.4	5'.7	52'.4	10'.0	
34° 02'.1	5'.6	17° 02'.4 S	9'.9	
48° 26'.7	5'.5	12'.3	9'.7	
62° 51'.2	5'.6	22'.0	9'.7	
77° 15'.8	5'.5	31'.7	9'.5	60'.8
91° 40'.3	5'.4	41'.2	9'.3	
106° 04'.7	5'.5	50'.5	9'.3	
120° 29'.2	5'.3	59'.8	9'.1	
134° 53'.5	5'.4	18° 08'.9 S	9'.0	
149° 17'.9	5'.3	18° 17'.9 S	8'.8	60'.7
163° 42'.2	5'.3	26'.7	8'.8	
178° 06'.5	5'.3	35'.5	8'.5	
192° 30'.8	5'.2	44'.0	8'.5	
206° 55'.0	5'.2	52'.5	8'.3	60'.6
221° 19'.2	5'.2	19° 00'.8 S	8'.1	
235° 43'.4	5'.1	08'.9	8'.1	
250° 07'.5	5'.1	17'.0	7'.9	60'.5
264° 31'.6	5'.1	24'.9	7'.7	
278° 55'.7	5'.1	32'.6	7'.6	
293° 19'.8	5'.1	40'.2	7'.4	
307° 43'.9	5'.0	47'.6	7'.4	60'.4
322° 07'.9	5'.0	19° 55'.0 S	7'.1	60'.4
336° 31'.9	5'.0	20° 02'.1 S	7'.0	
350° 55'.9	5'.0	09'.1	6'.9	
5° 19'.9	4'.9	16'.0	6'.7	60'.3
19° 43'.8	5'.0	22'.7	6'.6	
34° 07'.8	4'.9	29'.3	6'.4	
48° 31'.7	4'.9	35'.7	6'.3	60'.2
62° 55'.6	4'.9	42'.0	6'.1	
77° 19'.5	4'.9	48'.1	6'.0	
91° 43'.4	4'.9	54'.1	5'.8	60'.1
106° 07'.3	4'.9	59'.9	5'.7	
120° 31'.2	4'.9	21° 05'.6 S	5'.5	
SD 16'.7		16'.6	16'.5	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 28	Moonrise 29	Moonrise 30
N 72°	03:36	05:01	06:08	09:03	11:58	-
N 70°	03:50	05:05	06:06	08:43	11:08	-
68°	04:01	05:09	06:04	08:27	10:37	12:56
66°	04:10	05:12	06:03	08:14	10:14	12:13
64°	04:18	05:14	06:02	08:04	09:56	11:45
62°	04:24	05:16	06:01	07:55	09:41	11:23
60°	04:29	05:18	06:00	07:48	09:29	11:05
N 58°	04:34	05:20	05:59	07:41	09:18	10:51
56°	04:37	05:21	05:58	07:35	09:09	10:38
54°	04:41	05:22	05:57	07:30	09:01	10:27
52°	04:44	05:23	05:57	07:26	08:53	10:18
50°	04:46	05:24	05:56	07:21	08:47	10:09
45°	04:52	05:26	05:55	07:12	08:33	09:51
N 40°	04:55	05:27	05:54	07:05	08:22	09:36
35°	04:58	05:28	05:53	06:59	08:12	09:24
30°	05:00	05:28	05:52	06:53	08:03	09:13
20°	05:03	05:28	05:50	06:43	07:49	08:54
N 10°	05:03	05:28	05:49	06:35	07:36	08:38
0°	05:02	05:26	05:47	06:27	07:24	08:24
S 10°	05:00	05:25	05:46	06:19	07:13	08:09
20°	04:56	05:22	05:44	06:11	07:00	07:53
30°	04:49	05:17	05:41	06:02	06:46	07:35
35°	04:45	05:15	05:40	05:57	06:38	07:24
40°	04:40	05:11	05:38	05:51	06:29	07:13
45°	04:33	05:07	05:37	05:44	06:19	06:59
S 50°	04:23	05:02	05:34	05:36	06:06	06:42
52°	04:19	05:00	05:33	05:32	06:00	06:34
54°	04:14	04:57	05:32	05:28	05:53	06:25
56°	04:09	04:54	05:31	05:23	05:46	06:15
58°	04:02	04:50	05:30	05:18	05:38	06:04
S 60°	03:55	04:46	05:28	05:13	05:29	05:51
S 62°	03:46	04:41	05:26	05:06	05:18	05:36

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 28	Moonset 29	Moonset 30
N 72°	17:31	18:38	20:01	15:53	14:59	-
N 70°	17:33	18:33	19:47	16:15	15:51	-
68°	17:35	18:30	19:37	16:32	16:23	16:09
66°	17:36	18:27	19:28	16:46	16:47	16:52
64°	17:38	18:25	19:21	16:58	17:07	17:21
62°	17:39	18:23	19:15	17:08	17:22	17:44
60°	17:40	18:21	19:10	17:17	17:35	18:02
N 58°	17:41	18:20	19:06	17:25	17:47	18:17
56°	17:42	18:19	19:02	17:31	17:57	18:30
54°	17:42	18:17	18:59	17:37	18:05	18:41
52°	17:43	18:17	18:56	17:43	18:13	18:51
50°	17:44	18:16	18:53	17:48	18:20	19:00
45°	17:45	18:14	18:48	17:59	18:36	19:19
N 40°	17:46	18:13	18:45	18:07	18:48	19:35
35°	17:47	18:13	18:42	18:15	18:59	19:48
30°	17:48	18:12	18:40	18:22	19:08	19:59
20°	17:50	18:12	18:38	18:34	19:25	20:19
N 10°	17:52	18:13	18:37	18:44	19:39	20:36
0°	17:54	18:14	18:38	18:54	19:52	20:52
S 10°	17:55	18:16	18:41	19:04	20:06	21:08
20°	17:58	18:20	18:45	19:14	20:20	21:25
30°	18:00	18:24	18:52	19:26	20:37	21:45
35°	18:01	18:27	18:56	19:33	20:46	21:57
40°	18:03	18:30	19:02	19:41	20:57	22:10
45°	18:05	18:34	19:09	19:51	21:10	22:26
S 50°	18:07	18:40	19:19	20:02	21:26	22:45
52°	18:08	18:42	19:23	20:07	21:34	22:55
54°	18:10	18:45	19:28	20:13	21:42	23:05
56°	18:11	18:49	19:34	20:19	21:51	23:17
58°	18:13	18:52	19:41	20:27	22:02	23:30
S 60°	18:14	18:57	19:48	20:35	22:14	23:46
S 62°	18:16	19:01	19:57	20:45	22:29	24:06

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
28	9 05	9 15	11:51	12:41	00:12	1d 2%
29	9 25	9 35	11:50	13:38	01:09	2d 6%
30	9 45	9 55	11:50	14:38	02:08	3d 13%

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2011 October 1, 2, 3 (Sat, Sun, Monday)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
1 Saturday 00	9° 23'.1	170° 47'.6	6° 51'.0 S	239° 29'.1	19° 33'.3 N	332° 32'.8	13° 01'.2 N	171° 21'.0	5° 12'.6 S
01	24° 25'.6	185° 47'.2	52'.3	254° 30'.0	32'.9	347° 35'.5	01'.1	186° 23'.2	12'.8
02	39° 28'.0	200° 46'.8	53'.5	269° 31'.0	32'.6	2° 38'.2	01'.0	201° 25'.4	12'.9
03	54° 30'.5	215° 46'.4	54'.7	284° 31'.9	32'.3	17° 40'.9	00'.9	216° 27'.6	13'.0
04	69° 32'.9	230° 46'.0	56'.0	299° 32'.8	31'.9	32° 43'.6	00'.9	231° 29'.8	13'.1
05	84° 35'.4	245° 45'.6	57'.2	314° 33'.8	31'.6	47° 46'.3	00'.8	246° 32'.0	13'.2
06	99° 37'.9	260° 45'.2	58'.5	329° 34'.7	31'.2	62° 49'.0	00'.7	261° 34'.1	13'.3
07	114° 40'.3	275° 44'.8	59'.7	344° 35'.6	30'.9	77° 51'.7	00'.6	276° 36'.3	13'.4
08	129° 42'.8	290° 44'.4	7° 00'.9 S	359° 36'.5	30'.5	92° 54'.4	00'.5	291° 38'.5	13'.6
09	144° 45'.3	305° 43'.9	02'.2	14° 37'.5	30'.2	107° 57'.1	00'.4	306° 40'.7	13'.7
10	159° 47'.7	320° 43'.5	03'.4	29° 38'.4	29'.8	122° 59'.8	00'.4	321° 42'.9	13'.8
11	174° 50'.2	335° 43'.1	04'.7	44° 39'.3	29'.5	138° 02'.5	00'.3	336° 45'.1	13'.9
12	189° 52'.7	350° 42'.7	7° 05'.9 S	59° 40'.3	19° 29'.2 N	153° 05'.2	13° 00'.2 N	351° 47'.2	5° 14'.0 S
13	204° 55'.1	5° 42'.3	07'.1	74° 41'.2	28'.8	168° 07'.9	00'.1	6° 49'.4	14'.1
14	219° 57'.6	20° 41'.9	08'.4	89° 42'.1	28'.5	183° 10'.6	00'.0	21° 51'.6	14'.2
15	235° 00'.0	35° 41'.5	09'.6	104° 43'.1	28'.1	198° 13'.3	12° 59'.9 N	36° 53'.8	14'.4
16	250° 02'.5	50° 41'.1	10'.8	119° 44'.0	27'.8	213° 16'.0	59'.9	51° 56'.0	14'.5
17	265° 05'.0	65° 40'.7	12'.1	134° 45'.0	27'.4	228° 18'.7	59'.8	66° 58'.2	14'.6
18	280° 07'.4	80° 40'.2	13'.3	149° 45'.9	27'.1	243° 21'.4	59'.7	82° 00'.3	14'.7
19	295° 09'.9	95° 39'.8	14'.6	164° 46'.8	26'.7	258° 24'.2	59'.6	97° 02'.5	14'.8
20	310° 12'.4	110° 39'.4	15'.8	179° 47'.8	26'.4	273° 26'.9	59'.5	112° 04'.7	14'.9
21	325° 14'.8	125° 39'.0	17'.0	194° 48'.7	26'.0	288° 29'.6	59'.4	127° 06'.9	15'.1
22	340° 17'.3	140° 38'.6	18'.3	209° 49'.6	25'.7	303° 32'.3	59'.4	142° 09'.1	15'.2
23	355° 19'.8	155° 38'.2	19'.5	224° 50'.6	25'.4	318° 35'.0	59'.3	157° 11'.3	15'.3
2 Sunday 00	10° 22'.2	170° 37'.8	7° 20'.7 S	239° 51'.5	19° 25'.0 N	333° 37'.7	12° 59'.2 N	172° 13'.5	5° 15'.4 S
01	25° 24'.7	185° 37'.4	22'.0	254° 52'.4	24'.7	348° 40'.4	59'.1	187° 15'.6	15'.5
02	40° 27'.2	200° 36'.9	23'.2	269° 53'.4	24'.3	3° 43'.1	59'.0	202° 17'.8	15'.6
03	55° 29'.6	215° 36'.5	24'.4	284° 54'.3	24'.0	18° 45'.8	58'.9	217° 20'.0	15'.7
04	70° 32'.1	230° 36'.1	25'.7	299° 55'.3	23'.6	33° 48'.5	58'.9	232° 22'.2	15'.9
05	85° 34'.5	245° 35'.7	26'.9	314° 56'.2	23'.3	48° 51'.2	58'.8	247° 24'.4	16'.0
06	100° 37'.0	260° 35'.3	28'.1	329° 57'.1	22'.9	63° 53'.9	58'.7	262° 26'.6	16'.1
07	115° 39'.5	275° 34'.9	29'.4	344° 58'.1	22'.6	78° 56'.6	58'.6	277° 28'.7	16'.2
08	130° 41'.9	290° 34'.5	30'.6	359° 59'.0	22'.2	93° 59'.4	58'.5	292° 30'.9	16'.3
09	145° 44'.4	305° 34'.0	31'.8	15° 00'.0	21'.9	109° 02'.1	58'.4	307° 33'.1	16'.4
10	160° 46'.9	320° 33'.6	33'.1	30° 00'.9	21'.5	124° 04'.8	58'.3	322° 35'.3	16'.6
11	175° 49'.3	335° 33'.2	34'.3	45° 01'.8	21'.2	139° 07'.5	58'.3	337° 37'.5	16'.7
12	190° 51'.8	350° 32'.8	7° 35'.5 S	60° 02'.8	19° 20'.8 N	154° 10'.2	12° 58'.2 N	352° 39'.7	5° 16'.8 S
13	205° 54'.3	5° 32'.4	36'.8	75° 03'.7	20'.5	169° 12'.9	58'.1	7° 41'.8	16'.9
14	220° 56'.7	20° 32'.0	38'.0	90° 04'.7	20'.1	184° 15'.6	58'.0	22° 44'.0	17'.0
15	235° 59'.2	35° 31'.5	39'.2	105° 05'.6	19'.8	199° 18'.3	57'.9	37° 46'.2	17'.1
16	251° 01'.7	50° 31'.1	40'.5	120° 06'.5	19'.4	214° 21'.0	57'.8	52° 48'.4	17'.2
17	266° 04'.1	65° 30'.7	41'.7	135° 07'.5	19'.1	229° 23'.7	57'.7	67° 50'.6	17'.4
18	281° 06'.6	80° 30'.3	42'.9	150° 08'.4	18'.7	244° 26'.5	57'.7	82° 52'.8	17'.5
19	296° 09'.0	95° 29'.9	44'.2	165° 09'.4	18'.4	259° 29'.2	57'.6	97° 54'.9	17'.6
20	311° 11'.5	110° 29'.5	45'.4	180° 10'.3	18'.0	274° 31'.9	57'.5	112° 57'.1	17'.7
21	326° 14'.0	125° 29'.0	46'.6	195° 11'.2	17'.7	289° 34'.6	57'.4	127° 59'.3	17'.8
22	341° 16'.4	140° 28'.6	47'.8	210° 12'.2	17'.3	304° 37'.3	57'.3	143° 01'.5	17'.9
23	356° 18'.9	155° 28'.2	49'.1	225° 13'.1	17'.0	319° 40'.0	57'.2	158° 03'.7	18'.1
3 Monday 00	11° 21'.4	170° 27'.8	7° 50'.3 S	240° 14'.1	19° 16'.6 N	334° 42'.7	12° 57'.1 N	173° 05'.9	5° 18'.2 S
01	26° 23'.8	185° 27'.4	51'.5	255° 15'.0	16'.3	349° 45'.4	57'.1	188° 08'.0	18'.3
02	41° 26'.3	200° 26'.9	52'.8	270° 16'.0	15'.9	4° 48'.2	57'.0	203° 10'.2	18'.4
03	56° 28'.8	215° 26'.5	54'.0	285° 16'.9	15'.6	19° 50'.9	56'.9	218° 12'.4	18'.5
04	71° 31'.2	230° 26'.1	55'.2	300° 17'.9	15'.2	34° 53'.6	56'.8	233° 14'.6	18'.6
05	86° 33'.7	245° 25'.7	56'.4	315° 18'.8	14'.9	49° 56'.3	56'.7	248° 16'.8	18'.7
06	101° 36'.2	260° 25'.3	57'.7	330° 19'.7	14'.5	64° 59'.0	56'.6	263° 19'.0	18'.9
07	116° 38'.6	275° 24'.8	58'.9	345° 20'.7	14'.2	80° 01'.7	56'.5	278° 21'.1	19'.0
08	131° 41'.1	290° 24'.4	8° 00'.1 S	0° 21'.6	13'.8	95° 04'.4	56'.5	293° 23'.3	19'.1
09	146° 43'.5	305° 24'.0	01'.3	15° 22'.6	13'.5	110° 07'.2	56'.4	308° 25'.5	19'.2
10	161° 46'.0	320° 23'.6	02'.6	30° 23'.5	13'.1	125° 09'.9	56'.3	323° 27'.7	19'.3
11	176° 48'.5	335° 23'.1	03'.8	45° 24'.5	12'.8	140° 12'.6	56'.2	338° 29'.9	19'.4
12	191° 50'.9	350° 22'.7	8° 05'.0 S	60° 25'.4	19° 12'.4 N	155° 15'.3	12° 56'.1 N	353° 32'.1	5° 19'.6 S
13	206° 53'.4	5° 22'.3	06'.3	75° 26'.4	12'.1	170° 18'.0	56'.0	8° 34'.2	19'.7
14	221° 55'.9	20° 21'.9	07'.5	90° 27'.3	11'.7	185° 20'.7	55'.9	23° 36'.4	19'.8
15	236° 58'.3	35° 21'.5	08'.7	105° 28'.3	11'.4	200° 23'.5	55'.8	38° 38'.6	19'.9
16	252° 00'.8	50° 21'.0	09'.9	120° 29'.2	11'.0	215° 26'.2	55'.8	53° 40'.8	20'.0
17	267° 03'.3	65° 20'.6	11'.1	135° 30'.2	10'.7	230° 28'.9	55'.7	68° 43'.0	20'.1
18	282° 05'.7	80° 20'.2	12'.4	150° 31'.1	10'.3	245° 31'.6	55'.6	83° 45'.2	20'.2
19	297° 08'.2	95° 19'.8	13'.6	165° 32'.1	10'.0	260° 34'.3	55'.5	98° 47'.3	20'.4
20	312° 10'.7	110° 19'.3	14'.8	180° 33'.0	09'.6	275° 37'.0	55'.4	113° 49'.5	20'.5
21	327° 13'.1	125° 18'.9	16'.0	195° 34'.0	09'.2	290° 39'.8	55'.3	128° 51'.7	20'.6
22	342° 15'.6	140° 18'.5	17'.3	210° 34'.9	08'.9	305° 42'.5	55'.2	143° 53'.9	20'.7
23	357° 18'.0	155° 18'.1	18'.5	225° 35'.9	08'.5	320° 45'.2	55'.1	158° 56'.1	20'.8
	M.P. 23:15	v -0'.4	d 1'.2	v 0'.9	d 0'.3	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.9	40° 15'.2 S
Achernar	335° 27'.0	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.5	28° 59'.1 S
Aldebaran	290° 50'.6	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.8 N
Alkaid	153° 00'.3	49° 15'.4 N
Alnair	27° 44'.8	46° 54'.2 S
Alnilam	275° 47'.5	1° 11'.6 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.3	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.1	69° 03'.1 S
Avior	234° 18'.8	59° 32'.6 S
Bellatrix	278° 33'.2	6° 21'.7 N
Betelgeuse	271° 02'.5	7° 24'.6 N
Canopus	263° 56'.7	52° 41'.9 S
Capella	280° 36'.1	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.8	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.1 N
Elnath	278° 14'.0	28° 36'.9 N
Eltanin	90° 46'.8	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.8 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.9 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.8	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.1	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.6	69° 45'.8 S
Mirfak	308° 41'.7	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.9 S
Polaris	318° 00'.5	89° 18'.8 N
Pollux	243° 29'.3	27° 59'.7 N
Procyon	245° 01'.1	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.1	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.1 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.3 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.8	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.6	43° 28'.7 S
Vega	80° 39'.8	38° 48'.1 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	160° 15'.5	12:38
Mars	229° 29'.3	08:00
Jupiter	323° 15'.5	01:45
Saturn	161° 51'.2	12:29

SUN						
GHA	Dec	GHA	v	Dec	d	HP
182° 31'.2	2° 58'.0 S	134° 55'.1	4'.9	21° 11'.1 S	5'.4	60'.0
197° 31'.4	59'.0	149° 19'.0	4'.8	16'.5	5'.2	
212° 31'.6	00'.0	163° 42'.8	4'.9	21'.7	5'.1	
227° 31'.8	3° 00'.9 S	178° 06'.7	4'.9	26'.8	4'.9	59'.9
242° 32'.0	01'.9	192° 30'.6	4'.9	31'.7	4'.7	
257° 32'.2	02'.9	206° 54'.5	4'.9	36'.4	4'.6	
272° 32'.4	03'.8	221° 18'.4	4'.9	41'.0	4'.5	59'.8
287° 32'.6	04'.8	235° 42'.3	4'.8	45'.5	4'.3	
302° 32'.8	05'.8	250° 06'.1	5'.0	49'.8	4'.1	
317° 33'.0	06'.7	264° 30'.1	4'.9	53'.9	4'.0	59'.7
332° 33'.2	07'.7	278° 54'.0	4'.9	57'.9	3'.8	
347° 33'.4	08'.7	293° 17'.9	4'.9	22° 01'.7 S	3'.7	
2° 33'.6	3° 09'.7 S	307° 41'.8	5'.0	22° 05'.4 S	3'.5	59'.6
17° 33'.8	10'.6	322° 05'.8	5'.0	08'.9	3'.4	
32° 34'.1	11'.6	336° 29'.8	4'.9	12'.3	3'.2	
47° 34'.3	12'.6	350° 53'.7	5'.0	15'.5	3'.1	59'.5
62° 34'.5	13'.5	5° 17'.7	5'.1	18'.6	2'.9	
77° 34'.7	14'.5	19° 41'.8	5'.0	21'.5	2'.7	
92° 34'.9	15'.5	34° 05'.8	5'.1	24'.2	2'.6	59'.4
107° 35'.1	16'.4	48° 29'.9	5'.1	26'.8	2'.4	
122° 35'.3	17'.4	62° 54'.0	5'.1	29'.2	2'.3	
137° 35'.5	18'.4	77° 18'.1	5'.2	31'.5	2'.1	59'.3
152° 35'.7	19'.3	91° 42'.3	5'.2	33'.6	2'.0	
167° 35'.9	20'.3	106° 06'.5	5'.2	35'.6	1'.8	
182° 36'.1	3° 21'.3 S	120° 30'.7	5'.2	22° 37'.4 S	1'.7	59'.2
197° 36'.3	22'.3	134° 54'.9	5'.3	39'.1	1'.5	
212° 36'.5	23'.2	149° 19'.2	5'.3	40'.6	1'.4	59'.1
227° 36'.7	24'.2	163° 43'.5	5'.4	42'.0	1'.2	
242° 36'.9	25'.2	178° 07'.9	5'.4	43'.2	1'.0	
257° 37'.1	26'.1	192° 32'.3	5'.4	44'.2	0'.9	59'.0
272° 37'.3	27'.1	206° 56'.7	5'.5	45'.1	0'.8	
287° 37'.5	28'.1	221° 21'.2	5'.5	45'.9	0'.6	
302° 37'.7	29'.0	235° 45'.7	5'.6	46'.5	0'.4	58'.9
317° 37'.9	30'.0	250° 10'.3	5'.6	46'.9	0'.3	
332° 38'.1	31'.0	264° 34'.9	5'.6	47'.2	0'.2	
347° 38'.3	31'.9	278° 59'.5	5'.7	47'.4	0'.0	58'.8
2° 38'.5	3° 32'.9 S	293° 24'.2	5'.8	22° 47'.4 S	0'.2	58'.8
17° 38'.7	33'.9	307° 49'.0	5'.8	47'.2	0'.3	58'.7
32° 38'.9	34'.8	322° 13'.8	5'.9	46'.9	0'.4	
47° 39'.0	35'.8	336° 38'.7	5'.9	46'.5	0'.6	
62° 39'.2	36'.8	351° 03'.6	6'.0	45'.9	0'.7	58'.6
77° 39'.4	37'.7	5° 28'.6	6'.0	45'.2	0'.9	
92° 39'.6	38'.7	19° 53'.6	6'.1	44'.3	1'.0	
107° 39'.8	39'.7	34° 18'.7	6'.1	43'.3	1'.2	58'.5
122° 40'.0	40'.6	48° 43'.8	6'.2	42'.1	1'.3	
137° 40'.2	41'.6	63° 09'.0	6'.3	40'.8	1'.4	58'.4
152° 40'.4	42'.6	77° 34'.3	6'.3	39'.4	1'.6	
167° 40'.6	43'.6	91° 59'.6	6'.4	37'.8	1'.7	
182° 40'.8	3° 44'.5 S	106° 25'.0	6'.5	22° 36'.1 S	1'.9	58'.3
197° 41'.0	45'.5	120° 50'.5	6'.5	34'.2	2'.0	
212° 41'.2	46'.5	135° 16'.0	6'.6	32'.2	2'.1	
227° 41'.4	47'.4	149° 41'.6	6'.6	30'.1	2'.3	58'.2
242° 41'.6	48'.4	164° 07'.2	6'.8	27'.8	2'.4	
257° 41'.8	49'.4	178° 33'.0	6'.7	25'.4	2'.6	58'.1
272° 42'.0	50'.3	192° 58'.7	6'.9	22'.8	2'.7	
287° 42'.2	51'.3	207° 24'.6	6'.9	20'.1	2'.8	
302° 42'.4	52'.3	221° 50'.5	7'.1	17'.3	2'.9	58'.0
317° 42'.6	53'.2	236° 16'.6	7'.0	14'.4	3'.1	
332° 42'.8	54'.2	250° 42'.6	7'.2	11'.3	3'.2	
347° 43'.0	55'.2	265° 08'.8	7'.2	08'.1	3'.4	57'.9
2° 43'.2	3° 56'.1 S	279° 35'.0	7'.3	22° 04'.7 S	3'.4	57'.9
17° 43'.4	57'.1	294° 01'.3	7'.4	01'.3	3'.6	
32° 43'.6	58'.1	308° 27'.7	7'.5	21° 57'.7 S	3'.8	57'.8
47° 43'.8	59'.0	322° 54'.2	7'.5	53'.9	3'.8	
62° 44'.0	00'.0	337° 20'.7	7'.6	50'.1	4'.0	57'.7
77° 44'.2	4° 00'.9 S	351° 47'.3	7'.7	46'.1	4'.1	
92° 44'.4	01'.9	6° 14'.0	7'.8	42'.0	4'.2	
107° 44'.6	02'.9	20° 40'.8	7'.8	37'.8	4'.3	57'.6
122° 44'.7	03'.8	35° 07'.6	8'.0	33'.5	4'.5	
137° 44'.9	04'.8	49° 34'.6	8'.0	29'.0	4'.6	
152° 45'.1	05'.8	64° 01'.6	8'.1	24'.4	4'.7	57'.5
167° 45'.3	06'.7	78° 28'.7	8'.2	19'.7	4'.8	
SD 16'.0	d 1'.0	SD	16'.3	16'.0	15'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 1	Moonrise 2	Moonrise 3
N 72°	03:52	05:14	06:21	-	-	-
N 70°	04:04	05:17	06:18	-	-	-
68°	04:13	05:19	06:15	-	-	17:09
66°	04:21	05:21	06:12	14:04	15:21	15:50
64°	04:27	05:23	06:10	13:22	14:33	15:13
62°	04:32	05:24	06:08	12:53	14:02	14:46
60°	04:37	05:25	06:07	12:31	13:39	14:26
N 58°	04:40	05:26	06:05	12:14	13:20	14:09
56°	04:44	05:27	06:04	11:59	13:04	13:54
54°	04:46	05:28	06:03	11:46	12:51	13:42
52°	04:49	05:28	06:02	11:34	12:39	13:31
50°	04:51	05:29	06:01	11:24	12:29	13:21
45°	04:55	05:29	05:59	11:03	12:07	13:00
N 40°	04:58	05:30	05:57	10:47	11:49	12:44
35°	05:01	05:30	05:55	10:32	11:35	12:29
30°	05:02	05:30	05:54	10:20	11:22	12:17
20°	05:03	05:29	05:51	09:59	11:00	11:56
N 10°	05:03	05:28	05:49	09:41	10:41	11:38
0°	05:01	05:25	05:46	09:24	10:23	11:21
S 10°	04:58	05:23	05:44	09:07	10:06	11:04
20°	04:53	05:19	05:41	08:49	09:47	10:45
30°	04:46	05:14	05:38	08:28	09:25	10:24
35°	04:41	05:10	05:36	08:16	09:12	10:12
40°	04:34	05:06	05:34	08:02	08:58	09:58
45°	04:27	05:01	05:31	07:46	08:40	09:41
S 50°	04:16	04:55	05:28	07:26	08:19	09:20
52°	04:12	04:52	05:26	07:16	08:08	09:10
54°	04:06	04:49	05:25	07:05	07:57	08:59
56°	04:00	04:45	05:23	06:53	07:44	08:46
58°	03:53	04:41	05:21	06:39	07:29	08:32
S 60°	03:44	04:37	05:19	06:23	07:10	08:14
S 62°	03:34	04:31	05:16	06:03	06:48	07:52

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 1	Moonset 2	Moonset 3
N 72°	17:15	18:22	19:43	-	-	-
N 70°	17:19	18:19	19:32	-	-	-
68°	17:22	18:17	19:23	-	-	18:06
66°	17:25	18:16	19:16	17:07	17:54	19:24
64°	17:27	18:14	19:10	17:50	18:43	20:01
62°	17:29	18:13	19:05	18:19	19:13	20:27
60°	17:31	18:12	19:01	18:41	19:37	20:48
N 58°	17:32	18:11	18:57	18:59	19:55	21:04
56°	17:34	18:11	18:54	19:14	20:11	21:19
54°	17:35	18:10	18:51	19:27	20:24	21:31
52°	17:36	18:10	18:49	19:38	20:36	21:42
50°	17:37	18:09	18:47	19:49	20:46	21:51
45°	17:40	18:09	18:43	20:10	21:08	22:11
N 40°	17:41	18:08	18:40	20:27	21:25	22:27
35°	17:43	18:08	18:38	20:42	21:40	22:41
30°	17:45	18:09	18:36	20:54	21:53	22:53
20°	17:48	18:10	18:35	21:16	22:15	23:13
N 10°	17:50	18:11	18:36	21:35	22:34	23:31
0°	17:53	18:13	18:37	21:52	22:51	23:47
S 10°	17:55	18:16	18:41	22:10	23:09	24:04
20°	17:58	18:20	18:46	22:28	23:27	24:21
30°	18:02	18:26	18:54	22:50	23:49	24:41
35°	18:04	18:29	18:59	23:03	-	00:01
40°	18:06	18:33	19:05	23:17	-	00:16
45°	18:09	18:38	19:13	23:34	-	00:33
S 50°	18:12	18:45	19:24	23:56	-	00:54
52°	18:14	18:48	19:29	-	00:06	01:04
54°	18:15	18:51	19:34	-	00:17	01:15
56°	18:17	18:55	19:41	-	00:30	01:28
58°	18:19	18:59	19:48	-	00:46	01:43
S 60°	18:21	19:04	19:57	-	01:04	02:01
S 62°	18:24	19:10	20:07	00:06	01:26	02:23

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
1	10 04	10 14	11:50	15:38	03:08	4d 22%
2	10 24	10 33	11:49	16:37	04:08	5d 33%
3	10 43	10 52	11:49	17:34	05:06	6d 43%

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2011 October 4, 5, 6 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
4 00	12° 20'.5	170° 17'.6	8° 19'.7 S	240° 36'.8	19° 08'.2 N	335° 47'.9	12° 55'.1 N	173° 58'.2	5° 20'.9 S
01	27° 23'.0	185° 17'.2	20'.9	255° 37'.8	07'.8	350° 50'.6	55'.0	189° 00'.4	21'.1
02	42° 25'.4	200° 16'.8	22'.1	270° 38'.7	07'.5	5° 53'.4	54'.9	204° 02'.6	21'.2
03	57° 27'.9	215° 16'.3	23'.4	285° 39'.7	07'.1	20° 56'.1	54'.8	219° 04'.8	21'.3
T 04	72° 30'.4	230° 15'.9	24'.6	300° 40'.6	06'.8	35° 58'.8	54'.7	234° 07'.0	21'.4
u 05	87° 32'.8	245° 15'.5	25'.8	315° 41'.6	06'.4	51° 01'.5	54'.6	249° 09'.2	21'.5
e 06	102° 35'.3	260° 15'.1	27'.0	330° 42'.5	06'.1	66° 04'.2	54'.5	264° 11'.3	21'.6
s 07	117° 37'.8	275° 14'.6	28'.2	345° 43'.5	05'.7	81° 07'.0	54'.4	279° 13'.5	21'.7
d 08	132° 40'.2	290° 14'.2	29'.5	0° 44'.4	05'.4	96° 09'.7	54'.4	294° 15'.7	21'.9
a 09	147° 42'.7	305° 13'.8	30'.7	15° 45'.4	05'.0	111° 12'.4	54'.3	309° 17'.9	22'.0
y 10	162° 45'.1	320° 13'.4	31'.9	30° 46'.3	04'.6	126° 15'.1	54'.2	324° 20'.1	22'.1
11	177° 47'.6	335° 12'.9	33'.1	45° 47'.3	04'.3	141° 17'.8	54'.1	339° 22'.3	22'.2
12	192° 50'.1	350° 12'.5	8° 34'.3 S	60° 48'.2	19° 03'.9 N	156° 20'.6	12° 54'.0 N	354° 24'.4	5° 22'.3 S
13	207° 52'.5	5° 12'.1	35'.6	75° 49'.2	03'.6	171° 23'.3	53'.9	9° 26'.6	22'.4
14	222° 55'.0	20° 11'.6	36'.8	90° 50'.1	03'.2	186° 26'.0	53'.8	24° 28'.8	22'.6
15	237° 57'.5	35° 11'.2	38'.0	105° 51'.1	02'.9	201° 28'.7	53'.7	39° 31'.0	22'.7
16	252° 59'.9	50° 10'.8	39'.2	120° 52'.1	02'.5	216° 31'.4	53'.6	54° 33'.2	22'.8
17	268° 02'.4	65° 10'.3	40'.4	135° 53'.0	02'.2	231° 34'.2	53'.6	69° 35'.4	22'.9
18	283° 04'.9	80° 09'.9	41'.6	150° 54'.0	01'.8	246° 36'.9	53'.5	84° 37'.5	23'.0
19	298° 07'.3	95° 09'.5	42'.8	165° 54'.9	01'.4	261° 39'.6	53'.4	99° 39'.7	23'.1
20	313° 09'.8	110° 09'.0	44'.1	180° 55'.9	01'.1	276° 42'.3	53'.3	114° 41'.9	23'.2
21	328° 12'.3	125° 08'.6	45'.3	195° 56'.8	00'.7	291° 45'.1	53'.2	129° 44'.1	23'.4
22	343° 14'.7	140° 08'.2	46'.5	210° 57'.8	00'.4	306° 47'.8	53'.1	144° 46'.3	23'.5
23	358° 17'.2	155° 07'.7	47'.7	225° 58'.8	00'.0	321° 50'.5	53'.0	159° 48'.4	23'.6
5 00	13° 19'.6	170° 07'.3	8° 48'.9 S	240° 59'.7	18° 59'.7 N	336° 53'.2	12° 52'.9 N	174° 50'.6	5° 23'.7 S
01	28° 22'.1	185° 06'.9	50'.1	256° 00'.7	59'.3	351° 56'.0	52'.8	189° 52'.8	23'.8
02	43° 24'.6	200° 06'.4	51'.3	271° 01'.6	58'.9	6° 58'.7	52'.7	204° 55'.0	23'.9
03	58° 27'.0	215° 06'.0	52'.6	286° 02'.6	58'.6	22° 01'.4	52'.7	219° 57'.2	24'.1
W 04	73° 29'.5	230° 05'.6	53'.8	301° 03'.5	58'.2	37° 04'.1	52'.6	234° 59'.4	24'.2
e 05	88° 32'.0	245° 05'.1	55'.0	316° 04'.5	57'.9	52° 06'.9	52'.5	250° 01'.5	24'.3
d 06	103° 34'.4	260° 04'.7	56'.2	331° 05'.5	57'.5	67° 09'.6	52'.4	265° 03'.7	24'.4
n 07	118° 36'.9	275° 04'.3	57'.4	346° 06'.4	57'.2	82° 12'.3	52'.3	280° 05'.9	24'.5
e 08	133° 39'.4	290° 03'.8	58'.6	1° 07'.4	56'.8	97° 15'.0	52'.2	295° 08'.1	24'.6
s 09	148° 41'.8	305° 03'.4	59'.8	16° 08'.3	56'.4	112° 17'.8	52'.1	310° 10'.3	24'.7
d 10	163° 44'.3	320° 03'.0	9° 01'.0 S	31° 09'.3	56'.1	127° 20'.5	52'.0	325° 12'.4	24'.9
a 11	178° 46'.8	335° 02'.5	02'.2	46° 10'.3	55'.7	142° 23'.2	51'.9	340° 14'.6	25'.0
y 12	193° 49'.2	350° 02'.1	9° 03'.5 S	61° 11'.2	18° 55'.4 N	157° 25'.9	12° 51'.8 N	355° 16'.8	5° 25'.1 S
13	208° 51'.7	5° 01'.7	04'.7	76° 12'.2	55'.0	172° 28'.7	51'.8	10° 19'.0	25'.2
14	223° 54'.1	20° 01'.2	05'.9	91° 13'.1	54'.6	187° 31'.4	51'.7	25° 21'.2	25'.3
15	238° 56'.6	35° 00'.8	07'.1	106° 14'.1	54'.3	202° 34'.1	51'.6	40° 23'.4	25'.4
16	253° 59'.1	50° 00'.3	08'.3	121° 15'.1	53'.9	217° 36'.8	51'.5	55° 25'.5	25'.6
17	269° 01'.5	64° 59'.9	09'.5	136° 16'.0	53'.6	232° 39'.6	51'.4	70° 27'.7	25'.7
18	284° 04'.0	79° 59'.5	10'.7	151° 17'.0	53'.2	247° 42'.3	51'.3	85° 29'.9	25'.8
19	299° 06'.5	94° 59'.0	11'.9	166° 18'.0	52'.8	262° 45'.0	51'.2	100° 32'.1	25'.9
20	314° 08'.9	109° 58'.6	13'.1	181° 18'.9	52'.5	277° 47'.8	51'.1	115° 34'.3	26'.0
21	329° 11'.4	124° 58'.1	14'.3	196° 19'.9	52'.1	292° 50'.5	51'.0	130° 36'.4	26'.1
22	344° 13'.9	139° 57'.7	15'.5	211° 20'.8	51'.8	307° 53'.2	50'.9	145° 38'.6	26'.2
23	359° 16'.3	154° 57'.3	16'.7	226° 21'.8	51'.4	322° 55'.9	50'.8	160° 40'.8	26'.4
6 00	14° 18'.8	169° 56'.8	9° 17'.9 S	241° 22'.8	18° 51'.0 N	337° 58'.7	12° 50'.8 N	175° 43'.0	5° 26'.5 S
01	29° 21'.2	184° 56'.4	19'.1	256° 23'.7	50'.7	353° 01'.4	50'.7	190° 45'.2	26'.6
02	44° 23'.7	199° 55'.9	20'.3	271° 24'.7	50'.3	8° 04'.1	50'.6	205° 47'.4	26'.7
03	59° 26'.2	214° 55'.5	21'.6	286° 25'.7	50'.0	23° 06'.9	50'.5	220° 49'.5	26'.8
T 04	74° 28'.6	229° 55'.1	22'.8	301° 26'.6	49'.6	38° 09'.6	50'.4	235° 51'.7	26'.9
h 05	89° 31'.1	244° 54'.6	24'.0	316° 27'.6	49'.2	53° 12'.3	50'.3	250° 53'.9	27'.0
u 06	104° 33'.6	259° 54'.2	25'.2	331° 28'.6	48'.9	68° 15'.1	50'.2	265° 56'.1	27'.2
r 07	119° 36'.0	274° 53'.7	26'.4	346° 29'.5	48'.5	83° 17'.8	50'.1	280° 58'.3	27'.3
s 08	134° 38'.5	289° 53'.3	27'.6	1° 30'.5	48'.2	98° 20'.5	50'.0	296° 00'.4	27'.4
d 09	149° 41'.0	304° 52'.8	28'.8	16° 31'.5	47'.8	113° 23'.3	49'.9	311° 02'.6	27'.5
a 10	164° 43'.4	319° 52'.4	30'.0	31° 32'.4	47'.4	128° 26'.0	49'.8	326° 04'.8	27'.6
y 11	179° 45'.9	334° 52'.0	31'.2	46° 33'.4	47'.1	143° 28'.7	49'.7	341° 07'.0	27'.7
12	194° 48'.4	349° 51'.5	9° 32'.4 S	61° 34'.4	18° 46'.7 N	158° 31'.4	12° 49'.7 N	356° 09'.2	5° 27'.9 S
13	209° 50'.8	4° 51'.1	33'.6	76° 35'.3	46'.4	173° 34'.2	49'.6	11° 11'.4	28'.0
14	224° 53'.3	19° 50'.6	34'.8	91° 36'.3	46'.0	188° 36'.9	49'.5	26° 13'.5	28'.1
15	239° 55'.7	34° 50'.2	36'.0	106° 37'.3	45'.6	203° 39'.6	49'.4	41° 15'.7	28'.2
16	254° 58'.2	49° 49'.7	37'.2	121° 38'.2	45'.3	218° 42'.4	49'.3	56° 17'.9	28'.3
17	270° 00'.7	64° 49'.3	38'.4	136° 39'.2	44'.9	233° 45'.1	49'.2	71° 20'.1	28'.4
18	285° 03'.1	79° 48'.8	39'.6	151° 40'.2	44'.5	248° 47'.8	49'.1	86° 22'.3	28'.5
19	300° 05'.6	94° 48'.4	40'.8	166° 41'.1	44'.2	263° 50'.6	49'.0	101° 24'.4	28'.7
20	315° 08'.1	109° 47'.9	42'.0	181° 42'.1	43'.8	278° 53'.3	48'.9	116° 26'.6	28'.8
21	330° 10'.5	124° 47'.5	43'.2	196° 43'.1	43'.5	293° 56'.0	48'.8	131° 28'.8	28'.9
22	345° 13'.0	139° 47'.0	44'.4	211° 44'.1	43'.1	308° 58'.8	48'.7	146° 31'.0	29'.0
23	0° 15'.5	154° 46'.6	45'.6	226° 45'.0	42'.7	324° 01'.5	48'.6	161° 33'.2	29'.1
	M.P. 23:03	v -0'.4	d 1'.2	v 1'.0	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.9	40° 15'.2 S
Achernar	335° 27'.0	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.9 S
Adhara	255° 13'.5	28° 59'.1 S
Aldebaran	290° 50'.6	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.7 N
Alkaid	153° 00'.3	49° 15'.3 N
Alnair	27° 44'.8	46° 54'.2 S
Alnilam	275° 47'.5	1° 11'.6 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.3	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.1	69° 03'.1 S
Avior	234° 18'.8	59° 32'.6 S
Bellatrix	278° 33'.2	6° 21'.7 N
Betelgeuse	271° 02'.5	7° 24'.6 N
Canopus	263° 56'.6	52° 41'.9 S
Capella	280° 36'.0	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.7 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.7	61° 41'.1 N
Elnath	278° 14'.0	28° 37'.0 N
Eltanin	90° 46'.8	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.7 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.4	34° 22'.7 S
Kochab	137° 20'.8	74° 06'.6 N
Markab	13° 39'.2	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.5	69° 45'.8 S
Mirfak	308° 41'.7	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.8	56° 41'.9 S
Polaris	317° 59'.5	89° 18'.8 N
Pollux	243° 29'.3	27° 59'.7 N
Procyon	245° 01'.0	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.1	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.1 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.3 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.8	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.6	43° 28'.6 S
Vega	80° 39'.8	38° 48'.1 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	156° 47'.7	12:40
Mars	227° 40'.1	07:56
Jupiter	323° 33'.6	01:32
Saturn	161° 31'.0	12:19

SUN		MOON				
GHA	Dec	GHA	v	Dec	d	HP
182° 45'.5	4° 07'.7 S	92° 55'.9	8'.2	21° 14'.9 S	4'.9	57'.5
197° 45'.7	08'.7	107° 23'.1	8'.4	10'.0	5'.1	57'.4
212° 45'.9	09'.6	121° 50'.5	8'.4	04'.9	5'.1	
227° 46'.1	10'.6	136° 17'.9	8'.5	20° 59'.8 S	5'.3	
242° 46'.3	11'.6	150° 45'.4	8'.6	54'.5	5'.4	57'.3
257° 46'.5	12'.5	165° 13'.0	8'.7	49'.1	5'.5	
272° 46'.7	13'.5	179° 40'.7	8'.7	43'.6	5'.6	57'.2
287° 46'.9	14'.5	194° 08'.4	8'.9	38'.0	5'.7	
302° 47'.1	15'.4	208° 36'.3	8'.9	32'.3	5'.8	
317° 47'.3	16'.4	223° 04'.2	9'.0	26'.5	6'.0	57'.1
332° 47'.5	17'.4	237° 32'.2	9'.1	20'.5	6'.0	
347° 47'.7	18'.3	252° 00'.3	9'.2	14'.5	6'.1	
2° 47'.8	4° 19'.3 S	266° 28'.5	9'.3	20° 08'.4 S	6'.3	57'.0
17° 48'.0	20'.2	280° 56'.8	9'.3	02'.1	6'.3	
32° 48'.2	21'.2	295° 25'.1	9'.5	19° 55'.8 S	6'.4	
47° 48'.4	22'.2	309° 53'.6	9'.5	49'.4	6'.6	56'.9
62° 48'.6	23'.1	324° 22'.1	9'.6	42'.8	6'.6	
77° 48'.8	24'.1	338° 50'.7	9'.7	36'.2	6'.8	
92° 49'.0	25'.1	353° 19'.4	9'.8	29'.4	6'.8	56'.8
107° 49'.2	26'.0	7° 48'.2	9'.9	22'.6	6'.9	
122° 49'.4	27'.0	22° 17'.1	9'.9	15'.7	7'.1	
137° 49'.6	28'.0	36° 46'.0	10'.0	08'.6	7'.1	56'.7
152° 49'.8	28'.9	51° 15'.0	10'.2	01'.5	7'.2	
167° 50'.0	29'.9	65° 44'.2	10'.2	18° 54'.3 S	7'.3	
182° 50'.1	4° 30'.8 S	80° 13'.4	10'.3	18° 47'.0 S	7'.4	56'.7
197° 50'.3	31'.8	94° 42'.7	10'.3	39'.6	7'.4	56'.6
212° 50'.5	32'.8	109° 12'.0	10'.5	32'.2	7'.6	
227° 50'.7	33'.7	123° 41'.5	10'.5	24'.6	7'.7	
242° 50'.9	34'.7	138° 11'.0	10'.7	16'.9	7'.7	56'.5
257° 51'.1	35'.7	152° 40'.7	10'.7	09'.2	7'.8	
272° 51'.3	36'.6	167° 10'.4	10'.8	01'.4	7'.9	
287° 51'.5	37'.6	181° 40'.2	10'.9	17° 53'.5 S	8'.0	56'.4
302° 51'.7	38'.5	196° 10'.1	10'.9	45'.5	8'.1	
317° 51'.9	39'.5	210° 40'.0	11'.1	37'.4	8'.1	
332° 52'.0	40'.5	225° 10'.1	11'.1	29'.3	8'.2	56'.3
347° 52'.2	41'.4	239° 40'.2	11'.2	21'.1	8'.4	
2° 52'.4	4° 42'.4 S	254° 10'.4	11'.3	17° 12'.7 S	8'.3	56'.3
17° 52'.6	43'.4	268° 40'.7	11'.3	04'.4	8'.5	
32° 52'.8	44'.3	283° 11'.0	11'.5	16° 55'.9 S	8'.5	56'.2
47° 53'.0	45'.3	297° 41'.5	11'.5	47'.4	8'.6	
62° 53'.2	46'.2	312° 12'.0	11'.6	38'.8	8'.7	
77° 53'.4	47'.2	326° 42'.6	11'.7	30'.1	8'.8	56'.1
92° 53'.5	48'.2	341° 13'.3	11'.7	21'.3	8'.8	
107° 53'.7	49'.1	355° 44'.0	11'.9	12'.5	8'.9	
122° 53'.9	50'.1	10° 14'.9	11'.9	03'.6	8'.9	
137° 54'.1	51'.0	24° 45'.8	12'.0	15° 54'.7 S	9'.0	56'.0
152° 54'.3	52'.0	39° 16'.8	12'.1	45'.7	9'.1	
167° 54'.5	53'.0	53° 47'.9	12'.1	36'.6	9'.2	
182° 54'.7	4° 53'.9 S	68° 19'.0	12'.2	15° 27'.4 S	9'.2	55'.9
197° 54'.9	54'.9	82° 50'.2	12'.3	18'.2	9'.3	
212° 55'.0	55'.9	97° 21'.5	12'.4	08'.9	9'.4	
227° 55'.2	56'.8	111° 52'.9	12'.4	14° 59'.5 S	9'.4	
242° 55'.4	57'.8	126° 24'.3	12'.5	50'.1	9'.4	55'.8
257° 55'.6	58'.7	140° 55'.8	12'.6	40'.7	9'.6	
272° 55'.8	59'.7	155° 27'.4	12'.7	31'.1	9'.6	
287° 56'.0	5° 00'.7 S	169° 59'.1	12'.7	21'.5	9'.6	
302° 56'.2	01'.6	184° 30'.8	12'.8	11'.9	9'.7	55'.7
317° 56'.3	02'.6	199° 02'.6	12'.9	02'.2	9'.8	
332° 56'.5	03'.5	213° 34'.5	12'.9	13° 52'.4 S	9'.8	
347° 56'.7	04'.5	228° 06'.4	13'.0	42'.6	9'.9	
2° 56'.9	5° 05'.4 S	242° 38'.4	13'.1	13° 32'.7 S	9'.9	55'.6
17° 57'.1	06'.4	257° 10'.5	13'.1	22'.8	9'.9	
32° 57'.3	07'.4	271° 42'.6	13'.2	12'.9	10'.1	
47° 57'.5	08'.3	286° 14'.8	13'.3	02'.8	10'.0	
62° 57'.6	09'.3	300° 47'.1	13'.3	12° 52'.8 S	10'.2	55'.5
77° 57'.8	10'.2	315° 19'.4	13'.4	42'.6	10'.1	
92° 58'.0	11'.2	329° 51'.8	13'.4	32'.5	10'.3	
107° 58'.2	12'.2	344° 24'.2	13'.6	22'.2	10'.2	
122° 58'.4	13'.1	358° 56'.8	13'.5	12'.0	10'.3	55'.4
137° 58'.6	14'.1	13° 29'.3	13'.7	01'.7	10'.4	
152° 58'.7	15'.0	28° 02'.0	13'.7	11° 51'.3 S	10'.4	
167° 58'.9	16'.0	42° 34'.7	13'.7	40'.9	10'.4	
SD 16'.0	d 1'.0	SD	15'.5	15'.3	15'.2	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 4	Moonrise 5	Moonrise 6
N 72°	04:07	05:28	06:35	-	17:38	16:57
N 70°	04:17	05:29	06:30	17:41	16:54	16:34
68°	04:25	05:30	06:26	16:35	16:24	16:16
66°	04:31	05:31	06:22	15:59	16:02	16:02
64°	04:36	05:32	06:19	15:33	15:44	15:50
62°	04:40	05:32	06:16	15:13	15:29	15:40
60°	04:44	05:32	06:14	14:56	15:17	15:31
N 58°	04:47	05:33	06:12	14:42	15:06	15:23
56°	04:50	05:33	06:10	14:30	14:56	15:16
54°	04:52	05:33	06:08	14:20	14:48	15:10
52°	04:54	05:33	06:07	14:10	14:41	15:05
50°	04:56	05:33	06:05	14:02	14:34	15:00
45°	04:59	05:33	06:02	13:44	14:19	14:49
N 40°	05:01	05:33	06:00	13:29	14:07	14:40
35°	05:03	05:32	05:57	13:17	13:57	14:32
30°	05:04	05:31	05:55	13:06	13:48	14:25
20°	05:04	05:30	05:52	12:47	13:32	14:14
N 10°	05:03	05:27	05:48	12:31	13:19	14:03
0°	05:00	05:25	05:45	12:15	13:06	13:53
S 10°	04:56	05:21	05:42	12:00	12:53	13:44
20°	04:50	05:16	05:38	11:43	12:39	13:33
30°	04:42	05:10	05:34	11:24	12:24	13:21
35°	04:36	05:06	05:32	11:13	12:14	13:14
40°	04:29	05:01	05:29	11:01	12:04	13:06
45°	04:20	04:56	05:25	10:46	11:51	12:57
S 50°	04:09	04:49	05:21	10:27	11:36	12:45
52°	04:04	04:45	05:19	10:18	11:29	12:40
54°	03:58	04:41	05:17	10:09	11:21	12:34
56°	03:51	04:37	05:15	09:58	11:13	12:28
58°	03:43	04:32	05:13	09:45	11:03	12:21
S 60°	03:34	04:27	05:10	09:30	10:51	12:12
S 62°	03:23	04:21	05:07	09:12	10:37	12:03

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 4	Moonset 5	Moonset 6
N 72°	17:00	18:07	19:27	-	21:14	23:32
N 70°	17:05	18:06	19:17	19:26	21:57	23:53
68°	17:10	18:05	19:10	20:31	22:26	24:10
66°	17:13	18:04	19:04	21:06	22:47	24:23
64°	17:17	18:04	18:59	21:32	23:04	24:34
62°	17:19	18:03	18:55	21:51	23:18	24:43
60°	17:22	18:03	18:51	22:07	23:30	24:51
N 58°	17:24	18:03	18:48	22:21	23:40	24:58
56°	17:26	18:03	18:46	22:33	23:48	25:04
54°	17:28	18:03	18:44	22:43	23:56	25:09
52°	17:29	18:03	18:42	22:52	-	00:03
50°	17:31	18:03	18:40	23:00	-	00:09
45°	17:34	18:03	18:37	23:17	-	00:23
N 40°	17:37	18:04	18:35	23:31	-	00:34
35°	17:39	18:04	18:34	23:43	-	00:43
30°	17:41	18:05	18:33	23:53	-	00:51
20°	17:45	18:07	18:33	-	00:11	01:05
N 10°	17:48	18:09	18:34	-	00:26	01:18
0°	17:52	18:13	18:37	-	00:40	01:29
S 10°	17:55	18:16	18:41	00:04	00:54	01:40
20°	17:59	18:21	18:47	00:21	01:09	01:52
30°	18:03	18:28	18:56	00:41	01:26	02:06
35°	18:06	18:32	19:02	00:52	01:36	02:14
40°	18:09	18:36	19:09	01:06	01:48	02:23
45°	18:12	18:42	19:18	01:21	02:01	02:33
S 50°	18:17	18:50	19:29	01:41	02:17	02:46
52°	18:19	18:53	19:35	01:50	02:24	02:52
54°	18:21	18:57	19:41	02:00	02:33	02:58
56°	18:23	19:01	19:48	02:11	02:42	03:05
58°	18:26	19:06	19:56	02:24	02:53	03:13
S 60°	18:29	19:12	20:06	02:40	03:05	03:22
S 62°	18:32	19:18	20:17	02:58	03:19	03:33

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
4	11 02	11 11	11:49	18:28	06:01	7d 54%
5	11 20	11 29	11:49	19:18	06:53	8d 64%
6	11 38	11 47	11:48	20:04	07:41	9d 73%

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2011 October 7, 8, 9 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.3		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
7 00	15° 17'.9	169° 46'.2	9° 46'.8 S	241° 46'.0	18° 42'.4 N	339° 04'.2	12° 48'.5 N	176° 35'.4	5° 29'.2 S
01	30° 20'.4	184° 45'.7	48'.0	256° 47'.0	42'.0	354° 07'.0	48'.5	191° 37'.5	29'.4
02	45° 22'.9	199° 45'.3	49'.1	271° 47'.9	41'.6	9° 09'.7	48'.4	206° 39'.7	29'.5
03	60° 25'.3	214° 44'.8	50'.3	286° 48'.9	41'.3	24° 12'.5	48'.3	221° 41'.9	29'.6
04	75° 27'.8	229° 44'.4	51'.5	301° 49'.9	40'.9	39° 15'.2	48'.2	236° 44'.1	29'.7
05	90° 30'.2	244° 43'.9	52'.7	316° 50'.9	40'.5	54° 17'.9	48'.1	251° 46'.3	29'.8
06	105° 32'.7	259° 43'.5	53'.9	331° 51'.8	40'.2	69° 20'.7	48'.0	266° 48'.4	29'.9
07	120° 35'.2	274° 43'.0	55'.1	346° 52'.8	39'.8	84° 23'.4	47'.9	281° 50'.6	30'.0
08	135° 37'.6	289° 42'.6	56'.3	1° 53'.8	39'.4	99° 26'.1	47'.8	296° 52'.8	30'.2
09	150° 40'.1	304° 42'.1	57'.5	16° 54'.8	39'.1	114° 28'.9	47'.7	311° 55'.0	30'.3
10	165° 42'.6	319° 41'.6	58'.7	31° 55'.7	38'.7	129° 31'.6	47'.6	326° 57'.2	30'.4
11	180° 45'.0	334° 41'.2	59'.9	46° 56'.7	38'.4	144° 34'.3	47'.5	341° 59'.3	30'.5
12	195° 47'.5	349° 40'.7	10° 01'.1 S	61° 57'.7	18° 38'.0 N	159° 37'.1	12° 47'.4 N	357° 01'.5	5° 30'.6 S
13	210° 50'.0	4° 40'.3	02'.3	76° 58'.7	37'.6	174° 39'.8	47'.3	12° 03'.7	30'.7
14	225° 52'.4	19° 39'.8	03'.5	91° 59'.6	37'.3	189° 42'.6	47'.2	27° 05'.9	30'.8
15	240° 54'.9	34° 39'.4	04'.7	107° 00'.6	36'.9	204° 45'.3	47'.1	42° 08'.1	31'.0
16	255° 57'.3	49° 38'.9	05'.8	122° 01'.6	36'.5	219° 48'.0	47'.1	57° 10'.3	31'.1
17	270° 59'.8	64° 38'.5	07'.0	137° 02'.6	36'.2	234° 50'.8	47'.0	72° 12'.4	31'.2
18	286° 02'.3	79° 38'.0	08'.2	152° 03'.5	35'.8	249° 53'.5	46'.9	87° 14'.6	31'.3
19	301° 04'.7	94° 37'.6	09'.4	167° 04'.5	35'.4	264° 56'.2	46'.8	102° 16'.8	31'.4
20	316° 07'.2	109° 37'.1	10'.6	182° 05'.5	35'.1	279° 59'.0	46'.7	117° 19'.0	31'.5
21	331° 09'.7	124° 36'.7	11'.8	197° 06'.5	34'.7	295° 01'.7	46'.6	132° 21'.2	31'.7
22	346° 12'.1	139° 36'.2	13'.0	212° 07'.4	34'.3	310° 04'.5	46'.5	147° 23'.3	31'.8
23	1° 14'.6	154° 35'.7	14'.2	227° 08'.4	34'.0	325° 07'.2	46'.4	162° 25'.5	31'.9
8 00	16° 17'.1	169° 35'.3	10° 15'.3 S	242° 09'.4	18° 33'.6 N	340° 09'.9	12° 46'.3 N	177° 27'.7	5° 32'.0 S
01	31° 19'.5	184° 34'.8	16'.5	257° 10'.4	33'.2	355° 12'.7	46'.2	192° 29'.9	32'.1
02	46° 22'.0	199° 34'.4	17'.7	272° 11'.4	32'.9	10° 15'.4	46'.1	207° 32'.1	32'.2
03	61° 24'.5	214° 33'.9	18'.9	287° 12'.3	32'.5	25° 18'.2	46'.0	222° 34'.2	32'.3
04	76° 26'.9	229° 33'.5	20'.1	302° 13'.3	32'.1	40° 20'.9	45'.9	237° 36'.4	32'.5
05	91° 29'.4	244° 33'.0	21'.3	317° 14'.3	31'.8	55° 23'.6	45'.8	252° 38'.6	32'.6
06	106° 31'.8	259° 32'.5	22'.5	332° 15'.3	31'.4	70° 26'.4	45'.7	267° 40'.8	32'.7
07	121° 34'.3	274° 32'.1	23'.6	347° 16'.2	31'.0	85° 29'.1	45'.6	282° 43'.0	32'.8
08	136° 36'.8	289° 31'.6	24'.8	2° 17'.2	30'.7	100° 31'.9	45'.5	297° 45'.2	32'.9
09	151° 39'.2	304° 31'.2	26'.0	17° 18'.2	30'.3	115° 34'.6	45'.4	312° 47'.3	33'.0
10	166° 41'.7	319° 30'.7	27'.2	32° 19'.2	29'.9	130° 37'.3	45'.4	327° 49'.5	33'.1
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14	226° 51'.6	19° 28'.9	31'.9	92° 23'.1	28'.5	190° 48'.3	45'.0	27° 58'.2	33'.6
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20	317° 06'.3	109° 26'.1	39'.0	182° 29'.0	26'.2	281° 04'.8	44'.4	118° 11'.3	34'.3
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9 00	17° 16'.2	169° 24'.2	10° 43'.7 S	242° 33'.0	18° 24'.8 N	341° 15'.7	12° 44'.0 N	178° 20'.0	5° 34'.8 S
01	32° 18'.7	184° 23'.7	44'.9	257° 33'.9	24'.4	356° 18'.5	43'.9	193° 22'.2	34'.9
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05	92° 28'.5	244° 21'.9	49'.6	317° 37'.9	22'.9	56° 29'.5	43'.5	253° 30'.9	35'.3
06	107° 31'.0	259° 21'.4	50'.8	332° 38'.9	22'.6	71° 32'.2	43'.4	268° 33'.1	35'.4
07	122° 33'.4	274° 20'.9	51'.9	347° 39'.9	22'.2	86° 35'.0	43'.3	283° 35'.3	35'.6
08	137° 35'.9	289° 20'.5	53'.1	2° 40'.8	21'.8	101° 37'.7	43'.2	298° 37'.5	35'.7
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11	182° 43'.3	334° 19'.1	56'.6	47° 43'.8	20'.7	146° 45'.9	43'.0	343° 44'.0	36'.0
12	197° 45'.8	349° 18'.6	10° 57'.8 S	62° 44'.8	18° 20'.3 N	161° 48'.7	12° 42'.9 N	358° 46'.2	5° 36'.1 S
13	212° 48'.2	4° 18'.1	59'.0	77° 45'.8	20'.0	176° 51'.4	42'.8	13° 48'.4	36'.3
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20	318° 05'.5	109° 14'.8	07'.2	182° 52'.7	17'.4	282° 10'.7	42'.1	119° 03'.7	37'.1
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	M.P. 22:51	v -0'.5	d 1'.2	v 1'.0	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.9	40° 15'.2 S
Achernar	335° 27'.0	57° 10'.4 S
Acrux	173° 11'.5	63° 09'.8 S
Adhara	255° 13'.5	28° 59'.1 S
Aldebaran	290° 50'.6	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.7 N
Alkaid	153° 00'.3	49° 15'.3 N
Alnair	27° 44'.8	46° 54'.2 S
Alnilam	275° 47'.5	1° 11'.6 S
Alphard	217° 57'.5	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.3	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.2	69° 03'.1 S
Avior	234° 18'.8	59° 32'.6 S
Bellatrix	278° 33'.2	6° 21'.7 N
Betelgeuse	271° 02'.5	7° 24'.6 N
Canopus	263° 56'.6	52° 41'.9 S
Capella	280° 36'.0	46° 00'.4 N
Deneb	49° 32'.1	45° 19'.8 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.6	61° 41'.0 N
Elnath	278° 14'.0	28° 37'.0 N
Eltanin	90° 46'.8	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.7 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.5	34° 22'.7 S
Kochab	137° 20'.9	74° 06'.5 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.5	69° 45'.7 S
Mirfak	308° 41'.7	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.9 S
Polaris	317° 58'.8	89° 18'.8 N
Pollux	243° 29'.2	27° 59'.7 N
Procyon	245° 01'.0	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.1	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.1 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.3 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.7	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.6	43° 28'.6 S
Vega	80° 39'.8	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	153° 18'.2	12:42
Mars	225° 52'.3	07:51
Jupiter	323° 52'.9	01:19
Saturn	161° 10'.6	12:08

SUN

GHA	v	Dec	d
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197° 59'.3	17'.9	71° 40'.3	13'.8	20'.0	10'.6
212° 59'.5	18'.9	86° 13'.1	14'.0	09'.4	10'.5
227° 59'.7	19'.8	100° 46'.1	14'.0	10° 58'.9 S	10'.6
242° 59'.8	20'.8	115° 19'.1	14'.0	48'.3	10'.7
258° 00'.0	21'.7	129° 52'.1	14'.1	37'.6	10'.7
273° 00'.2	22'.7	144° 25'.2	14'.2	26'.9	10'.7
288° 00'.4	23'.7	158° 58'.4	14'.2	16'.2	10'.7
303° 00'.6	24'.6	173° 31'.6	14'.2	05'.5	10'.8
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333° 00'.9	26'.5	202° 38'.1	14'.4	43'.8	10'.8
348° 01'.1	27'.5	217° 11'.5	14'.4	33'.0	10'.9
3° 01'.3	5° 28'.4 S	231° 44'.9	14'.5	9° 22'.1 S	10'.9
18° 01'.5	29'.4	246° 18'.4	14'.5	11'.2	11'.0
33° 01'.7	30'.3	260° 51'.9	14'.5	00'.2	11'.0
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78° 02'.2	33'.2	304° 32'.7	14'.7	27'.2	11'.1
93° 02'.4	34'.2	319° 06'.4	14'.7	16'.1	11'.1
108° 02'.6	35'.1	333° 40'.1	14'.8	05'.0	11'.2
123° 02'.7	36'.1	348° 13'.9	14'.8	7° 53'.8 S	11'.1
138° 02'.9	37'.0	2° 47'.7	14'.9	42'.7	11'.2
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168° 03'.3	38'.9	31° 55'.5	14'.9	20'.3	11'.2
183° 03'.5	5° 39'.9 S	46° 29'.4	15'.0	7° 09'.1 S	11'.3
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243° 04'.2	43'.7	104° 45'.6	15'.1	24'.0	11'.4
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273° 04'.5	45'.6	133° 53'.9	15'.2	01'.3	11'.4
288° 04'.7	46'.6	148° 28'.1	15'.2	5° 49'.9 S	11'.4
303° 04'.9	47'.5	163° 02'.3	15'.3	38'.5	11'.4
318° 05'.1	48'.5	177° 36'.6	15'.3	27'.1	11'.4
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3° 05'.6	5° 51'.4 S	221° 19'.6	15'.4	4° 52'.8 S	11'.4
18° 05'.8	52'.3	235° 54'.0	15'.4	41'.4	11'.5
33° 05'.9	53'.3	250° 28'.4	15'.5	29'.9	11'.5
48° 06'.1	54'.2	265° 02'.9	15'.4	18'.4	11'.5
63° 06'.3	55'.2	279° 37'.3	15'.5	06'.9	11'.5
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93° 06'.7	57'.1	308° 46'.4	15'.5	43'.9	11'.6
108° 06'.8	58'.0	323° 20'.9	15'.6	32'.3	11'.5
123° 07'.0	59'.0	337° 55'.5	15'.6	20'.8	11'.5
138° 07'.2	59'.9	352° 30'.1	15'.6	09'.3	11'.6
153° 07'.4	6° 00'.9 S	7° 04'.7	15'.6	2° 57'.7 S	11'.6
168° 07'.5	01'.8	21° 39'.3	15'.7	46'.1	11'.5
183° 07'.7	6° 02'.8 S	36° 14'.0	15'.7	2° 34'.6 S	11'.6
198° 07'.9	03'.7	50° 48'.7	15'.7	23'.0	11'.6
213° 08'.1	04'.7	65° 23'.4	15'.7	11'.4	11'.5
228° 08'.2	05'.6	79° 58'.1	15'.7	1° 59'.9 S	11'.6
243° 08'.4	06'.6	94° 32'.8	15'.8	48'.3	11'.6
258° 08'.6	07'.5	109° 07'.6	15'.7	36'.7	11'.6
273° 08'.7	08'.5	123° 42'.3	15'.8	25'.1	11'.6
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303° 09'.1	10'.4	152° 51'.9	15'.8	01'.9	11'.5
318° 09'.3	11'.3	167° 26'.7	15'.8	0° 50'.4 S	11'.6
333° 09'.4	12'.3	182° 01'.5	15'.9	38'.8	11'.6
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3° 09'.8	6° 14'.2 S	211° 11'.2	15'.9	0° 15'.6 S	11'.6
18° 10'.0	15'.1	225° 46'.1	15'.8	04'.0	11'.5
33° 10'.1	16'.1	240° 20'.9	15'.9	0° 07'.5 N	11'.6
48° 10'.3	17'.0	254° 55'.8	15'.9	19'.1	11'.6
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78° 10'.6	18'.9	284° 05'.6	15'.9	42'.2	11'.6
93° 10'.8	19'.9	298° 40'.5	15'.9	53'.8	11'.5
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123° 11'.2	21'.8	327° 50'.3	15'.9	16'.8	11'.6
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SD 16'.0	d 1'.0	SD	15'.0	14'.9	14'.8

MOON

GHA	v	Dec	d	HP
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71° 40'.3	13'.8	20'.0	10'.6	
86° 13'.1	14'.0	09'.4	10'.5	
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202° 38'.1	14'.4	43'.8	10'.8	
217° 11'.5	14'.4	33'.0	10'.9	
231° 44'.9	14'.5	9° 22'.1 S	10'.9	55'.1
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275° 25'.4	14'.6	8° 49'.2 S	11'.0	
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304° 32'.7	14'.7	27'.2	11'.1	
319° 06'.4	14'.7	16'.1	11'.1	
333° 40'.1	14'.8	05'.0	11'.2	
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17° 21'.6	14'.9	31'.5	11'.2	
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61° 03'.4	15'.0	6° 57'.8 S	11'.2	54'.8
75° 37'.4	15'.1	46'.6	11'.3	
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163° 02'.3	15'.3	38'.5	11'.4	
177° 36'.6	15'.3	27'.1	11'.4	
192° 10'.9	15'.3	15'.7	11'.4	
206° 45'.2	15'.4	04'.3	11'.5	
221° 19'.6	15'.4	4° 52'.8 S	11'.4	54'.7
235° 54'.0	15'.4	41'.4	11'.5	54'.6
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323° 20'.9	15'.6	32'.3	11'.5	
337° 55'.5	15'.6	20'.8	11'.5	54'.5
352° 30'.1	15'.6	09'.3	11'.6	
7° 04'.7	15'.6	2° 57'.7 S	11'.6	
21° 39'.3	15'.7	46'.1	11'.5	
36° 14'.0	15'.7	2° 34'.6 S	11'.6	54'.5
50° 48'.7	15'.7	23'.0	11'.6	
65° 23'.4	15'.7	11'.4	11'.5	
79° 58'.1	15'.7	1° 59'.9 S	11'.6	
94° 32'.8	15'.8	48'.3	11'.6	54'.4
109° 07'.6	15'.7	36'.7	11'.6	
123° 42'.3	15'.8	25'.1	11'.6	
138° 17'.1	15'.8	13'.5	11'.6	
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182° 01'.5	15'.9	38'.8	11'.6	
196° 36'.4	15'.8	27'.2	11'.6	
211° 11'.2	15'.9	0° 15'.6 S	11'.6	54'.3
225° 46'.1	15'.8	04'.0	11'.5	
240° 20'.9	15'.9	0° 07'.5 N	11'.6	
254° 55'.8	15'.9	19'.1	11'.6	
269° 30'.7	15'.9	30'.7	11'.5	
284° 05'.6	15'.9	42'.2	11'.6	
298° 40'.5	15'.9	53'.8	11'.5	
313° 15'.4	15'.9	1° 05'.3 N	11'.5	
327° 50'.3	15'.9	16'.8	11'.6	
342° 25'.2	15'.9	28'.4	11'.5	54'.2
357° 00'.1	15'.9	39'.9	11'.5	
11° 35'.0	15'.9	51'.4	11'.5	
SD 15'.0		14'.9	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 7	Moonrise 8	Moonrise 9
N 72°	04:22	05:41	06:49	16:33	16:14	15:57
N 70°	04:29	05:41	06:42	16:20	16:08	15:57
68°	04:36	05:41	06:36	16:10	16:04	15:58
66°	04:41	05:40	06:32	16:01	16:00	15:58
64°	04:45	05:40	06:28	15:54	15:56	15:59
62°	04:48	05:40	06:24	15:47	15:53	15:59
60°	04:51	05:40	06:21	15:42	15:51	15:59
N 58°	04:54	05:39	06:19	15:37	15:49	15:59
56°	04:56	05:39	06:16	15:33	15:47	16:00
54°	04:58	05:39	06:14	15:29	15:45	16:00
52°	04:59	05:38	06:12	15:25	15:43	16:00
50°	05:00	05:38	06:10	15:22	15:42	16:00
45°	05:03	05:37	06:06	15:15	15:38	16:00
N 40°	05:04	05:36	06:03	15:09	15:35	16:01
35°	05:05	05:34	06:00	15:04	15:33	16:01
30°	05:05	05:33	05:57	14:59	15:31	16:01
20°	05:05	05:30	05:53	14:51	15:27	16:02
N 10°	05:03	05:27	05:48	14:45	15:24	16:02
0°	04:59	05:24	05:44	14:38	15:21	16:02
S 10°	04:55	05:19	05:40	14:32	15:18	16:03
20°	04:48	05:14	05:36	14:25	15:14	16:03
30°	04:38	05:06	05:30	14:17	15:11	16:04
35°	04:32	05:02	05:27	14:12	15:09	16:04
40°	04:24	04:57	05:24	14:07	15:06	16:04
45°	04:14	04:50	05:20	14:01	15:03	16:05
S 50°	04:02	04:42	05:15	13:53	15:00	16:05
52°	03:56	04:38	05:13	13:50	14:58	16:05
54°	03:49	04:34	05:10	13:46	14:57	16:06
56°	03:42	04:29	05:07	13:42	14:55	16:06
58°	03:33	04:24	05:04	13:37	14:52	16:06
S 60°	03:23	04:17	05:01	13:32

2011 October 10, 11, 12 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
10 Monday 00	18° 15'.3	169° 12'.9	11° 11'.8 S	242° 56'.7	18° 15'.9 N	342° 21'.7	12° 41'.7 N	179° 12'.4	5° 37'.5 S
01	33° 17'.8	184° 12'.5	13'.0	257° 57'.7	15'.5	357° 24'.4	41'.6	194° 14'.6	37'.6
02	48° 20'.3	199° 12'.0	14'.2	272° 58'.7	15'.1	12° 27'.2	41'.5	209° 16'.7	37'.7
03	63° 22'.7	214° 11'.5	15'.3	287° 59'.7	14'.8	27° 29'.9	41'.4	224° 18'.9	37'.9
04	78° 25'.2	229° 11'.0	16'.5	303° 00'.6	14'.4	42° 32'.7	41'.3	239° 21'.1	38'.0
05	93° 27'.7	244° 10'.6	17'.7	318° 01'.6	14'.0	57° 35'.4	41'.2	254° 23'.3	38'.1
06	108° 30'.1	259° 10'.1	18'.8	333° 02'.6	13'.6	72° 38'.2	41'.1	269° 25'.5	38'.2
07	123° 32'.6	274° 09'.6	20'.0	348° 03'.6	13'.3	87° 40'.9	41'.0	284° 27'.6	38'.3
08	138° 35'.0	289° 09'.1	21'.1	3° 04'.6	12'.9	102° 43'.7	40'.9	299° 29'.8	38'.4
09	153° 37'.5	304° 08'.6	22'.3	18° 05'.6	12'.5	117° 46'.4	40'.8	314° 32'.0	38'.5
10	168° 40'.0	319° 08'.2	23'.5	33° 06'.6	12'.1	132° 49'.2	40'.7	329° 34'.2	38'.7
11	183° 42'.4	334° 07'.7	24'.6	48° 07'.6	11'.8	147° 51'.9	40'.6	344° 36'.4	38'.8
12	198° 44'.9	349° 07'.2	11° 25'.8 S	63° 08'.6	18° 11'.4 N	162° 54'.7	12° 40'.5 N	359° 38'.5	5° 38'.9 S
13	213° 47'.4	4° 06'.7	27'.0	78° 09'.6	11'.0	177° 57'.4	40'.4	14° 40'.7	39'.0
14	228° 49'.8	19° 06'.2	28'.1	93° 10'.6	10'.6	193° 00'.2	40'.3	29° 42'.9	39'.1
15	243° 52'.3	34° 05'.8	29'.3	108° 11'.6	10'.3	208° 02'.9	40'.2	44° 45'.1	39'.2
16	258° 54'.8	49° 05'.3	30'.4	123° 12'.6	09'.9	223° 05'.7	40'.1	59° 47'.3	39'.3
17	273° 57'.2	64° 04'.8	31'.6	138° 13'.6	09'.5	238° 08'.4	40'.0	74° 49'.4	39'.5
18	288° 59'.7	79° 04'.3	32'.7	153° 14'.6	09'.1	253° 11'.2	39'.9	89° 51'.6	39'.6
19	304° 02'.2	94° 03'.8	33'.9	168° 15'.6	08'.8	268° 13'.9	39'.8	104° 53'.8	39'.7
20	319° 04'.6	109° 03'.4	35'.1	183° 16'.6	08'.4	283° 16'.7	39'.7	119° 56'.0	39'.8
21	334° 07'.1	124° 02'.9	36'.2	198° 17'.6	08'.0	298° 19'.4	39'.6	134° 58'.2	39'.9
22	349° 09'.5	139° 02'.4	37'.4	213° 18'.6	07'.7	313° 22'.2	39'.5	150° 00'.3	40'.0
23	4° 12'.0	154° 01'.9	38'.5	228° 19'.6	07'.3	328° 24'.9	39'.4	165° 02'.5	40'.2
11 Tuesday 00	19° 14'.5	169° 01'.4	11° 39'.7 S	243° 20'.6	18° 06'.9 N	343° 27'.7	12° 39'.3 N	180° 04'.7	5° 40'.3 S
01	34° 16'.9	184° 00'.9	40'.8	258° 21'.6	06'.5	358° 30'.4	39'.3	195° 06'.9	40'.4
02	49° 19'.4	199° 00'.5	42'.0	273° 22'.6	06'.2	13° 33'.2	39'.2	210° 09'.1	40'.5
03	64° 21'.9	214° 00'.0	43'.2	288° 23'.6	05'.8	28° 35'.9	39'.1	225° 11'.2	40'.6
04	79° 24'.3	228° 59'.5	44'.3	303° 24'.6	05'.4	43° 38'.7	39'.0	240° 13'.4	40'.7
05	94° 26'.8	243° 59'.0	45'.5	318° 25'.6	05'.0	58° 41'.5	38'.9	255° 15'.6	40'.8
06	109° 29'.3	258° 58'.5	46'.6	333° 26'.6	04'.6	73° 44'.2	38'.8	270° 17'.8	41'.0
07	124° 31'.7	273° 58'.0	47'.8	348° 27'.6	04'.3	88° 47'.0	38'.7	285° 20'.0	41'.1
08	139° 34'.2	288° 57'.5	48'.9	3° 28'.6	03'.9	103° 49'.7	38'.6	300° 22'.1	41'.2
09	154° 36'.6	303° 57'.1	50'.1	18° 29'.6	03'.5	118° 52'.5	38'.5	315° 24'.3	41'.3
10	169° 39'.1	318° 56'.6	51'.2	33° 30'.6	03'.1	133° 55'.2	38'.4	330° 26'.5	41'.4
11	184° 41'.6	333° 56'.1	52'.4	48° 31'.6	02'.8	148° 58'.0	38'.3	345° 28'.7	41'.5
12	199° 44'.0	348° 55'.6	11° 53'.5 S	63° 32'.6	18° 02'.4 N	164° 00'.7	12° 38'.2 N	0° 30'.9	5° 41'.6 S
13	214° 46'.5	3° 55'.1	54'.7	78° 33'.6	02'.0	179° 03'.5	38'.1	15° 33'.0	41'.8
14	229° 49'.0	18° 54'.6	55'.8	93° 34'.6	01'.6	194° 06'.2	38'.0	30° 35'.2	41'.9
15	244° 51'.4	33° 54'.1	57'.0	108° 35'.6	01'.3	209° 09'.0	37'.9	45° 37'.4	42'.0
16	259° 53'.9	48° 53'.6	58'.1	123° 36'.6	00'.9	224° 11'.8	37'.8	60° 39'.6	42'.1
17	274° 56'.4	63° 53'.1	59'.3	138° 37'.6	00'.5	239° 14'.5	37'.7	75° 41'.8	42'.2
18	289° 58'.8	78° 52'.6	12° 00'.4 S	153° 38'.6	00'.1	254° 17'.3	37'.6	90° 43'.9	42'.3
19	305° 01'.3	93° 52'.2	01'.6	168° 39'.6	17° 59'.8 N	269° 20'.0	37'.5	105° 46'.1	42'.4
20	320° 03'.8	108° 51'.7	02'.7	183° 40'.6	59'.4	284° 22'.8	37'.4	120° 48'.3	42'.6
21	335° 06'.2	123° 51'.2	03'.8	198° 41'.6	59'.0	299° 25'.5	37'.3	135° 50'.5	42'.7
22	350° 08'.7	138° 50'.7	05'.0	213° 42'.6	58'.6	314° 28'.3	37'.2	150° 52'.7	42'.8
23	5° 11'.1	153° 50'.2	06'.1	228° 43'.6	58'.2	329° 31'.1	37'.1	165° 54'.8	42'.9
12 Wednesday 00	20° 13'.6	168° 49'.7	12° 07'.3 S	243° 44'.6	17° 57'.9 N	344° 33'.8	12° 37'.0 N	180° 57'.0	5° 43'.0 S
01	35° 16'.1	183° 49'.2	08'.4	258° 45'.6	57'.5	359° 36'.6	36'.9	195° 59'.2	43'.1
02	50° 18'.5	198° 48'.7	09'.6	273° 46'.6	57'.1	14° 39'.3	36'.8	211° 01'.4	43'.2
03	65° 21'.0	213° 48'.2	10'.7	288° 47'.6	56'.7	29° 42'.1	36'.7	226° 03'.6	43'.4
04	80° 23'.5	228° 47'.7	11'.8	303° 48'.6	56'.4	44° 44'.8	36'.6	241° 05'.7	43'.5
05	95° 25'.9	243° 47'.2	13'.0	318° 49'.7	56'.0	59° 47'.6	36'.5	256° 07'.9	43'.6
06	110° 28'.4	258° 46'.7	14'.1	333° 50'.7	55'.6	74° 50'.4	36'.4	271° 10'.1	43'.7
07	125° 30'.9	273° 46'.2	15'.3	348° 51'.7	55'.2	89° 53'.1	36'.3	286° 12'.3	43'.8
08	140° 33'.3	288° 45'.7	16'.4	3° 52'.7	54'.8	104° 55'.9	36'.2	301° 14'.5	43'.9
09	155° 35'.8	303° 45'.2	17'.5	18° 53'.7	54'.5	119° 58'.6	36'.1	316° 16'.6	44'.0
10	170° 38'.2	318° 44'.7	18'.7	33° 54'.7	54'.1	135° 01'.4	36'.0	331° 18'.8	44'.2
11	185° 40'.7	333° 44'.2	19'.8	48° 55'.7	53'.7	150° 04'.2	35'.9	346° 21'.0	44'.3
12	200° 43'.2	348° 43'.7	12° 21'.0 S	63° 56'.7	17° 53'.3 N	165° 06'.9	12° 35'.8 N	1° 23'.2	5° 44'.4 S
13	215° 45'.6	3° 43'.2	22'.1	78° 57'.7	53'.0	180° 09'.7	35'.7	16° 25'.4	44'.5
14	230° 48'.1	18° 42'.7	23'.2	93° 58'.7	52'.6	195° 12'.4	35'.6	31° 27'.5	44'.6
15	245° 50'.6	33° 42'.2	24'.4	108° 59'.7	52'.2	210° 15'.2	35'.5	46° 29'.7	44'.7
16	260° 53'.0	48° 41'.7	25'.5	124° 00'.8	51'.8	225° 18'.0	35'.4	61° 31'.9	44'.8
17	275° 55'.5	63° 41'.2	26'.6	139° 01'.8	51'.4	240° 20'.7	35'.3	76° 34'.1	45'.0
18	290° 58'.0	78° 40'.7	27'.8	154° 02'.8	51'.1	255° 23'.5	35'.2	91° 36'.3	45'.1
19	306° 00'.4	93° 40'.2	28'.9	169° 03'.8	50'.7	270° 26'.2	35'.1	106° 38'.4	45'.2
20	321° 02'.9	108° 39'.7	30'.0	184° 04'.8	50'.3	285° 29'.0	35'.0	121° 40'.6	45'.3
21	336° 05'.4	123° 39'.2	31'.2	199° 05'.8	49'.9	300° 31'.8	34'.9	136° 42'.8	45'.4
22	351° 07'.8	138° 38'.7	32'.3	214° 06'.8	49'.5	315° 34'.5	34'.8	151° 45'.0	45'.5
23	6° 10'.3	153° 38'.2	33'.4	229° 07'.8	49'.2	330° 37'.3	34'.7	166° 47'.2	45'.6
	M.P. 22:39	v -0'.5	d 1'.1	v 1'.0	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.2 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.4	63° 09'.8 S
Adhara	255° 13'.4	28° 59'.1 S
Aldebaran	290° 50'.5	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.7 N
Alkaid	153° 00'.3	49° 15'.3 N
Alnair	27° 44'.9	46° 54'.2 S
Alnilam	275° 47'.4	1° 11'.6 S
Alphard	217° 57'.4	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.2	69° 03'.1 S
Avior	234° 18'.7	59° 32'.6 S
Bellatrix	278° 33'.1	6° 21'.7 N
Betelgeuse	271° 02'.5	7° 24'.6 N
Canopus	263° 56'.6	52° 41'.9 S
Capella	280° 36'.0	46° 00'.4 N
Deneb	49° 32'.2	45° 19'.8 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.6	61° 41'.0 N
Elnath	278° 14'.0	28° 37'.0 N
Eltanin	90° 46'.9	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.4 S
Gacrux	172° 02'.9	57° 10'.7 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.5	34° 22'.7 S
Kochab	137° 20'.9	74° 06'.5 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.7 S
Miaplacidus	221° 40'.5	69° 45'.7 S
Mirfak	308° 41'.7	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.9 S
Polaris	317° 58'.1	89° 18'.8 N
Pollux	243° 29'.2	27° 59'.7 N
Procyon	245° 01'.0	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.0	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.1 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.3 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.7	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.6	43° 28'.6 S
Vega	80° 39'.8	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	149° 47'.0	12:44
Mars	224° 06'.1	07:46
Jupiter	324° 13'.2	01:06
Saturn	160° 50'.2	11:58

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 11'.8	6° 25'.6 S	26° 09'.9	15'.9	2° 02'.9 N	11'.5	54'.2
198° 12'.0	26'.5	40° 44'.8	15'.9	14'.4	11'.5	
213° 12'.2	27'.5	55° 19'.7	15'.9	25'.9	11'.4	
228° 12'.3	28'.4	69° 54'.6	15'.9	37'.3	11'.5	
243° 12'.5	29'.4	84° 29'.5	15'.9	48'.8	11'.4	
258° 12'.7	30'.3	99° 04'.4	16'.0	3° 00'.2 N	11'.4	
273° 12'.9	31'.3	113° 39'.4	15'.9	11'.6	11'.4	
288° 13'.0	32'.2	128° 14'.3	15'.9	23'.0	11'.4	
303° 13'.2	33'.2	142° 49'.2	15'.8	34'.4	11'.4	
318° 13'.4	34'.1	157° 24'.0	15'.9	45'.8	11'.3	54'.1
333° 13'.5	35'.1	171° 58'.9	15'.9	57'.1	11'.3	
348° 13'.7	36'.0	186° 33'.8	15'.9	4° 08'.4 N	11'.4	
3° 13'.9	6° 36'.9 S	201° 08'.7	15'.9	4° 19'.8 N	11'.3	54'.1
18° 14'.0	37'.9	215° 43'.6	15'.8	31'.1	11'.2	
33° 14'.2	38'.8	230° 18'.4	15'.9	42'.3	11'.3	
48° 14'.4	39'.8	244° 53'.3	15'.8	53'.6	11'.2	
63° 14'.5	40'.7	259° 28'.1	15'.8	5° 04'.8 N	11'.2	
78° 14'.7	41'.7	274° 02'.9	15'.8	16'.0	11'.2	
93° 14'.9	42'.6	288° 37'.7	15'.8	27'.2	11'.2	
108° 15'.0	43'.6	303° 12'.5	15'.8	38'.4	11'.1	
123° 15'.2	44'.5	317° 47'.3	15'.8	49'.5	11'.1	
138° 15'.4	45'.5	332° 22'.1	15'.8	6° 00'.6 N	11'.1	
153° 15'.5	46'.4	346° 56'.9	15'.7	11'.7	11'.1	
168° 15'.7	47'.4	1° 31'.6	15'.8	22'.8	11'.0	
183° 15'.9	6° 48'.3 S	16° 06'.4	15'.7	6° 33'.8 N	11'.0	54'.0
198° 16'.0	49'.2	30° 41'.1	15'.7	44'.8	11'.0	
213° 16'.2	50'.2	45° 15'.8	15'.7	55'.8	11'.0	
228° 16'.4	51'.1	59° 50'.5	15'.6	7° 06'.8 N	10'.9	
243° 16'.5	52'.1	74° 25'.1	15'.7	17'.7	10'.9	
258° 16'.7	53'.0	88° 59'.8	15'.6	28'.6	10'.8	
273° 16'.9	54'.0	103° 34'.4	15'.6	39'.4	10'.9	
288° 17'.0	54'.9	118° 09'.0	15'.6	50'.3	10'.8	
303° 17'.2	55'.8	132° 43'.6	15'.6	8° 01'.1 N	10'.7	
318° 17'.3	56'.8	147° 18'.2	15'.5	11'.8	10'.8	
333° 17'.5	57'.7	161° 52'.7	15'.5	22'.6	10'.7	
348° 17'.7	58'.7	176° 27'.2	15'.5	33'.3	10'.6	
3° 17'.8	6° 59'.6 S	191° 01'.7	15'.5	8° 43'.9 N	10'.6	54'.0
18° 18'.0	7° 00'.6 S	205° 36'.2	15'.4	54'.5	10'.6	
33° 18'.2	01'.5	220° 10'.6	15'.5	9° 05'.1 N	10'.6	
48° 18'.3	02'.4	234° 45'.1	15'.4	15'.7	10'.5	
63° 18'.5	03'.4	249° 19'.5	15'.3	26'.2	10'.5	
78° 18'.6	04'.3	263° 53'.8	15'.4	36'.7	10'.4	
93° 18'.8	05'.3	278° 28'.2	15'.3	47'.1	10'.4	
108° 19'.0	06'.2	293° 02'.5	15'.3	57'.5	10'.4	
123° 19'.1	07'.2	307° 36'.8	15'.3	10° 07'.9 N	10'.3	
138° 19'.3	08'.1	322° 11'.1	15'.2	18'.2	10'.2	
153° 19'.5	09'.0	336° 45'.3	15'.2	28'.4	10'.3	
168° 19'.6	10'.0	351° 19'.5	15'.2	38'.7	10'.2	
183° 19'.8	7° 10'.9 S	5° 53'.7	15'.1	10° 48'.9 N	10'.1	54'.0
198° 19'.9	11'.9	20° 27'.8	15'.1	59'.0	10'.1	
213° 20'.1	12'.8	35° 01'.9	15'.1	11° 09'.1 N	10'.1	
228° 20'.3	13'.7	49° 36'.0	15'.1	19'.2	10'.0	
243° 20'.4	14'.7	64° 10'.1	15'.0	29'.2	9'.9	
258° 20'.6	15'.6	78° 44'.1	15'.0	39'.1	9'.9	
273° 20'.7	16'.6	93° 18'.1	14'.9	49'.0	9'.9	
288° 20'.9	17'.5	107° 52'.0	15'.0	58'.9	9'.8	
303° 21'.0	18'.4	122° 26'.0	14'.8	12° 08'.7 N	9'.8	
318° 21'.2	19'.4	136° 59'.8	14'.9	18'.5	9'.7	
333° 21'.4	20'.3	151° 33'.7	14'.8	28'.2	9'.7	
348° 21'.5	21'.3	166° 07'.5	14'.8	37'.9	9'.6	
3° 21'.7	7° 22'.2 S	180° 41'.3	14'.7	12° 47'.5 N	9'.5	54'.0
18° 21'.8	23'.1	195° 15'.0	14'.7	57'.0	9'.5	
33° 22'.0	24'.1	209° 48'.7	14'.7	13° 06'.5 N	9'.5	
48° 22'.2	25'.0	224° 22'.4	14'.6	16'.0	9'.4	
63° 22'.3	25'.9	238° 56'.0	14'.6	25'.4	9'.3	
78° 22'.5	26'.9	253° 29'.6	14'.6	34'.7	9'.3	
93° 22'.6	27'.8	268° 03'.2	14'.5	44'.0	9'.3	
108° 22'.8	28'.8	282° 36'.7	14'.5	53'.3	9'.2	
123° 22'.9	29'.7	297° 10'.2	14'.4	14° 02'.5 N	9'.1	
138° 23'.1	30'.6	311° 43'.6	14'.4	11'.6	9'.0	
153° 23'.2	31'.6	326° 17'.0	14'.4	20'.6	9'.0	
168° 23'.4	32'.5	340° 50'.4	14'.3	29'.6	9'.0	
SD 16'.0	d 0'.9	SD	14'.7	14'.7	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 10	Moonrise 11	Moonrise 12
N 72°	04:36	05:54	07:03	15:40	15:22	14:58
N 70°	04:42	05:52	06:54	15:47	15:35	15:22
68°	04:47	05:51	06:47	15:52	15:47	15:41
66°	04:50	05:50	06:42	15:57	15:56	15:56
64°	04:54	05:49	06:37	16:01	16:04	16:08
62°	04:56	05:48	06:32	16:04	16:11	16:19
60°	04:58	05:47	06:28	16:07	16:17	16:28
N 58°	05:00	05:46	06:25	16:10	16:22	16:36
56°	05:02	05:45	06:22	16:13	16:27	16:43
54°	05:03	05:44	06:19	16:15	16:31	16:49
52°	05:04	05:43	06:17	16:17	16:35	16:55
50°	05:05	05:42	06:15	16:19	16:38	17:00
45°	05:06	05:40	06:10	16:23	16:46	17:11
N 40°	05:07	05:39	06:06	16:26	16:52	17:20
35°	05:07	05:37	06:02	16:29	16:58	17:28
30°	05:07	05:35	05:59	16:31	17:02	17:35
20°	05:06	05:31	05:53	16:36	17:11	17:47
N 10°	05:03	05:27	05:48	16:40	17:18	17:58
0°	04:59	05:23	05:44	16:44	17:25	18:08
S 10°	04:53	05:17	05:39	16:48	17:33	18:19
20°	04:45	05:11	05:33	16:52	17:40	18:30
30°	04:34	05:03	05:27	16:56	17:49	18:42
35°	04:27	04:58	05:23	16:59	17:54	18:49
40°	04:19	04:52	05:19	17:02	18:00	18:58
45°	04:08	04:44	05:14	17:06	18:07	19:08
S 50°	03:55	04:35	05:09	17:10	18:15	19:20
52°	03:48	04:31	05:06	17:12	18:19	19:25
54°	03:41	04:26	05:03	17:14	18:23	19:31
56°	03:33	04:21	05:00	17:17	18:27	19:38
58°	03:23	04:15	04:56	17:19	18:32	19:46
S 60°	03:12	04:08	04:52	17:22	18:38	19:55
S 62°	02:58	04:00	04:47	17:26	18:45	20:05

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 10	Moonset 11	Moonset 12
N 72°	16:29	17:37	18:55	05:00	06:45	08:37
N 70°	16:37	17:39	18:49	04:56	06:33	08:15
68°	16:45	17:41	18:45	04:52	06:24	07:58
66°	16:51	17:42	18:41	04:49	06:16	07:44
64°	16:56	17:43	18:38	04:47	06:09	07:33
62°	17:00	17:45	18:36	04:45	06:04	07:23
60°	17:04	17:46	18:34	04:43	05:59	07:15
N 58°	17:07	17:47	18:32	04:41	05:54	07:08
56°	17:10	17:48	18:31	04:40	05:51	07:01
54°	17:13	17:49	18:29	04:39	05:47	06:56
52°	17:16	17:50	18:28	04:38	05:44	06:51
50°	17:18	17:50	18:28	04:36	05:41	06:46
45°	17:23	17:52	18:26	04:34	05:35	06:36
N 40°	17:27	17:54	18:26	04:32	05:30	06:28
35°	17:31	17:56	18:26	04:31	05:26	06:21
30°	17:34	17:58	18:26	04:29	05:22	06:15
20°	17:40	18:02	18:28	04:27	05:15	06:04
N 10°	17:45	18:06	18:31	04:24	05:09	05:55
0°	17:50	18:11	18:35	04:22	05:04	05:46
S 10°	17:55	18:16	18:41	04:20	04:58	05:37
20°	18:01	18:23	18:49	04:18	04:53	05:28
30°	18:07	18:31	19:00	04:15	04:46	05:18
35°	18:11	18:37	19:07	04:14	04:42	05:12
40°	18:15	18:43	19:16	04:12	04:38	05:05
45°	18:20	18:50	19:26	04:10	04:33	04:57
S 50°	18:26	19:00	19:40	04:08	04:27	04:47
52°	18:29	19:04	19:47	04:07	04:24	04:43
54°	18:32	19:09	19:54	04:06	04:21	04:38
56°	18:35	19:14	20:03	04:05	04:18	04:33
58°	18:39	19:21	20:13	04:03	04:14	04:27
S 60°	18:43	19:28	20:25	04:02	04:10	04:20
S 62°	18:48	19:36	20:39	04:00	04:06	04:13

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
10	12 47	12 55	11:47	22:54	10:33	13d 98%
11	13 03	13 11	11:47	23:36	11:15	14d Full
12	13 19	13 26	11:47	24:19	11:57	15d Full

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2011 October 13, 14, 15 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
13 Thursday 00	21° 12'.7	168° 37'.7	12° 34'.6 S	244° 08'.8	17° 48'.8 N	345° 40'.0	12° 34'.6 N	181° 49'.3	5° 45'.8 S
01	36° 15'.2	183° 37'.2	35'.7	259° 09'.9	48'.4	0° 42'.8	34'.5	196° 51'.5	45'.9
02	51° 17'.7	198° 36'.7	36'.8	274° 10'.9	48'.0	15° 45'.6	34'.4	211° 53'.7	46'.0
03	66° 20'.1	213° 36'.2	38'.0	289° 11'.9	47'.6	30° 48'.3	34'.3	226° 55'.9	46'.1
04	81° 22'.6	228° 35'.7	39'.1	304° 12'.9	47'.3	45° 51'.1	34'.2	241° 58'.1	46'.2
05	96° 25'.1	243° 35'.2	40'.2	319° 13'.9	46'.9	60° 53'.8	34'.1	257° 00'.2	46'.3
06	111° 27'.5	258° 34'.7	41'.4	334° 14'.9	46'.5	75° 56'.6	33'.9	272° 02'.4	46'.4
07	126° 30'.0	273° 34'.2	42'.5	349° 15'.9	46'.1	90° 59'.4	33'.8	287° 04'.6	46'.6
08	141° 32'.5	288° 33'.7	43'.6	4° 17'.0	45'.7	106° 02'.1	33'.7	302° 06'.8	46'.7
09	156° 34'.9	303° 33'.2	44'.7	19° 18'.0	45'.3	121° 04'.9	33'.6	317° 09'.0	46'.8
10	171° 37'.4	318° 32'.7	45'.9	34° 19'.0	45'.0	136° 07'.7	33'.5	332° 11'.1	46'.9
11	186° 39'.8	333° 32'.2	47'.0	49° 20'.0	44'.6	151° 10'.4	33'.4	347° 13'.3	47'.0
12	201° 42'.3	348° 31'.6	12° 48'.1 S	64° 21'.0	17° 44'.2 N	166° 13'.2	12° 33'.3 N	2° 15'.5	5° 47'.1 S
13	216° 44'.8	3° 31'.1	49'.2	79° 22'.0	43'.8	181° 15'.9	33'.2	17° 17'.7	47'.2
14	231° 47'.2	18° 30'.6	50'.4	94° 23'.1	43'.4	196° 18'.7	33'.1	32° 19'.9	47'.4
15	246° 49'.7	33° 30'.1	51'.5	109° 24'.1	43'.1	211° 21'.5	33'.0	47° 22'.0	47'.5
16	261° 52'.2	48° 29'.6	52'.6	124° 25'.1	42'.7	226° 24'.2	32'.9	62° 24'.2	47'.6
17	276° 54'.6	63° 29'.1	53'.7	139° 26'.1	42'.3	241° 27'.0	32'.8	77° 26'.4	47'.7
18	291° 57'.1	78° 28'.6	54'.9	154° 27'.1	41'.9	256° 29'.8	32'.7	92° 28'.6	47'.8
19	306° 59'.6	93° 28'.1	56'.0	169° 28'.1	41'.5	271° 32'.5	32'.6	107° 30'.8	47'.9
20	322° 02'.0	108° 27'.6	57'.1	184° 29'.2	41'.2	286° 35'.3	32'.5	122° 32'.9	48'.0
21	337° 04'.5	123° 27'.0	58'.2	199° 30'.2	40'.8	301° 38'.1	32'.4	137° 35'.1	48'.2
22	352° 07'.0	138° 26'.5	59'.3	214° 31'.2	40'.4	316° 40'.8	32'.3	152° 37'.3	48'.3
23	7° 09'.4	153° 26'.0	13° 00'.5 S	229° 32'.2	40'.0	331° 43'.6	32'.2	167° 39'.5	48'.4
14 Friday 00	22° 11'.9	168° 25'.5	13° 01'.6 S	244° 33'.2	17° 39'.6 N	346° 46'.4	12° 32'.1 N	182° 41'.7	5° 48'.5 S
01	37° 14'.3	183° 25'.0	02'.7	259° 34'.3	39'.2	1° 49'.1	32'.0	197° 43'.8	48'.6
02	52° 16'.8	198° 24'.5	03'.8	274° 35'.3	38'.9	16° 51'.9	31'.9	212° 46'.0	48'.7
03	67° 19'.3	213° 24'.0	04'.9	289° 36'.3	38'.5	31° 54'.6	31'.8	227° 48'.2	48'.8
04	82° 21'.7	228° 23'.4	06'.1	304° 37'.3	38'.1	46° 57'.4	31'.7	242° 50'.4	49'.0
05	97° 24'.2	243° 22'.9	07'.2	319° 38'.3	37'.7	62° 00'.2	31'.6	257° 52'.6	49'.1
06	112° 26'.7	258° 22'.4	08'.3	334° 39'.4	37'.3	77° 02'.9	31'.5	272° 54'.7	49'.2
07	127° 29'.1	273° 21'.9	09'.4	349° 40'.4	36'.9	92° 05'.7	31'.4	287° 56'.9	49'.3
08	142° 31'.6	288° 21'.4	10'.5	4° 41'.4	36'.6	107° 08'.5	31'.3	302° 59'.1	49'.4
09	157° 34'.1	303° 20'.9	11'.6	19° 42'.4	36'.2	122° 11'.2	31'.2	318° 01'.3	49'.5
10	172° 36'.5	318° 20'.3	12'.7	34° 43'.4	35'.8	137° 14'.0	31'.1	333° 03'.5	49'.6
11	187° 39'.0	333° 19'.8	13'.9	49° 44'.5	35'.4	152° 16'.8	31'.0	348° 05'.6	49'.8
12	202° 41'.5	348° 19'.3	13° 15'.0 S	64° 45'.5	17° 35'.0 N	167° 19'.5	12° 30'.9 N	3° 07'.8	5° 49'.9 S
13	217° 43'.9	3° 18'.8	16'.1	79° 46'.5	34'.6	182° 22'.3	30'.8	18° 10'.0	50'.0
14	232° 46'.4	18° 18'.3	17'.2	94° 47'.5	34'.3	197° 25'.1	30'.7	33° 12'.2	50'.1
15	247° 48'.8	33° 17'.7	18'.3	109° 48'.6	33'.9	212° 27'.8	30'.6	48° 14'.4	50'.2
16	262° 51'.3	48° 17'.2	19'.4	124° 49'.6	33'.5	227° 30'.6	30'.5	63° 16'.5	50'.3
17	277° 53'.8	63° 16'.7	20'.5	139° 50'.6	33'.1	242° 33'.4	30'.4	78° 18'.7	50'.4
18	292° 56'.2	78° 16'.2	21'.6	154° 51'.6	32'.7	257° 36'.1	30'.3	93° 20'.9	50'.6
19	307° 58'.7	93° 15'.7	22'.7	169° 52'.7	32'.3	272° 38'.9	30'.2	108° 23'.1	50'.7
20	323° 01'.2	108° 15'.1	23'.9	184° 53'.7	32'.0	287° 41'.7	30'.1	123° 25'.2	50'.8
21	338° 03'.6	123° 14'.6	25'.0	199° 54'.7	31'.6	302° 44'.4	30'.0	138° 27'.4	50'.9
22	353° 06'.1	138° 14'.1	26'.1	214° 55'.7	31'.2	317° 47'.2	29'.9	153° 29'.6	51'.0
23	8° 08'.6	153° 13'.6	27'.2	229° 56'.8	30'.8	332° 50'.0	29'.8	168° 31'.8	51'.1
15 Saturday 00	23° 11'.0	168° 13'.0	13° 28'.3 S	244° 57'.8	17° 30'.4 N	347° 52'.8	12° 29'.7 N	183° 34'.0	5° 51'.2 S
01	38° 13'.5	183° 12'.5	29'.4	259° 58'.8	30'.0	2° 55'.5	29'.5	198° 36'.1	51'.4
02	53° 15'.9	198° 12'.0	30'.5	274° 59'.8	29'.6	17° 58'.3	29'.4	213° 38'.3	51'.5
03	68° 18'.4	213° 11'.5	31'.6	290° 00'.9	29'.3	33° 01'.1	29'.3	228° 40'.5	51'.6
04	83° 20'.9	228° 10'.9	32'.7	305° 01'.9	28'.9	48° 03'.8	29'.2	243° 42'.7	51'.7
05	98° 23'.3	243° 10'.4	33'.8	320° 02'.9	28'.5	63° 06'.6	29'.1	258° 44'.9	51'.8
06	113° 25'.8	258° 09'.9	34'.9	335° 04'.0	28'.1	78° 09'.4	29'.0	273° 47'.0	51'.9
07	128° 28'.3	273° 09'.4	36'.0	350° 05'.0	27'.7	93° 12'.1	28'.9	288° 49'.2	52'.0
08	143° 30'.7	288° 08'.8	37'.1	5° 06'.0	27'.3	108° 14'.9	28'.8	303° 51'.4	52'.2
09	158° 33'.2	303° 08'.3	38'.2	20° 07'.0	26'.9	123° 17'.7	28'.7	318° 53'.6	52'.3
10	173° 35'.7	318° 07'.8	39'.3	35° 08'.1	26'.6	138° 20'.4	28'.6	333° 55'.8	52'.4
11	188° 38'.1	333° 07'.2	40'.4	50° 09'.1	26'.2	153° 23'.2	28'.5	348° 57'.9	52'.5
12	203° 40'.6	348° 06'.7	13° 41'.5 S	65° 10'.1	17° 25'.8 N	168° 26'.0	12° 28'.4 N	4° 00'.1	5° 52'.6 S
13	218° 43'.1	3° 06'.2	42'.6	80° 11'.2	25'.4	183° 28'.8	28'.3	19° 02'.3	52'.7
14	233° 45'.5	18° 05'.6	43'.7	95° 12'.2	25'.0	198° 31'.5	28'.2	34° 04'.5	52'.8
15	248° 48'.0	33° 05'.1	44'.8	110° 13'.2	24'.6	213° 34'.3	28'.1	49° 06'.7	52'.9
16	263° 50'.4	48° 04'.6	45'.9	125° 14'.3	24'.2	228° 37'.1	28'.0	64° 08'.8	53'.1
17	278° 52'.9	63° 04'.0	47'.0	140° 15'.3	23'.9	243° 39'.8	27'.9	79° 11'.0	53'.2
18	293° 55'.4	78° 03'.5	48'.1	155° 16'.3	23'.5	258° 42'.6	27'.8	94° 13'.2	53'.3
19	308° 57'.8	93° 03'.0	49'.2	170° 17'.4	23'.1	273° 45'.4	27'.7	109° 15'.4	53'.4
20	324° 00'.3	108° 02'.4	50'.3	185° 18'.4	22'.7	288° 48'.1	27'.6	124° 17'.6	53'.5
21	339° 02'.8	123° 01'.9	51'.4	200° 19'.4	22'.3	303° 50'.9	27'.5	139° 19'.7	53'.6
22	354° 05'.2	138° 01'.4	52'.5	215° 20'.5	21'.9	318° 53'.7	27'.4	154° 21'.9	53'.7
23	9° 07'.7	153° 00'.8	53'.6	230° 21'.5	21'.5	333° 56'.5	27'.3	169° 24'.1	53'.9
	M.P. 22:28	v -0'.5	d 1'.1	v 1'.0	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.2 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.4	63° 09'.8 S
Adhara	255° 13'.4	28° 59'.1 S
Aldebaran	290° 50'.5	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.7 N
Alkaid	153° 00'.3	49° 15'.3 N
Alnair	27° 44'.9	46° 54'.2 S
Alnilam	275° 47'.4	1° 11'.6 S
Alphard	217° 57'.4	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.4 N
Atria	107° 31'.2	69° 03'.1 S
Avior	234° 18'.7	59° 32'.6 S
Bellatrix	278° 33'.1	6° 21'.7 N
Betelgeuse	271° 02'.5	7° 24'.6 N
Canopus	263° 56'.5	52° 41'.9 S
Capella	280° 36'.0	46° 00'.4 N
Deneb	49° 32'.2	45° 19'.8 N
Denebola	182° 35'.2	14° 30'.4 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.6	61° 41'.0 N
Elnath	278° 13'.9	28° 37'.0 N
Eltanin	90° 46'.9	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.9	57° 10'.7 S
Gienah	175° 53'.9	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.5	34° 22'.7 S
Kochab	137° 20'.9	74° 06'.5 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.4	69° 45'.7 S
Mirfak	308° 41'.7	49° 54'.1 N
Nunki	75° 59'.8	26° 16'.8 S
Peacock	53° 20'.9	56° 41'.9 S
Polaris	317° 57'.3	89° 18'.8 N
Pollux	243° 29'.2	27° 59'.7 N
Procyon	245° 01'.0	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.0	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.3 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.7	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.5	43° 28'.6 S
Vega	80° 39'.9	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	146° 13'.6	12:47
Mars	222° 21'.4	07:41
Jupiter	324° 34'.5	00:53
Saturn	160° 29'.8	11:48

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 23'.6	7° 33'.4 S	355° 23'.7	14'.3	14° 38'.6 N	8'.9	54'.0
198° 23'.7	34'.4	9° 57'.0	14'.2	47'.5	8'.8	
213° 23'.9	35'.3	24° 30'.2	14'.2	56'.3	8'.7	
228° 24'.0	36'.3	39° 03'.4	14'.2	15° 05'.0 N	8'.7	
243° 24'.2	37'.2	53° 36'.6	14'.1	13'.7	8'.7	
258° 24'.3	38'.1	68° 09'.7	14'.0	22'.4	8'.5	
273° 24'.5	39'.1	82° 42'.7	14'.1	30'.9	8'.5	
288° 24'.6	40'.0	97° 15'.8	14'.0	39'.4	8'.5	
303° 24'.8	40'.9	111° 48'.8	13'.9	47'.9	8'.3	
318° 24'.9	41'.9	126° 21'.7	13'.9	56'.2	8'.3	
333° 25'.1	42'.8	140° 54'.6	13'.8	16° 04'.5 N	8'.3	
348° 25'.2	43'.7	155° 27'.4	13'.9	12'.8	8'.2	
3° 25'.4	7° 44'.7 S	170° 00'.3	13'.7	16° 21'.0 N	8'.1	54'.0
18° 25'.6	45'.6	184° 33'.0	13'.7	29'.1	8'.0	
33° 25'.7	46'.5	199° 05'.7	13'.7	37'.1	7'.9	
48° 25'.9	47'.5	213° 38'.4	13'.7	45'.0	7'.9	
63° 26'.0	48'.4	228° 11'.1	13'.5	52'.9	7'.9	
78° 26'.2	49'.3	242° 43'.6	13'.6	17° 00'.8 N	7'.7	
93° 26'.3	50'.3	257° 16'.2	13'.5	08'.5	7'.7	
108° 26'.5	51'.2	271° 48'.7	13'.4	16'.2	7'.6	
123° 26'.6	52'.1	286° 21'.1	13'.4	23'.8	7'.5	
138° 26'.8	53'.1	300° 53'.5	13'.4	31'.3	7'.5	
153° 26'.9	54'.0	315° 25'.9	13'.3	38'.8	7'.3	
168° 27'.1	54'.9	329° 58'.2	13'.3	46'.1	7'.3	
183° 27'.2	7° 55'.9 S	344° 30'.5	13'.2	17° 53'.4 N	7'.3	54'.1
198° 27'.4	56'.8	359° 02'.7	13'.2	18° 00'.7 N	7'.1	
213° 27'.5	57'.7	13° 34'.9	13'.1	07'.8	7'.1	
228° 27'.7	58'.7	28° 07'.0	13'.1	14'.9	7'.0	
243° 27'.8	59'.6	42° 39'.1	13'.0	21'.9	6'.9	
258° 28'.0	8° 00'.5 S	57° 11'.1	13'.0	28'.8	6'.8	
273° 28'.1	01'.5	71° 43'.1	13'.0	35'.6	6'.7	
288° 28'.3	02'.4	86° 15'.1	12'.9	42'.3	6'.7	
303° 28'.4	03'.3	100° 47'.0	12'.8	49'.0	6'.6	
318° 28'.5	04'.2	115° 18'.8	12'.8	55'.6	6'.5	
333° 28'.7	05'.2	129° 50'.6	12'.8	19° 02'.1 N	6'.4	
348° 28'.8	06'.1	144° 22'.4	12'.7	08'.5	6'.3	
3° 29'.0	8° 07'.0 S	158° 54'.1	12'.7	19° 14'.8 N	6'.3	54'.1
18° 29'.1	08'.0	173° 25'.8	12'.6	21'.1	6'.2	
33° 29'.3	08'.9	187° 57'.4	12'.6	27'.3	6'.0	
48° 29'.4	09'.8	202° 29'.0	12'.5	33'.3	6'.0	54'.2
63° 29'.6	10'.8	217° 00'.5	12'.5	39'.3	5'.9	
78° 29'.7	11'.7	231° 32'.0	12'.4	45'.2	5'.8	
93° 29'.9	12'.6	246° 03'.4	12'.4	51'.0	5'.8	
108° 30'.0	13'.5	260° 34'.8	12'.4	56'.8	5'.6	
123° 30'.2	14'.5	275° 06'.2	12'.3	20° 02'.4 N	5'.6	
138° 30'.3	15'.4	289° 37'.5	12'.2	08'.0	5'.4	
153° 30'.4	16'.3	304° 08'.7	12'.2	13'.4	5'.4	
168° 30'.6	17'.3	318° 39'.9	12'.2	18'.8	5'.3	
183° 30'.7	8° 18'.2 S	333° 11'.1	12'.1	20° 24'.1 N	5'.1	54'.2
198° 30'.9	19'.1	347° 42'.2	12'.1	29'.2	5'.1	
213° 31'.0	20'.0	2° 13'.3	12'.1	34'.3	5'.0	54'.3
228° 31'.2	21'.0	16° 44'.4	12'.0	39'.3	4'.9	
243° 31'.3	21'.9	31° 15'.4	11'.9	44'.2	4'.8	
258° 31'.5	22'.8	45° 46'.3	11'.9	49'.0	4'.8	
273° 31'.6	23'.7	60° 17'.2	11'.9	53'.8	4'.6	
288° 31'.7	24'.7	74° 48'.1	11'.8	58'.4	4'.5	
303° 31'.9	25'.6	89° 18'.9	11'.8	21° 02'.9 N	4'.4	
318° 32'.0	26'.5	103° 49'.7	11'.7	07'.3	4'.4	
333° 32'.2	27'.4	118° 20'.4	11'.7	11'.7	4'.2	
348° 32'.3	28'.4	132° 51'.1	11'.6	15'.9	4'.1	54'.4
3° 32'.4	8° 29'.3 S	147° 21'.7	11'.7	21° 20'.0 N	4'.1	54'.4
18° 32'.6	30'.2	161° 52'.4	11'.5	24'.1	3'.9	
33° 32'.7	31'.1	176° 22'.9	11'.6	28'.0	3'.8	
48° 32'.9	32'.1	190° 53'.5	11'.4	31'.8	3'.8	
63° 33'.0	33'.0	205° 23'.9	11'.5	35'.6	3'.6	
78° 33'.1	33'.9	219° 54'.4	11'.4	39'.2	3'.5	
93° 33'.3	34'.8	234° 24'.8	11'.4	42'.7	3'.5	
108° 33'.4	35'.8	248° 55'.2	11'.3	46'.2	3'.3	54'.5
123° 33'.6	36'.7	263° 25'.5	11'.3	49'.5	3'.2	
138° 33'.7	37'.6	277° 55'.8	11'.3	52'.7	3'.2	
153° 33'.8	38'.5	292° 26'.1	11'.2	55'.9	3'.0	
168° 34'.0	39'.5	306° 56'.3	11'.2	58'.9	2'.9	
SD 16'.0	d 0'.9	SD	14'.7	14'.7	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 13	Moonrise 14	Moonrise 15
N 72°	04:49	06:07	07:17	14:19	-	-
N 70°	04:54	06:04	07:07	15:04	14:27	-
68°	04:57	06:02	06:58	15:34	15:26	15:11
66°	05:00	05:59	06:51	15:57	16:00	16:10
64°	05:02	05:57	06:45	16:14	16:25	16:44
62°	05:04	05:55	06:40	16:29	16:45	17:09
60°	05:06	05:54	06:36	16:42	17:01	17:28
N 58°	05:07	05:52	06:32	16:53	17:15	17:45
56°	05:08	05:51	06:28	17:02	17:27	17:58
54°	05:08	05:49	06:25	17:10	17:37	18:10
52°	05:09	05:48	06:22	17:18	17:46	18:21
50°	05:10	05:47	06:20	17:25	17:54	18:31
45°	05:10	05:44	06:14	17:39	18:12	18:51
N 40°	05:10	05:42	06:09	17:51	18:26	19:07
35°	05:10	05:39	06:05	18:02	18:39	19:20
30°	05:09	05:37	06:01	18:11	18:49	19:32
20°	05:06	05:32	05:54	18:26	19:08	19:53
N 10°	05:03	05:27	05:48	18:40	19:24	20:11
0°	04:58	05:22	05:43	18:53	19:39	20:28
S 10°	04:51	05:16	05:37	19:06	19:55	20:44
20°	04:42	05:08	05:31	19:20	20:11	21:02
30°	04:31	04:59	05:24	19:36	20:30	21:23
35°	04:23	04:54	05:19	19:45	20:41	21:35
40°	04:14	04:47	05:15	19:56	20:53	21:49
45°	04:02	04:39	05:09	20:09	21:08	22:06
S 50°	03:48	04:29	05:02	20:24	21:27	22:27
52°	03:41	04:24	04:59	20:31	21:36	22:37
54°	03:33	04:19	04:56	20:39	21:45	22:48
56°	03:23	04:13	04:52	20:48	21:57	23:00
58°	03:13	04:06	04:48	20:59	22:09	23:15
S 60°	03:00	03:58	04:43	21:10	22:24	23:32
S 62°	02:45	03:49	04:37	21:24	22:42	23:54

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 13	Moonset 14	Moonset 15
N 72°	16:13	17:23	18:40	10:48	-	-
N 70°	16:24	17:26	18:36	10:04	12:17	-
68°	16:32	17:29	18:33	09:35	11:19	13:13
66°	16:39	17:31	18:30	09:14	10:45	12:15
64°	16:45	17:33	18:28	08:57	10:21	11:41
62°	16:51	17:35	18:27	08:43	10:01	11:16
60°	16:55	17:37	18:25	08:31	09:46	10:57
N 58°	16:59	17:39	18:24	08:21	09:33	10:41
56°	17:03	17:40	18:23	08:12	09:21	10:27
54°	17:06	17:42	18:23	08:04	09:11	10:16
52°	17:09	17:43	18:22	07:57	09:02	10:05
50°	17:12	17:44	18:22	07:51	08:54	09:56
45°	17:18	17:47	18:21	07:37	08:37	09:36
N 40°	17:23	17:50	18:21	07:26	08:24	09:21
35°	17:27	17:52	18:22	07:16	08:12	09:07
30°	17:31	17:55	18:23	07:08	08:02	08:56
20°	17:38	18:00	18:25	06:54	07:44	08:36
N 10°	17:44	18:05	18:29	06:41	07:29	08:19
0°	17:49	18:10	18:35	06:30	07:15	08:02
S 10°	17:55	18:17	18:41	06:18	07:01	07:46
20°	18:02	18:24	18:50	06:06	06:46	07:29
30°	18:09	18:33	19:02	05:52	06:29	07:09
35°	18:13	18:39	19:10	05:43	06:19	06:58
40°	18:18	18:46	19:19	05:34	06:07	06:45
45°	18:24	18:54	19:31	05:23	05:54	06:29
S 50°	18:31	19:05	19:46	05:10	05:37	06:10
52°	18:34	19:10	19:53	05:04	05:30	06:01
54°	18:38	19:15	20:01	04:58	05:21	05:51
56°	18:42	19:21	20:11	04:50	05:12	05:40
58°	18:46	19:28	20:22	04:42	05:01	05:27
S 60°	18:51	19:36	20:35	04:33	04:49	05:11
S 62°	18:57	19:45	20:50	04:22	04:34	04:53

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
13	13 34	13 41	11:46	00:19	12:41	16d 98%
14	13 49	13 56	11:46	01:04	13:27	17d 95%
15	14 03	14 09	11:46	01:51	14:15	18d 90%

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2011 October 16, 17, 18 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
16 Sunday 00	24° 10'.2	168° 00'.3	13° 54'.7 S	245° 22'.5	17° 21'.1 N	348° 59'.2	12° 27'.2 N	184° 26'.3	5° 54'.0 S
01	39° 12'.6	182° 59'.8	55'.7	260° 23'.6	20'.8	4° 02'.0	27'.1	199° 28'.5	54'.1
02	54° 15'.1	197° 59'.2	56'.8	275° 24'.6	20'.4	19° 04'.8	27'.0	214° 30'.6	54'.2
03	69° 17'.6	212° 58'.7	57'.9	290° 25'.6	20'.0	34° 07'.5	26'.8	229° 32'.8	54'.3
04	84° 20'.0	227° 58'.2	59'.0	305° 26'.7	19'.6	49° 10'.3	26'.7	244° 35'.0	54'.4
05	99° 22'.5	242° 57'.6	14° 00'.1 S	320° 27'.7	19'.2	64° 13'.1	26'.6	259° 37'.2	54'.5
06	114° 24'.9	257° 57'.1	01'.2	335° 28'.7	18'.8	79° 15'.9	26'.5	274° 39'.4	54'.7
07	129° 27'.4	272° 56'.5	02'.3	350° 29'.8	18'.4	94° 18'.6	26'.4	289° 41'.5	54'.8
08	144° 29'.9	287° 56'.0	03'.4	5° 30'.8	18'.0	109° 21'.4	26'.3	304° 43'.7	54'.9
09	159° 32'.3	302° 55'.5	04'.5	20° 31'.8	17'.7	124° 24'.2	26'.2	319° 45'.9	55'.0
10	174° 34'.8	317° 54'.9	05'.5	35° 32'.9	17'.3	139° 27'.0	26'.1	334° 48'.1	55'.1
11	189° 37'.3	332° 54'.4	06'.6	50° 33'.9	16'.9	154° 29'.7	26'.0	349° 50'.3	55'.2
12	204° 39'.7	347° 53'.8	14° 07'.7 S	65° 34'.9	17° 16'.5 N	169° 32'.5	12° 25'.9 N	4° 52'.4	5° 55'.3 S
13	219° 42'.2	2° 53'.3	08'.8	80° 36'.0	16'.1	184° 35'.3	25'.8	19° 54'.6	55'.4
14	234° 44'.7	17° 52'.8	09'.9	95° 37'.0	15'.7	199° 38'.1	25'.7	34° 56'.8	55'.6
15	249° 47'.1	32° 52'.2	11'.0	110° 38'.1	15'.3	214° 40'.8	25'.6	49° 59'.0	55'.7
16	264° 49'.6	47° 51'.7	12'.1	125° 39'.1	14'.9	229° 43'.6	25'.5	65° 01'.2	55'.8
17	279° 52'.1	62° 51'.1	13'.1	140° 40'.1	14'.6	244° 46'.4	25'.4	80° 03'.3	55'.9
18	294° 54'.5	77° 50'.6	14'.2	155° 41'.2	14'.2	259° 49'.1	25'.3	95° 05'.5	56'.0
19	309° 57'.0	92° 50'.0	15'.3	170° 42'.2	13'.8	274° 51'.9	25'.2	110° 07'.7	56'.1
20	324° 59'.4	107° 49'.5	16'.4	185° 43'.3	13'.4	289° 54'.7	25'.1	125° 09'.9	56'.2
21	340° 01'.9	122° 49'.0	17'.5	200° 44'.3	13'.0	304° 57'.5	25'.0	140° 12'.0	56'.4
22	355° 04'.4	137° 48'.4	18'.5	215° 45'.3	12'.6	320° 00'.2	24'.9	155° 14'.2	56'.5
23	10° 06'.8	152° 47'.9	19'.6	230° 46'.4	12'.2	335° 03'.0	24'.8	170° 16'.4	56'.6
17 Monday 00	25° 09'.3	167° 47'.3	14° 20'.7 S	245° 47'.4	17° 11'.8 N	350° 05'.8	12° 24'.6 N	185° 18'.6	5° 56'.7 S
01	40° 11'.8	182° 46'.8	21'.8	260° 48'.5	11'.4	5° 08'.6	24'.5	200° 20'.8	56'.8
02	55° 14'.2	197° 46'.2	22'.8	275° 49'.5	11'.1	20° 11'.3	24'.4	215° 22'.9	56'.9
03	70° 16'.7	212° 45'.7	23'.9	290° 50'.5	10'.7	35° 14'.1	24'.3	230° 25'.1	57'.0
04	85° 19'.2	227° 45'.1	25'.0	305° 51'.6	10'.3	50° 16'.9	24'.2	245° 27'.3	57'.2
05	100° 21'.6	242° 44'.6	26'.1	320° 52'.6	09'.9	65° 19'.7	24'.1	260° 29'.5	57'.3
06	115° 24'.1	257° 44'.0	27'.1	335° 53'.7	09'.5	80° 22'.4	24'.0	275° 31'.7	57'.4
07	130° 26'.5	272° 43'.5	28'.2	350° 54'.7	09'.1	95° 25'.2	23'.9	290° 33'.8	57'.5
08	145° 29'.0	287° 42'.9	29'.3	5° 55'.8	08'.7	110° 28'.0	23'.8	305° 36'.0	57'.6
09	160° 31'.5	302° 42'.4	30'.4	20° 56'.8	08'.3	125° 30'.8	23'.7	320° 38'.2	57'.7
10	175° 33'.9	317° 41'.8	31'.4	35° 57'.8	07'.9	140° 33'.5	23'.6	335° 40'.4	57'.8
11	190° 36'.4	332° 41'.3	32'.5	50° 58'.9	07'.5	155° 36'.3	23'.5	350° 42'.6	57'.9
12	205° 38'.9	347° 40'.7	14° 33'.6 S	65° 59'.9	17° 07'.2 N	170° 39'.1	12° 23'.4 N	5° 44'.7	5° 58'.1 S
13	220° 41'.3	2° 40'.2	34'.7	81° 01'.0	06'.8	185° 41'.9	23'.3	20° 46'.9	58'.2
14	235° 43'.8	17° 39'.6	35'.7	96° 02'.0	06'.4	200° 44'.7	23'.2	35° 49'.1	58'.3
15	250° 46'.3	32° 39'.1	36'.8	111° 03'.1	06'.0	215° 47'.4	23'.1	50° 51'.3	58'.4
16	265° 48'.7	47° 38'.5	37'.9	126° 04'.1	05'.6	230° 50'.2	23'.0	65° 53'.5	58'.5
17	280° 51'.2	62° 37'.9	38'.9	141° 05'.2	05'.2	245° 53'.0	22'.9	80° 55'.6	58'.6
18	295° 53'.7	77° 37'.4	40'.0	156° 06'.2	04'.8	260° 55'.8	22'.7	95° 57'.8	58'.7
19	310° 56'.1	92° 36'.8	41'.1	171° 07'.2	04'.4	275° 58'.5	22'.6	111° 00'.0	58'.9
20	325° 58'.6	107° 36'.3	42'.1	186° 08'.3	04'.0	291° 01'.3	22'.5	126° 02'.2	59'.0
21	341° 01'.0	122° 35'.7	43'.2	201° 09'.3	03'.6	306° 04'.1	22'.4	141° 04'.4	59'.1
22	356° 03'.5	137° 35'.2	44'.3	216° 10'.4	03'.3	321° 06'.9	22'.3	156° 06'.5	59'.2
23	11° 06'.0	152° 34'.6	45'.3	231° 11'.4	02'.9	336° 09'.6	22'.2	171° 08'.7	59'.3
18 Tuesday 00	26° 08'.4	167° 34'.0	14° 46'.4 S	246° 12'.5	17° 02'.5 N	351° 12'.4	12° 22'.1 N	186° 10'.9	5° 59'.4 S
01	41° 10'.9	182° 33'.5	47'.4	261° 13'.5	02'.1	6° 15'.2	22'.0	201° 13'.1	59'.5
02	56° 13'.4	197° 32'.9	48'.5	276° 14'.6	01'.7	21° 18'.0	21'.9	216° 15'.3	59'.6
03	71° 15'.8	212° 32'.4	49'.6	291° 15'.6	01'.3	36° 20'.8	21'.8	231° 17'.4	59'.8
04	86° 18'.3	227° 31'.8	50'.6	306° 16'.7	00'.9	51° 23'.5	21'.7	246° 19'.6	59'.9
05	101° 20'.8	242° 31'.2	51'.7	321° 17'.7	00'.5	66° 26'.3	21'.6	261° 21'.8	6° 00'.0 S
06	116° 23'.2	257° 30'.7	52'.7	336° 18'.8	00'.1	81° 29'.1	21'.5	276° 24'.0	00'.1
07	131° 25'.7	272° 30'.1	53'.8	351° 19'.8	16° 59'.7 N	96° 31'.9	21'.4	291° 26'.2	00'.2
08	146° 28'.2	287° 29'.6	54'.9	6° 20'.9	59'.3	111° 34'.6	21'.3	306° 28'.3	00'.3
09	161° 30'.6	302° 29'.0	55'.9	21° 21'.9	58'.9	126° 37'.4	21'.2	321° 30'.5	00'.4
10	176° 33'.1	317° 28'.4	57'.0	36° 23'.0	58'.6	141° 40'.2	21'.1	336° 32'.7	00'.5
11	191° 35'.5	332° 27'.9	58'.0	51° 24'.0	58'.2	156° 43'.0	20'.9	351° 34'.9	00'.7
12	206° 38'.0	347° 27'.3	14° 59'.1 S	66° 25'.1	16° 57'.8 N	171° 45'.8	12° 20'.8 N	6° 37'.0	6° 00'.8 S
13	221° 40'.5	2° 26'.7	15° 00'.1 S	81° 26'.1	57'.4	186° 48'.5	20'.7	21° 39'.2	00'.9
14	236° 42'.9	17° 26'.2	01'.2	96° 27'.2	57'.0	201° 51'.3	20'.6	36° 41'.4	01'.0
15	251° 45'.4	32° 25'.6	02'.3	111° 28'.2	56'.6	216° 54'.1	20'.5	51° 43'.6	01'.1
16	266° 47'.9	47° 25'.0	03'.3	126° 29'.3	56'.2	231° 56'.9	20'.4	66° 45'.8	01'.2
17	281° 50'.3	62° 24'.5	04'.4	141° 30'.3	55'.8	246° 59'.7	20'.3	81° 47'.9	01'.3
18	296° 52'.8	77° 23'.9	05'.4	156° 31'.4	55'.4	262° 02'.4	20'.2	96° 50'.1	01'.5
19	311° 55'.3	92° 23'.3	06'.5	171° 32'.4	55'.0	277° 05'.2	20'.1	111° 52'.3	01'.6
20	326° 57'.7	107° 22'.8	07'.5	186° 33'.5	54'.6	292° 08'.0	20'.0	126° 54'.5	01'.7
21	342° 00'.2	122° 22'.2	08'.6	201° 34'.6	54'.2	307° 10'.8	19'.9	141° 56'.7	01'.8
22	357° 02'.7	137° 21'.6	09'.6	216° 35'.6	53'.8	322° 13'.6	19'.8	156° 58'.8	01'.9
23	12° 05'.1	152° 21'.1	10'.7	231° 36'.7	53'.5	337° 16'.3	19'.7	172° 01'.0	02'.0
	M.P. 22:16	v -0'.6	d 1'.1	v 1'.0	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.4	63° 09'.8 S
Adhara	255° 13'.4	28° 59'.1 S
Aldebaran	290° 50'.5	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.7 N
Alkaid	153° 00'.3	49° 15'.3 N
Alnair	27° 44'.9	46° 54'.2 S
Alnilam	275° 47'.4	1° 11'.6 S
Alphard	217° 57'.4	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.3	69° 03'.0 S
Avior	234° 18'.7	59° 32'.6 S
Bellatrix	278° 33'.1	6° 21'.7 N
Betelgeuse	271° 02'.4	7° 24'.6 N
Canopus	263° 56'.5	52° 41'.9 S
Capella	280° 35'.9	46° 00'.4 N
Deneb	49° 32'.2	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.6	61° 41'.0 N
Elnath	278° 13'.9	28° 37'.0 N
Eltanin	90° 46'.9	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.9	57° 10'.7 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.5	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.5 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.4	69° 45'.7 S
Mirfak	308° 41'.6	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.9 S
Polaris	317° 56'.4	89° 18'.9 N
Pollux	243° 29'.2	27° 59'.7 N
Procyon	245° 01'.0	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 45'.0	11° 54'.5 N
Rigel	281° 13'.0	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.7	37° 06'.7 S
Sirius	258° 34'.7	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.5	43° 28'.6 S
Vega	80° 39'.9	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	142° 38'.0	12:49
Mars	220° 38'.1	07:36
Jupiter	324° 56'.5	00:39
Saturn	160° 09'.3	11:37

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 34'.1	8° 40'.4 S	321° 26'.5	11'.1	22° 01'.8 N	2'.8	54'.5
198° 34'.3	41'.3	335° 56'.6	11'.1	04'.6	2'.7	
213° 34'.4	42'.2	350° 26'.7	11'.1	07'.3	2'.6	54'.6
228° 34'.5	43'.1	4° 56'.8	11'.0	09'.9	2'.5	
243° 34'.7	44'.1	19° 26'.8	11'.0	12'.4	2'.4	
258° 34'.8	45'.0	33° 56'.8	11'.0	14'.8	2'.3	
273° 34'.9	45'.9	48° 26'.8	11'.0	17'.1	2'.2	
288° 35'.1	46'.8	62° 56'.8	10'.9	19'.3	2'.0	
303° 35'.2	47'.8	77° 26'.7	10'.8	21'.3	2'.0	54'.7
318° 35'.3	48'.7	91° 56'.5	10'.9	23'.3	1'.8	
333° 35'.5	49'.6	106° 26'.4	10'.8	25'.1	1'.8	
348° 35'.6	50'.5	120° 56'.2	10'.8	26'.9	1'.6	
3° 35'.8	8° 51'.4 S	135° 26'.0	10'.7	22° 28'.5 N	1'.6	54'.7
18° 35'.9	52'.4	149° 55'.7	10'.8	30'.1	1'.4	
33° 36'.0	53'.3	164° 25'.5	10'.6	31'.5	1'.3	54'.8
48° 36'.2	54'.2	178° 55'.1	10'.7	32'.8	1'.2	
63° 36'.3	55'.1	193° 24'.8	10'.7	34'.0	1'.1	
78° 36'.4	56'.0	207° 54'.5	10'.6	35'.1	0'.9	
93° 36'.6	57'.0	222° 24'.1	10'.5	36'.0	0'.9	
108° 36'.7	57'.9	236° 53'.6	10'.6	36'.9	0'.8	
123° 36'.8	58'.8	251° 23'.2	10'.5	37'.7	0'.6	54'.9
138° 37'.0	59'.7	265° 52'.7	10'.5	38'.3	0'.5	
153° 37'.1	9° 00'.6 S	280° 22'.2	10'.5	38'.8	0'.4	
168° 37'.2	01'.5	294° 51'.7	10'.5	39'.2	0'.3	
183° 37'.4	9° 02'.5 S	309° 21'.2	10'.4	22° 39'.5 N	0'.2	54'.9
198° 37'.5	03'.4	323° 50'.6	10'.5	39'.7	0'.1	55'.0
213° 37'.6	04'.3	338° 20'.1	10'.3	39'.8	0'.0	
228° 37'.8	05'.2	352° 49'.4	10'.4	39'.8	0'.2	
243° 37'.9	06'.1	7° 18'.8	10'.4	39'.6	0'.2	
258° 38'.0	07'.0	21° 48'.2	10'.3	39'.4	0'.4	
273° 38'.1	08'.0	36° 17'.5	10'.3	39'.0	0'.5	55'.1
288° 38'.3	08'.9	50° 46'.8	10'.3	38'.5	0'.6	
303° 38'.4	09'.8	65° 16'.1	10'.3	37'.9	0'.7	
318° 38'.5	10'.7	79° 45'.4	10'.3	37'.2	0'.9	
333° 38'.7	11'.6	94° 14'.7	10'.2	36'.3	0'.9	
348° 38'.8	12'.5	108° 43'.9	10'.2	35'.4	1'.1	55'.2
3° 38'.9	9° 13'.5 S	123° 13'.1	10'.2	22° 34'.3 N	1'.1	55'.2
18° 39'.0	14'.4	137° 42'.3	10'.2	33'.2	1'.3	
33° 39'.2	15'.3	152° 11'.5	10'.2	31'.9	1'.5	
48° 39'.3	16'.2	166° 40'.7	10'.2	30'.4	1'.5	55'.3
63° 39'.4	17'.1	181° 09'.9	10'.2	28'.9	1'.6	
78° 39'.6	18'.0	195° 39'.1	10'.1	27'.3	1'.8	
93° 39'.7	18'.9	210° 08'.2	10'.1	25'.5	1'.8	
108° 39'.8	19'.8	224° 37'.3	10'.2	23'.7	2'.0	55'.4
123° 39'.9	20'.8	239° 06'.5	10'.1	21'.7	2'.1	
138° 40'.1	21'.7	253° 35'.6	10'.1	19'.6	2'.2	
153° 40'.2	22'.6	268° 04'.7	10'.1	17'.4	2'.4	
168° 40'.3	23'.5	282° 33'.8	10'.1	15'.0	2'.4	55'.5
183° 40'.4	9° 24'.4 S	297° 02'.9	10'.1	22° 12'.6 N	2'.6	55'.5
198° 40'.6	25'.3	311° 32'.0	10'.0	10'.0	2'.7	
213° 40'.7	26'.2	326° 01'.0	10'.1	07'.3	2'.8	
228° 40'.8	27'.1	340° 30'.1	10'.1	04'.5	2'.9	55'.6
243° 40'.9	28'.1	354° 59'.2	10'.0	01'.6	3'.0	
258° 41'.1	29'.0	9° 28'.2	10'.1	21° 58'.6 N	3'.1	
273° 41'.2	29'.9	23° 57'.3	10'.0	55'.5	3'.3	
288° 41'.3	30'.8	38° 26'.3	10'.0	52'.2	3'.4	55'.7
303° 41'.4	31'.7	52° 55'.3	10'.1	48'.8	3'.5	
318° 41'.6	32'.6	67° 24'.4	10'.0	45'.3	3'.6	
333° 41'.7	33'.5	81° 53'.4	10'.0	41'.7	3'.7	
348° 41'.8	34'.4	96° 22'.4	10'.1	38'.0	3'.8	55'.8
3° 41'.9	9° 35'.3 S	110° 51'.5	10'.0	21° 34'.2 N	4'.0	55'.8
18° 42'.1	36'.2	125° 20'.5	10'.0	30'.2	4'.0	
33° 42'.2	37'.2	139° 49'.5	10'.1	26'.2	4'.2	
48° 42'.3	38'.1	154° 18'.6	10'.0	22'.0	4'.3	55'.9
63° 42'.4	39'.0	168° 47'.6	10'.0	17'.7	4'.4	
78° 42'.5	39'.9	183° 16'.6	10'.1	13'.3	4'.5	
93° 42'.7	40'.8	197° 45'.7	10'.0	08'.8	4'.6	56'.0
108° 42'.8	41'.7	212° 14'.7	10'.0	04'.2	4'.8	
123° 42'.9	42'.6	226° 43'.7	10'.1	20° 59'.4 N	4'.9	
138° 43'.0	43'.5	241° 12'.8	10'.0	54'.5	4'.9	
153° 43'.1	44'.4	255° 41'.8	10'.0	49'.6	5'.1	56'.1
168° 43'.3	45'.3	270° 10'.8	10'.1	44'.5	5'.2	
SD 16'.0	d 0'.9	SD	14'.9	15'.0	15'.2	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 16	Moonrise 17	Moonrise 18
N 72°	05:02	06:21	07:32	-	-	-
N 70°	05:05	06:16	07:20	-	-	-
68°	05:08	06:12	07:10	-	-	18:00
66°	05:09	06:09	07:01	16:34	17:29	18:53
64°	05:11	06:06	06:54	17:17	18:11	19:25
62°	05:12	06:03	06:48	17:45	18:39	19:49
60°	05:13	06:01	06:43	18:07	19:01	20:08
N 58°	05:13	05:59	06:39	18:25	19:18	20:24
56°	05:14	05:57	06:34	18:40	19:33	20:37
54°	05:14	05:55	06:31	18:53	19:46	20:49
52°	05:14	05:53	06:27	19:05	19:57	20:59
50°	05:14	05:52	06:24	19:15	20:07	21:08
45°	05:14	05:48	06:18	19:36	20:28	21:27
N 40°	05:13	05:45	06:12	19:53	20:45	21:43
35°	05:12	05:42	06:07	20:07	20:59	21:56
30°	05:11	05:39	06:03	20:20	21:12	22:07
20°	05:07	05:33	05:55	20:41	21:33	22:27
N 10°	05:03	05:27	05:49	21:00	21:51	22:44
0°	04:57	05:21	05:42	21:18	22:08	23:00
S 10°	04:49	05:14	05:36	21:35	22:26	23:16
20°	04:40	05:06	05:28	21:54	22:44	23:33
30°	04:27	04:56	05:20	22:15	23:05	23:52
35°	04:19	04:50	05:15	22:28	23:17	24:03
40°	04:09	04:42	05:10	22:43	23:32	24:16
45°	03:56	04:33	05:04	23:00	23:49	24:32
S 50°	03:41	04:22	04:56	23:21	-	00:09
52°	03:33	04:17	04:52	23:32	-	00:19
54°	03:24	04:11	04:49	23:43	-	00:30
56°	03:14	04:04	04:44	23:56	-	00:43
58°	03:02	03:57	04:39	-	00:12	00:58
S 60°	02:48	03:48	04:34	-	00:30	01:15
S 62°	02:31	03:38	04:28	-	00:53	01:36

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 16	Moonset 17	Moonset 18
N 72°	15:57	17:08	18:26	-	-	-
N 70°	16:10	17:13	18:23	-	-	-
68°	16:20	17:17	18:21	-	-	15:39
66°	16:28	17:21	18:20	13:33	14:24	14:46
64°	16:35	17:24	18:19	12:51	13:42	14:14
62°	16:41	17:26	18:18	12:22	13:13	13:49
60°	16:46	17:29	18:17	12:00	12:52	13:30
N 58°	16:51	17:31	18:16	11:42	12:34	13:14
56°	16:55	17:33	18:16	11:27	12:19	13:01
54°	16:59	17:35	18:16	11:15	12:06	12:49
52°	17:03	17:37	18:16	11:03	11:55	12:38
50°	17:06	17:38	18:16	10:53	11:45	12:29
45°	17:12	17:42	18:16	10:32	11:23	12:09
N 40°	17:18	17:46	18:17	10:15	11:06	11:53
35°	17:23	17:49	18:18	10:01	10:52	11:40
30°	17:28	17:52	18:20	09:48	10:39	11:28
20°	17:35	17:58	18:23	09:27	10:18	11:07
N 10°	17:42	18:03	18:28	09:09	09:59	10:50
0°	17:49	18:10	18:34	08:52	09:42	10:33
S 10°	17:55	18:17	18:42	08:34	09:25	10:16
20°	18:03	18:25	18:51	08:16	09:06	09:59
30°	18:11	18:36	19:04	07:55	08:44	09:38
35°	18:16	18:42	19:13	07:42	08:32	09:26
40°	18:21	18:49	19:23	07:28	08:17	09:12
45°	18:28	18:59	19:36	07:11	08:00	08:55
S 50°	18:36	19:10	19:52	06:50	07:38	08:35
52°	18:40	19:15	20:00	06:40	07:28	08:25
54°	18:44	19:21	20:09	06:29	07:16	08:14
56°	18:48	19:28	20:19	06:16	07:03	08:02
58°	18:53	19:36	20:31	06:01	06:48	07:47
S 60°	18:59	19:44	20:45	05:44	06:29	07:30
S 62°	19:05	19:55	21:03	05:22	06:07	07:09

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
16	14 16	14 23	11:46	02:40	15:04	19d 83%
17	14 29	14 35	11:45	03:30	15:55	20d 76%
18	14 42	14 47	11:45	04:21	16:46	21d 67%

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2011 October 19, 20, 21 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
19 Wednesday 00	27° 07'.6	167° 20'.5	15° 11'.7 S	246° 37'.7	16° 53'.1 N	352° 19'.1	12° 19'.6 N	187° 03'.2	6° 02'.1 S
01	42° 10'.0	182° 19'.9	12'.8	261° 38'.8	52'.7	7° 21'.9	19'.5	202° 05'.4	02'.2
02	57° 12'.5	197° 19'.3	13'.8	276° 39'.8	52'.3	22° 24'.7	19'.3	217° 07'.6	02'.4
03	72° 15'.0	212° 18'.8	14'.8	291° 40'.9	51'.9	37° 27'.5	19'.2	232° 09'.7	02'.5
04	87° 17'.4	227° 18'.2	15'.9	306° 41'.9	51'.5	52° 30'.2	19'.1	247° 11'.9	02'.6
05	102° 19'.9	242° 17'.6	16'.9	321° 43'.0	51'.1	67° 33'.0	19'.0	262° 14'.1	02'.7
06	117° 22'.4	257° 17'.1	18'.0	336° 44'.1	50'.7	82° 35'.8	18'.9	277° 16'.3	02'.8
07	132° 24'.8	272° 16'.5	19'.0	351° 45'.1	50'.3	97° 38'.6	18'.8	292° 18'.5	02'.9
08	147° 27'.3	287° 15'.9	20'.1	6° 46'.2	49'.9	112° 41'.4	18'.7	307° 20'.6	03'.0
09	162° 29'.8	302° 15'.3	21'.1	21° 47'.2	49'.5	127° 44'.1	18'.6	322° 22'.8	03'.1
10	177° 32'.2	317° 14'.8	22'.1	36° 48'.3	49'.1	142° 46'.9	18'.5	337° 25'.0	03'.3
11	192° 34'.7	332° 14'.2	23'.2	51° 49'.3	48'.7	157° 49'.7	18'.4	352° 27'.2	03'.4
12	207° 37'.1	347° 13'.6	15° 24'.2 S	66° 50'.4	16° 48'.3 N	172° 52'.5	12° 18'.3 N	7° 29'.4	6° 03'.5 S
13	222° 39'.6	2° 13'.0	25'.3	81° 51'.5	47'.9	187° 55'.3	18'.2	22° 31'.5	03'.6
14	237° 42'.1	17° 12'.4	26'.3	96° 52'.5	47'.6	202° 58'.0	18'.1	37° 33'.7	03'.7
15	252° 44'.5	32° 11'.9	27'.3	111° 53'.6	47'.2	218° 00'.8	18'.0	52° 35'.9	03'.8
16	267° 47'.0	47° 11'.3	28'.4	126° 54'.6	46'.8	233° 03'.6	17'.8	67° 38'.1	03'.9
17	282° 49'.5	62° 10'.7	29'.4	141° 55'.7	46'.4	248° 06'.4	17'.7	82° 40'.3	04'.1
18	297° 51'.9	77° 10'.1	30'.5	156° 56'.8	46'.0	263° 09'.2	17'.6	97° 42'.4	04'.2
19	312° 54'.4	92° 09'.6	31'.5	171° 57'.8	45'.6	278° 12'.0	17'.5	112° 44'.6	04'.3
20	327° 56'.9	107° 09'.0	32'.5	186° 58'.9	45'.2	293° 14'.7	17'.4	127° 46'.8	04'.4
21	342° 59'.3	122° 08'.4	33'.6	201° 59'.9	44'.8	308° 17'.5	17'.3	142° 49'.0	04'.5
22	358° 01'.8	137° 07'.8	34'.6	217° 01'.0	44'.4	323° 20'.3	17'.2	157° 51'.2	04'.6
23	13° 04'.3	152° 07'.2	35'.6	232° 02'.1	44'.0	338° 23'.1	17'.1	172° 53'.3	04'.7
20 Thursday 00	28° 06'.7	167° 06'.6	15° 36'.7 S	247° 03'.1	16° 43'.6 N	353° 25'.9	12° 17'.0 N	187° 55'.5	6° 04'.8 S
01	43° 09'.2	182° 06'.1	37'.7	262° 04'.2	43'.2	8° 28'.7	16'.9	202° 57'.7	05'.0
02	58° 11'.6	197° 05'.5	38'.7	277° 05'.3	42'.8	23° 31'.4	16'.8	217° 59'.9	05'.1
03	73° 14'.1	212° 04'.9	39'.7	292° 06'.3	42'.4	38° 34'.2	16'.7	233° 02'.1	05'.2
04	88° 16'.6	227° 04'.3	40'.8	307° 07'.4	42'.0	53° 37'.0	16'.6	248° 04'.2	05'.3
05	103° 19'.0	242° 03'.7	41'.8	322° 08'.4	41'.6	68° 39'.8	16'.5	263° 06'.4	05'.4
06	118° 21'.5	257° 03'.1	42'.8	337° 09'.5	41'.2	83° 42'.6	16'.3	278° 08'.6	05'.5
07	133° 24'.0	272° 02'.6	43'.9	352° 10'.6	40'.8	98° 45'.4	16'.2	293° 10'.8	05'.6
08	148° 26'.4	287° 02'.0	44'.9	7° 11'.6	40'.5	113° 48'.1	16'.1	308° 13'.0	05'.7
09	163° 28'.9	302° 01'.4	45'.9	22° 12'.7	40'.1	128° 50'.9	16'.0	323° 15'.1	05'.9
10	178° 31'.4	317° 00'.8	46'.9	37° 13'.8	39'.7	143° 53'.7	15'.9	338° 17'.3	06'.0
11	193° 33'.8	332° 00'.2	48'.0	52° 14'.8	39'.3	158° 56'.5	15'.8	353° 19'.5	06'.1
12	208° 36'.3	346° 59'.6	15° 49'.0 S	67° 15'.9	16° 38'.9 N	173° 59'.3	12° 15'.7 N	8° 21'.7	6° 06'.2 S
13	223° 38'.8	1° 59'.0	50'.0	82° 17'.0	38'.5	189° 02'.1	15'.6	23° 23'.9	06'.3
14	238° 41'.2	16° 58'.4	51'.0	97° 18'.0	38'.1	204° 04'.8	15'.5	38° 26'.0	06'.4
15	253° 43'.7	31° 57'.9	52'.1	112° 19'.1	37'.7	219° 07'.6	15'.4	53° 28'.2	06'.5
16	268° 46'.1	46° 57'.3	53'.1	127° 20'.2	37'.3	234° 10'.4	15'.3	68° 30'.4	06'.6
17	283° 48'.6	61° 56'.7	54'.1	142° 21'.2	36'.9	249° 13'.2	15'.2	83° 32'.6	06'.8
18	298° 51'.1	76° 56'.1	55'.1	157° 22'.3	36'.5	264° 16'.0	15'.0	98° 34'.8	06'.9
19	313° 53'.5	91° 55'.5	56'.1	172° 23'.4	36'.1	279° 18'.8	14'.9	113° 36'.9	07'.0
20	328° 56'.0	106° 54'.9	57'.1	187° 24'.4	35'.7	294° 21'.5	14'.8	128° 39'.1	07'.1
21	343° 58'.5	121° 54'.3	58'.2	202° 25'.5	35'.3	309° 24'.3	14'.7	143° 41'.3	07'.2
22	359° 00'.9	136° 53'.7	59'.2	217° 26'.6	34'.9	324° 27'.1	14'.6	158° 43'.5	07'.3
23	14° 03'.4	151° 53'.1	16° 00'.2 S	232° 27'.6	34'.5	339° 29'.9	14'.5	173° 45'.7	07'.4
21 Friday 00	29° 05'.9	166° 52'.5	16° 01'.2 S	247° 28'.7	16° 34'.1 N	354° 32'.7	12° 14'.4 N	188° 47'.8	6° 07'.5 S
01	44° 08'.3	181° 51'.9	02'.2	262° 29'.8	33'.7	9° 35'.5	14'.3	203° 50'.0	07'.7
02	59° 10'.8	196° 51'.3	03'.2	277° 30'.9	33'.3	24° 38'.3	14'.2	218° 52'.2	07'.8
03	74° 13'.2	211° 50'.7	04'.3	292° 31'.9	32'.9	39° 41'.0	14'.1	233° 54'.4	07'.9
04	89° 15'.7	226° 50'.1	05'.3	307° 33'.0	32'.5	54° 43'.8	14'.0	248° 56'.6	08'.0
05	104° 18'.2	241° 49'.5	06'.3	322° 34'.1	32'.1	69° 46'.6	13'.9	263° 58'.7	08'.1
06	119° 20'.6	256° 48'.9	07'.3	337° 35'.1	31'.7	84° 49'.4	13'.8	279° 00'.9	08'.2
07	134° 23'.1	271° 48'.3	08'.3	352° 36'.2	31'.3	99° 52'.2	13'.6	294° 03'.1	08'.3
08	149° 25'.6	286° 47'.7	09'.3	7° 37'.3	30'.9	114° 55'.0	13'.5	309° 05'.3	08'.4
09	164° 28'.0	301° 47'.1	10'.3	22° 38'.4	30'.6	129° 57'.7	13'.4	324° 07'.5	08'.6
10	179° 30'.5	316° 46'.5	11'.3	37° 39'.4	30'.2	145° 00'.5	13'.3	339° 09'.6	08'.7
11	194° 33'.0	331° 45'.9	12'.3	52° 40'.5	29'.8	160° 03'.3	13'.2	354° 11'.8	08'.8
12	209° 35'.4	346° 45'.3	16° 13'.3 S	67° 41'.6	16° 29'.4 N	175° 06'.1	12° 13'.1 N	9° 14'.0	6° 08'.9 S
13	224° 37'.9	1° 44'.7	14'.4	82° 42'.6	29'.0	190° 08'.9	13'.0	24° 16'.2	09'.0
14	239° 40'.4	16° 44'.1	15'.4	97° 43'.7	28'.6	205° 11'.7	12'.9	39° 18'.4	09'.1
15	254° 42'.8	31° 43'.5	16'.4	112° 44'.8	28'.2	220° 14'.5	12'.8	54° 20'.5	09'.2
16	269° 45'.3	46° 42'.9	17'.4	127° 45'.9	27'.8	235° 17'.2	12'.7	69° 22'.7	09'.3
17	284° 47'.7	61° 42'.3	18'.4	142° 46'.9	27'.4	250° 20'.0	12'.6	84° 24'.9	09'.4
18	299° 50'.2	76° 41'.7	19'.4	157° 48'.0	27'.0	265° 22'.8	12'.5	99° 27'.1	09'.6
19	314° 52'.7	91° 41'.1	20'.4	172° 49'.1	26'.6	280° 25'.6	12'.3	114° 29'.3	09'.7
20	329° 55'.1	106° 40'.5	21'.4	187° 50'.2	26'.2	295° 28'.4	12'.2	129° 31'.4	09'.8
21	344° 57'.6	121° 39'.9	22'.4	202° 51'.2	25'.8	310° 31'.2	12'.1	144° 33'.6	09'.9
22	0° 00'.1	136° 39'.3	23'.4	217° 52'.3	25'.4	325° 34'.0	12'.0	159° 35'.8	10'.0
23	15° 02'.5	151° 38'.7	24'.4	232° 53'.4	25'.0	340° 36'.8	11'.9	174° 38'.0	10'.1
	M.P. 22:04	v -0'.6	d 1'.0	v 1'.1	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.4	63° 09'.8 S
Adhara	255° 13'.4	28° 59'.1 S
Aldebaran	290° 50'.5	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.7 N
Alkaid	153° 00'.3	49° 15'.3 N
Alnair	27° 44'.9	46° 54'.2 S
Alnilam	275° 47'.4	1° 11'.6 S
Alphard	217° 57'.4	8° 42'.5 S
Alphecca	126° 12'.3	26° 40'.7 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.3	69° 03'.0 S
Avior	234° 18'.6	59° 32'.6 S
Bellatrix	278° 33'.1	6° 21'.7 N
Betelgeuse	271° 02'.4	7° 24'.6 N
Canopus	263° 56'.5	52° 41'.9 S
Capella	280° 35'.9	46° 00'.4 N
Deneb	49° 32'.2	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.6	61° 41'.0 N
Elnath	278° 13'.9	28° 37'.0 N
Eltanin	90° 46'.9	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.8	57° 10'.7 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.8	23° 31'.2 N
Kaus Aust.	83° 45'.5	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.5 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.3	69° 45'.7 S
Mirfak	308° 41'.6	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.9 S
Polaris	317° 55'.7	89° 18'.9 N
Pollux	243° 29'.1	27° 59'.7 N
Procyon	245° 00'.9	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.0	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.7	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.5	43° 28'.6 S
Vega	80° 39'.9	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	138° 59'.9	12:52
Mars	218° 56'.4	07:31
Jupiter	325° 19'.2	00:26
Saturn	159° 48'.8	11:27

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 43'.4	9° 46'.2 S	284° 39'.9	10'.0	20° 39'.3 N	5'.3	56'.1
198° 43'.5	47'.1	299° 08'.9	10'.1	34'.0	5'.5	56'.2
213° 43'.6	48'.0	313° 38'.0	10'.0	28'.5	5'.5	
228° 43'.7	48'.9	328° 07'.0	10'.1	23'.0	5'.7	
243° 43'.9	49'.8	342° 36'.1	10'.1	17'.3	5'.7	56'.3
258° 44'.0	50'.8	357° 05'.2	10'.1	11'.6	5'.9	
273° 44'.1	51'.7	11° 34'.3	10'.0	05'.7	6'.0	
288° 44'.2	52'.6	26° 03'.3	10'.1	19° 59'.7 N	6'.1	56'.4
303° 44'.3	53'.5	40° 32'.4	10'.1	53'.6	6'.2	
318° 44'.4	54'.4	55° 01'.5	10'.1	47'.4	6'.3	
333° 44'.6	55'.3	69° 30'.6	10'.1	41'.1	6'.4	
348° 44'.7	56'.2	83° 59'.7	10'.2	34'.7	6'.6	56'.5
3° 44'.8	9° 57'.1 S	98° 28'.9	10'.1	19° 28'.1 N	6'.6	56'.5
18° 44'.9	58'.0	112° 58'.0	10'.1	21'.5	6'.8	
33° 45'.0	58'.9	127° 27'.1	10'.2	14'.7	6'.8	56'.6
48° 45'.1	59'.8	141° 56'.3	10'.1	07'.9	7'.0	
63° 45'.2	10° 00'.7 S	156° 25'.4	10'.2	00'.9	7'.1	
78° 45'.4	01'.6	170° 54'.6	10'.1	18° 53'.8 N	7'.1	56'.7
93° 45'.5	02'.5	185° 23'.7	10'.2	46'.7	7'.3	
108° 45'.6	03'.4	199° 52'.9	10'.2	39'.4	7'.4	
123° 45'.7	04'.3	214° 22'.1	10'.2	32'.0	7'.5	56'.8
138° 45'.8	05'.2	228° 51'.3	10'.2	24'.5	7'.6	
153° 45'.9	06'.1	243° 20'.5	10'.2	16'.9	7'.8	
168° 46'.0	07'.0	257° 49'.7	10'.2	09'.1	7'.8	56'.9
183° 46'.2	10° 07'.9 S	272° 18'.9	10'.2	18° 01'.3 N	7'.9	56'.9
198° 46'.3	08'.8	286° 48'.1	10'.3	17° 53'.4 N	8'.0	
213° 46'.4	09'.7	301° 17'.4	10'.2	45'.4	8'.2	57'.0
228° 46'.5	10'.6	315° 46'.6	10'.3	37'.2	8'.2	
243° 46'.6	11'.5	330° 15'.9	10'.2	29'.0	8'.3	57'.1
258° 46'.7	12'.4	344° 45'.1	10'.3	20'.7	8'.5	
273° 46'.8	13'.3	359° 14'.4	10'.3	12'.2	8'.5	
288° 46'.9	14'.2	13° 43'.7	10'.3	03'.7	8'.6	57'.2
303° 47'.0	15'.1	28° 13'.0	10'.3	16° 55'.1 N	8'.8	
318° 47'.2	16'.0	42° 42'.3	10'.3	46'.3	8'.8	
333° 47'.3	16'.9	57° 11'.6	10'.3	37'.5	8'.9	57'.3
348° 47'.4	17'.8	71° 40'.9	10'.4	28'.6	9'.1	
3° 47'.5	10° 18'.7 S	86° 10'.3	10'.3	16° 19'.5 N	9'.1	57'.3
18° 47'.6	19'.6	100° 39'.6	10'.4	10'.4	9'.2	57'.4
33° 47'.7	20'.5	115° 09'.0	10'.3	01'.2	9'.4	
48° 47'.8	21'.4	129° 38'.3	10'.4	15° 51'.8 N	9'.4	
63° 47'.9	22'.3	144° 07'.7	10'.4	42'.4	9'.5	57'.5
78° 48'.0	23'.2	158° 37'.1	10'.3	32'.9	9'.6	
93° 48'.1	24'.1	173° 06'.4	10'.4	23'.3	9'.7	57'.6
108° 48'.2	25'.0	187° 35'.8	10'.4	13'.6	9'.8	
123° 48'.3	25'.9	202° 05'.2	10'.4	03'.8	9'.9	
138° 48'.4	26'.7	216° 34'.6	10'.4	14° 53'.9 N	10'.0	57'.7
153° 48'.6	27'.6	231° 04'.0	10'.5	43'.9	10'.1	
168° 48'.7	28'.5	245° 33'.5	10'.4	33'.8	10'.1	
183° 48'.8	10° 29'.4 S	260° 02'.9	10'.4	14° 23'.7 N	10'.3	57'.8
198° 48'.9	30'.3	274° 32'.3	10'.5	13'.4	10'.3	
213° 49'.0	31'.2	289° 01'.8	10'.4	03'.1	10'.5	57'.9
228° 49'.1	32'.1	303° 31'.2	10'.4	13° 52'.6 N	10'.5	
243° 49'.2	33'.0	318° 00'.6	10'.5	42'.1	10'.6	
258° 49'.3	33'.9	332° 30'.1	10'.5	31'.5	10'.7	58'.0
273° 49'.4	34'.8	346° 59'.6	10'.4	20'.8	10'.8	
288° 49'.5	35'.7	1° 29'.0	10'.5	10'.0	10'.8	58'.1
303° 49'.6	36'.6	15° 58'.5	10'.5	12° 59'.2 N	11'.0	
318° 49'.7	37'.5	30° 28'.0	10'.4	48'.2	11'.0	
333° 49'.8	38'.4	44° 57'.4	10'.5	37'.2	11'.1	58'.2
348° 49'.9	39'.2	59° 26'.9	10'.5	26'.1	11'.2	
3° 50'.0	10° 40'.1 S	73° 56'.4	10'.5	12° 14'.9 N	11'.3	58'.2
18° 50'.1	41'.0	88° 25'.9	10'.4	03'.6	11'.4	58'.3
33° 50'.3	41'.9	102° 55'.3	10'.5	11° 52'.2 N	11'.4	
48° 50'.3	42'.8	117° 24'.8	10'.5	40'.8	11'.5	58'.4
63° 50'.4	43'.7	131° 54'.3	10'.5	29'.3	11'.6	
78° 50'.5	44'.6	146° 23'.8	10'.5	17'.7	11'.7	
93° 50'.6	45'.5	160° 53'.3	10'.4	06'.0	11'.7	58'.5
108° 50'.7	46'.4	175° 22'.7	10'.5	10° 54'.3 N	11'.8	
123° 50'.8	47'.3	189° 52'.2	10'.5	42'.5	11'.9	58'.6
138° 50'.9	48'.1	204° 21'.7	10'.5	30'.6	12'.0	
153° 51'.0	49'.0	218° 51'.2	10'.4	18'.6	12'.0	
168° 51'.1	49'.9	233° 20'.6	10'.5	06'.6	12'.1	58'.7
SD 16'.1	d 0'.9	SD 15'.4		15'.6	15'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 19	Moonrise 20	Moonrise 21
N 72°	05:15	06:34	07:47	-	20:57	23:17
N 70°	05:17	06:28	07:33	19:13	21:31	23:34
68°	05:18	06:22	07:21	20:01	21:55	23:47
66°	05:19	06:18	07:12	20:31	22:14	23:58
64°	05:19	06:14	07:04	20:54	22:29	24:07
62°	05:19	06:11	06:57	21:12	22:41	24:14
60°	05:20	06:08	06:51	21:26	22:52	24:21
N 58°	05:20	06:05	06:45	21:39	23:01	24:26
56°	05:19	06:03	06:41	21:50	23:09	24:31
54°	05:19	06:00	06:36	21:59	23:16	24:36
52°	05:19	05:58	06:33	22:08	23:22	24:40
50°	05:19	05:56	06:29	22:15	23:28	24:44
45°	05:18	05:52	06:22	22:32	23:40	24:52
N 40°	05:16	05:48	06:15	22:45	23:50	24:58
35°	05:15	05:44	06:10	22:56	23:59	25:04
30°	05:13	05:41	06:05	23:06	-	00:07
20°	05:08	05:34	05:56	23:23	-	00:20
N 10°	05:03	05:27	05:49	23:37	-	00:31
0°	04:56	05:20	05:41	23:51	-	00:42
S 10°	04:48	05:13	05:34	-	00:05	00:52
20°	04:37	05:04	05:26	-	00:19	01:04
30°	04:23	04:53	05:17	-	00:36	01:17
35°	04:15	04:46	05:12	00:03	00:45	01:24
40°	04:04	04:38	05:06	00:16	00:56	01:32
45°	03:51	04:28	04:59	00:32	01:09	01:42
S 50°	03:33	04:16	04:50	00:50	01:25	01:54
52°	03:25	04:10	04:46	00:59	01:32	02:00
54°	03:16	04:03	04:42	01:09	01:40	02:06
56°	03:05	03:56	04:37	01:20	01:49	02:12
58°	02:52	03:48	04:31	01:33	01:59	02:20
S 60°	02:36	03:39	04:25	01:48	02:11	02:28
S 62°	02:17	03:28	04:18	02:05	02:25	02:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 19	Moonset 20	Moonset 21
N 72°	15:41	16:54	18:12	-	16:19	15:45
N 70°	15:55	17:00	18:11	16:14	15:44	15:26
68°	16:07	17:06	18:10	15:26	15:18	15:12
66°	16:17	17:10	18:09	14:55	14:58	14:59
64°	16:25	17:14	18:09	14:32	14:42	14:49
62°	16:32	17:18	18:09	14:13	14:29	14:40
60°	16:38	17:21	18:09	13:58	14:18	14:33
N 58°	16:43	17:23	18:09	13:45	14:08	14:26
56°	16:48	17:26	18:09	13:33	13:59	14:20
54°	16:52	17:28	18:09	13:23	13:51	14:15
52°	16:56	17:31	18:10	13:14	13:44	14:10
50°	17:00	17:33	18:10	13:06	13:38	14:06
45°	17:07	17:37	18:11	12:49	13:25	13:56
N 40°	17:14	17:41	18:13	12:35	13:13	13:48
35°	17:19	17:45	18:15	12:23	13:04	13:41
30°	17:24	17:49	18:17	12:13	12:55	13:35
20°	17:33	17:55	18:21	11:55	12:40	13:24
N 10°	17:41	18:02	18:27	11:39	12:27	13:15
0°	17:48	18:09	18:34	11:24	12:15	13:06
S 10°	17:56	18:17	18:42	11:09	12:03	12:57
20°	18:04	18:26	18:53	10:53	11:50	12:47
30°	18:13	18:38	19:07	10:35	11:35	12:36
35°	18:19	18:45	19:16	10:24	11:26	12:30
40°	18:25	18:53	19:27	10:12	11:16	12:23
45°	18:32	19:03	19:40	09:57	11:04	12:14
S 50°	18:41	19:15	19:58	09:39	10:49	12:04
52°	18:45	19:21	20:06	09:31	10:42	11:59
54°	18:49	19:28	20:16	09:21	10:35	11:53
56°	18:54	19:35	20:27	09:10	10:26	11:47
58°	19:00	19:43	20:41	08:58	10:17	11:41
S 60°	19:06	19:53	20:56	08:44	10:06	11:33
S 62°	19:13	20:05	21:16	08:26	09:53	11:24

	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
Day						
19	14 53	14 59	11:45	05:12	17:38	22d 57%
20	15 04	15 10	11:45	06:03	18:29	23d 46%
21	15 15	15 20	11:45	06:54	19:19	24d 36%

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2011 October 22, 23, 24 (Saturday, Sunday, Monday)

GMT	ARIES	VENUS -3.9		MARS +1.2		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
22 00	30° 05'.0	166° 38'.1	16° 25'.4 S	247° 54'.5	16° 24'.6 N	355° 39'.5	12° 11'.8 N	189° 40'.2	6° 10'.2 S
01	45° 07'.5	181° 37'.5	26'.4	262° 55'.6	24'.2	10° 42'.3	11'.7	204° 42'.3	10'.3
02	60° 09'.9	196° 36'.9	27'.4	277° 56'.6	23'.8	25° 45'.1	11'.6	219° 44'.5	10'.5
03	75° 12'.4	211° 36'.3	28'.4	292° 57'.7	23'.4	40° 47'.9	11'.5	234° 46'.7	10'.6
04	90° 14'.9	226° 35'.7	29'.4	307° 58'.8	23'.0	55° 50'.7	11'.4	249° 48'.9	10'.7
05	105° 17'.3	241° 35'.0	30'.4	322° 59'.9	22'.6	70° 53'.5	11'.3	264° 51'.1	10'.8
06	120° 19'.8	256° 34'.4	31'.3	338° 00'.9	22'.2	85° 56'.3	11'.1	279° 53'.2	10'.9
07	135° 22'.2	271° 33'.8	32'.3	353° 02'.0	21'.8	100° 59'.0	11'.0	294° 55'.4	11'.0
08	150° 24'.7	286° 33'.2	33'.3	8° 03'.1	21'.4	116° 01'.8	10'.9	309° 57'.6	11'.1
09	165° 27'.2	301° 32'.6	34'.3	23° 04'.2	21'.0	131° 04'.6	10'.8	324° 59'.8	11'.2
10	180° 29'.6	316° 32'.0	35'.3	38° 05'.3	20'.6	146° 07'.4	10'.7	340° 02'.0	11'.4
11	195° 32'.1	331° 31'.4	36'.3	53° 06'.3	20'.2	161° 10'.2	10'.6	355° 04'.1	11'.5
12	210° 34'.6	346° 30'.8	16° 37'.3 S	68° 07'.4	16° 19'.8 N	176° 13'.0	12° 10'.5 N	10° 06'.3	6° 11'.6 S
13	225° 37'.0	1° 30'.2	38'.3	83° 08'.5	19'.4	191° 15'.8	10'.4	25° 08'.5	11'.7
14	240° 39'.5	16° 29'.5	39'.3	98° 09'.6	19'.0	206° 18'.6	10'.3	40° 10'.7	11'.8
15	255° 42'.0	31° 28'.9	40'.3	113° 10'.7	18'.6	221° 21'.3	10'.2	55° 12'.9	11'.9
16	270° 44'.4	46° 28'.3	41'.2	128° 11'.7	18'.2	236° 24'.1	10'.1	70° 15'.0	12'.0
17	285° 46'.9	61° 27'.7	42'.2	143° 12'.8	17'.8	251° 26'.9	10'.0	85° 17'.2	12'.1
18	300° 49'.3	76° 27'.1	43'.2	158° 13'.9	17'.4	266° 29'.7	09'.8	100° 19'.4	12'.2
19	315° 51'.8	91° 26'.5	44'.2	173° 15'.0	17'.0	281° 32'.5	09'.7	115° 21'.6	12'.4
20	330° 54'.3	106° 25'.8	45'.2	188° 16'.1	16'.6	296° 35'.3	09'.6	130° 23'.8	12'.5
21	345° 56'.7	121° 25'.2	46'.2	203° 17'.2	16'.2	311° 38'.1	09'.5	145° 25'.9	12'.6
22	0° 59'.2	136° 24'.6	47'.2	218° 18'.2	15'.8	326° 40'.9	09'.4	160° 28'.1	12'.7
23	16° 01'.7	151° 24'.0	48'.1	233° 19'.3	15'.4	341° 43'.7	09'.3	175° 30'.3	12'.8
23 00	31° 04'.1	166° 23'.4	16° 49'.1 S	248° 20'.4	16° 15'.0 N	356° 46'.4	12° 09'.2 N	190° 32'.5	6° 12'.9 S
01	46° 06'.6	181° 22'.7	50'.1	263° 21'.5	14'.6	11° 49'.2	09'.1	205° 34'.7	13'.0
02	61° 09'.1	196° 22'.1	51'.1	278° 22'.6	14'.2	26° 52'.0	09'.0	220° 36'.8	13'.1
03	76° 11'.5	211° 21'.5	52'.1	293° 23'.7	13'.8	41° 54'.8	08'.9	235° 39'.0	13'.3
04	91° 14'.0	226° 20'.9	53'.0	308° 24'.8	13'.4	56° 57'.6	08'.8	250° 41'.2	13'.4
05	106° 16'.5	241° 20'.3	54'.0	323° 25'.8	13'.0	72° 00'.4	08'.6	265° 43'.4	13'.5
06	121° 18'.9	256° 19'.6	55'.0	338° 26'.9	12'.6	87° 03'.2	08'.5	280° 45'.6	13'.6
07	136° 21'.4	271° 19'.0	56'.0	353° 28'.0	12'.2	102° 06'.0	08'.4	295° 47'.7	13'.7
08	151° 23'.8	286° 18'.4	56'.9	8° 29'.1	11'.8	117° 08'.7	08'.3	310° 49'.9	13'.8
09	166° 26'.3	301° 17'.8	57'.9	23° 30'.2	11'.4	132° 11'.5	08'.2	325° 52'.1	13'.9
10	181° 28'.8	316° 17'.1	58'.9	38° 31'.3	11'.0	147° 14'.3	08'.1	340° 54'.3	14'.0
11	196° 31'.2	331° 16'.5	59'.9	53° 32'.4	10'.6	162° 17'.1	08'.0	355° 56'.5	14'.1
12	211° 33'.7	346° 15'.9	17° 00'.8 S	68° 33'.4	16° 10'.2 N	177° 19'.9	12° 07'.9 N	10° 58'.6	6° 14'.3 S
13	226° 36'.2	1° 15'.3	01'.8	83° 34'.5	09'.8	192° 22'.7	07'.8	26° 00'.8	14'.4
14	241° 38'.6	16° 14'.6	02'.8	98° 35'.6	09'.4	207° 25'.5	07'.7	41° 03'.0	14'.5
15	256° 41'.1	31° 14'.0	03'.7	113° 36'.7	09'.0	222° 28'.3	07'.5	56° 05'.2	14'.6
16	271° 43'.6	46° 13'.4	04'.7	128° 37'.8	08'.6	237° 31'.1	07'.4	71° 07'.4	14'.7
17	286° 46'.0	61° 12'.7	05'.7	143° 38'.9	08'.2	252° 33'.9	07'.3	86° 09'.5	14'.8
18	301° 48'.5	76° 12'.1	06'.6	158° 40'.0	07'.8	267° 36'.6	07'.2	101° 11'.7	14'.9
19	316° 50'.9	91° 11'.5	07'.6	173° 41'.1	07'.4	282° 39'.4	07'.1	116° 13'.9	15'.0
20	331° 53'.4	106° 10'.9	08'.6	188° 42'.2	07'.0	297° 42'.2	07'.0	131° 16'.1	15'.1
21	346° 55'.9	121° 10'.2	09'.5	203° 43'.3	06'.6	312° 45'.0	06'.9	146° 18'.3	15'.3
22	1° 58'.3	136° 09'.6	10'.5	218° 44'.3	06'.2	327° 47'.8	06'.8	161° 20'.4	15'.4
23	17° 00'.8	151° 09'.0	11'.5	233° 45'.4	05'.8	342° 50'.6	06'.7	176° 22'.6	15'.5
24 00	32° 03'.3	166° 08'.3	17° 12'.4 S	248° 46'.5	16° 05'.4 N	357° 53'.4	12° 06'.6 N	191° 24'.8	6° 15'.6 S
01	47° 05'.7	181° 07'.7	13'.4	263° 47'.6	05'.0	12° 56'.2	06'.5	206° 27'.0	15'.7
02	62° 08'.2	196° 07'.1	14'.3	278° 48'.7	04'.6	27° 59'.0	06'.3	221° 29'.2	15'.8
03	77° 10'.7	211° 06'.4	15'.3	293° 49'.8	04'.2	43° 01'.7	06'.2	236° 31'.4	15'.9
04	92° 13'.1	226° 05'.8	16'.3	308° 50'.9	03'.8	58° 04'.5	06'.1	251° 33'.5	16'.0
05	107° 15'.6	241° 05'.2	17'.2	323° 52'.0	03'.4	73° 07'.3	06'.0	266° 35'.7	16'.1
06	122° 18'.1	256° 04'.5	18'.2	338° 53'.1	03'.0	88° 10'.1	05'.9	281° 37'.9	16'.3
07	137° 20'.5	271° 03'.9	19'.1	353° 54'.2	02'.6	103° 12'.9	05'.8	296° 40'.1	16'.4
08	152° 23'.0	286° 03'.3	20'.1	8° 55'.3	02'.2	118° 15'.7	05'.7	311° 42'.3	16'.5
09	167° 25'.4	301° 02'.6	21'.1	23° 56'.4	01'.8	133° 18'.5	05'.6	326° 44'.4	16'.6
10	182° 27'.9	316° 02'.0	22'.0	38° 57'.5	01'.4	148° 21'.3	05'.5	341° 46'.6	16'.7
11	197° 30'.4	331° 01'.3	23'.0	53° 58'.6	01'.0	163° 24'.1	05'.4	356° 48'.8	16'.8
12	212° 32'.8	346° 00'.7	17° 23'.9 S	68° 59'.7	16° 00'.6 N	178° 26'.9	12° 05'.2 N	11° 51'.0	6° 16'.9 S
13	227° 35'.3	1° 00'.1	24'.9	84° 00'.8	00'.2	193° 29'.6	05'.1	26° 53'.2	17'.0
14	242° 37'.8	15° 59'.4	25'.8	99° 01'.8	15° 59'.8 N	208° 32'.4	05'.0	41° 55'.3	17'.1
15	257° 40'.2	30° 58'.8	26'.8	114° 02'.9	59'.4	223° 35'.2	04'.9	56° 57'.5	17'.3
16	272° 42'.7	45° 58'.1	27'.7	129° 04'.0	59'.0	238° 38'.0	04'.8	71° 59'.7	17'.4
17	287° 45'.2	60° 57'.5	28'.7	144° 05'.1	58'.6	253° 40'.8	04'.7	87° 01'.9	17'.5
18	302° 47'.6	75° 56'.9	29'.6	159° 06'.2	58'.2	268° 43'.6	04'.6	102° 04'.1	17'.6
19	317° 50'.1	90° 56'.2	30'.6	174° 07'.3	57'.8	283° 46'.4	04'.5	117° 06'.2	17'.7
20	332° 52'.6	105° 55'.6	31'.5	189° 08'.4	57'.4	298° 49'.2	04'.4	132° 08'.4	17'.8
21	347° 55'.0	120° 54'.9	32'.5	204° 09'.5	57'.0	313° 52'.0	04'.3	147° 10'.6	17'.9
22	2° 57'.5	135° 54'.3	33'.4	219° 10'.6	56'.6	328° 54'.8	04'.2	162° 12'.8	18'.0
23	17° 59'.9	150° 53'.6	34'.4	234° 11'.7	56'.2	343° 57'.6	04'.0	177° 15'.0	18'.1
	M.P. 21:52	v -0'.6	d 1'.0	v 1'.1	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.4	63° 09'.8 S
Adhara	255° 13'.3	28° 59'.1 S
Aldebaran	290° 50'.5	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.6 N
Alkaid	153° 00'.3	49° 15'.2 N
Alnair	27° 44'.9	46° 54'.2 S
Alnilam	275° 47'.4	1° 11'.6 S
Alphard	217° 57'.4	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.3	69° 03'.0 S
Avior	234° 18'.6	59° 32'.6 S
Bellatrix	278° 33'.1	6° 21'.7 N
Betelgeuse	271° 02'.4	7° 24'.6 N
Canopus	263° 56'.4	52° 41'.9 S
Capella	280° 35'.9	46° 00'.4 N
Deneb	49° 32'.2	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.1 S
Dubhe	193° 53'.5	61° 41'.0 N
Elnath	278° 13'.9	28° 37'.0 N
Eltanin	90° 47'.0	51° 29'.6 N
Enif	33° 48'.1	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.8	57° 10'.7 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.7	23° 31'.2 N
Kaus Aust.	83° 45'.5	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.5 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.3	69° 45'.7 S
Mirfak	308° 41'.6	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.9 S
Polaris	317° 55'.3	89° 18'.9 N
Pollux	243° 29'.1	27° 59'.7 N
Procyon	245° 00'.9	5° 11'.7 N
Rasalhague	96° 07'.7	12° 33'.3 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 13'.0	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.6	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.5	43° 28'.6 S
Vega	80° 39'.9	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	135° 19'.2	12:55
Mars	217° 16'.3	07:26
Jupiter	325° 42'.3	00:13
Saturn	159° 28'.3	11:16

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 51'.2	10° 50'.8 S	247° 50'.1	10'.5	9° 54'.5 N	12'.2	58'.7
198° 51'.3	51'.7	262° 19'.6	10'.4	42'.3	12'.3	
213° 51'.4	52'.6	276° 49'.0	10'.5	30'.0	12'.3	58'.8
228° 51'.5	53'.5	291° 18'.5	10'.4	17'.7	12'.4	
243° 51'.6	54'.4	305° 47'.9	10'.4	05'.3	12'.4	58'.9
258° 51'.7	55'.2	320° 17'.3	10'.5	8° 52'.9 N	12'.6	
273° 51'.8	56'.1	334° 46'.8	10'.4	40'.3	12'.5	
288° 51'.9	57'.0	349° 16'.2	10'.4	27'.8	12'.7	59'.0
303° 52'.0	57'.9	3° 45'.6	10'.4	15'.1	12'.7	
318° 52'.1	58'.8	18° 15'.0	10'.4	02'.4	12'.7	59'.1
333° 52'.2	59'.7	32° 44'.4	10'.4	7° 49'.7 N	12'.9	
348° 52'.3	11° 00'.6 S	47° 13'.8	10'.3	36'.8	12'.9	
3° 52'.4	11° 01'.4 S	61° 43'.1	10'.4	7° 23'.9 N	12'.9	59'.2
18° 52'.5	02'.3	76° 12'.5	10'.3	11'.0	13'.0	
33° 52'.6	03'.2	90° 41'.8	10'.4	6° 58'.0 N	13'.1	
48° 52'.7	04'.1	105° 11'.2	10'.3	44'.9	13'.1	59'.3
63° 52'.7	05'.0	119° 40'.5	10'.3	31'.8	13'.1	
78° 52'.8	05'.9	134° 09'.8	10'.3	18'.7	13'.3	59'.4
93° 52'.9	06'.7	148° 39'.1	10'.2	05'.4	13'.2	
108° 53'.0	07'.6	163° 08'.3	10'.3	5° 52'.2 N	13'.4	
123° 53'.1	08'.5	177° 37'.6	10'.2	38'.8	13'.3	59'.5
138° 53'.2	09'.4	192° 06'.8	10'.2	25'.5	13'.4	
153° 53'.3	10'.3	206° 36'.0	10'.2	12'.1	13'.5	
168° 53'.4	11'.1	221° 05'.2	10'.2	4° 58'.6 N	13'.5	59'.6
183° 53'.5	11° 12'.0 S	235° 34'.4	10'.1	4° 45'.1 N	13'.6	59'.6
198° 53'.6	12'.9	250° 03'.5	10'.2	31'.5	13'.5	
213° 53'.7	13'.8	264° 32'.7	10'.1	18'.0	13'.7	59'.7
228° 53'.8	14'.7	279° 01'.8	10'.1	04'.3	13'.7	
243° 53'.8	15'.5	293° 30'.9	10'.0	3° 50'.6 N	13'.7	59'.8
258° 53'.9	16'.4	307° 59'.9	10'.1	36'.9	13'.7	
273° 54'.0	17'.3	322° 29'.0	10'.0	23'.2	13'.8	
288° 54'.1	18'.2	336° 58'.0	9'.9	09'.4	13'.8	59'.9
303° 54'.2	19'.1	351° 26'.9	10'.0	2° 55'.6 N	13'.9	
318° 54'.3	19'.9	5° 55'.9	9'.9	41'.7	13'.9	
333° 54'.4	20'.8	20° 24'.8	9'.9	27'.8	13'.9	60'.0
348° 54'.5	21'.7	34° 53'.7	9'.9	13'.9	13'.9	
3° 54'.6	11° 22'.6 S	49° 22'.6	9'.8	2° 00'.0 N	14'.0	60'.0
18° 54'.6	23'.4	63° 51'.4	9'.8	46'.0	14'.0	60'.1
33° 54'.7	24'.3	78° 20'.2	9'.8	32'.0	14'.0	
48° 54'.8	25'.2	92° 49'.0	9'.7	18'.0	14'.1	
63° 54'.9	26'.1	107° 17'.7	9'.7	03'.9	14'.1	60'.2
78° 55'.0	27'.0	121° 46'.4	9'.7	0° 49'.8 N	14'.1	
93° 55'.1	27'.8	136° 15'.1	9'.6	35'.7	14'.1	
108° 55'.2	28'.7	150° 43'.7	9'.6	21'.6	14'.1	60'.3
123° 55'.2	29'.6	165° 12'.3	9'.6	07'.5	14'.2	
138° 55'.3	30'.5	179° 40'.9	9'.5	0° 06'.7 S	14'.1	
153° 55'.4	31'.3	194° 09'.4	9'.5	20'.8	14'.2	60'.4
168° 55'.5	32'.2	208° 37'.9	9'.4	35'.0	14'.2	
183° 55'.6	11° 33'.1 S	223° 06'.3	9'.4	0° 49'.2 S	14'.2	60'.4
198° 55'.7	33'.9	237° 34'.7	9'.4	1° 03'.4 S	14'.2	
213° 55'.8	34'.8	252° 03'.1	9'.3	17'.6	14'.2	60'.5
228° 55'.8	35'.7	266° 31'.4	9'.3	31'.8	14'.2	
243° 55'.9	36'.6	280° 59'.7	9'.2	46'.0	14'.2	
258° 56'.0	37'.4	295° 27'.9	9'.2	2° 00'.2 S	14'.3	60'.6
273° 56'.1	38'.3	309° 56'.1	9'.1	14'.5	14'.2	
288° 56'.2	39'.2	324° 24'.2	9'.1	28'.7	14'.2	
303° 56'.2	40'.1	338° 52'.3	9'.1	42'.9	14'.2	
318° 56'.3	40'.9	353° 20'.4	9'.0	57'.1	14'.2	60'.7
333° 56'.4	41'.8	7° 48'.4	8'.9	3° 11'.3 S	14'.3	
348° 56'.5	42'.7	22° 16'.3	8'.9	25'.6	14'.2	
3° 56'.6	11° 43'.5 S	36° 44'.2	8'.9	3° 39'.8 S	14'.1	60'.8
18° 56'.6	44'.4	51° 12'.1	8'.8	53'.9	14'.2	
33° 56'.7	45'.3	65° 39'.9	8'.7	4° 08'.1 S	14'.2	
48° 56'.8	46'.1	80° 07'.6	8'.7	22'.3	14'.2	
63° 56'.9	47'.0	94° 35'.3	8'.7	36'.5	14'.1	60'.9
78° 57'.0	47'.9	109° 03'.0	8'.6	50'.6	14'.1	
93° 57'.0	48'.7	123° 30'.6	8'.5	5° 04'.7 S	14'.1	
108° 57'.1	49'.6	137° 58'.1	8'.5	18'.8	14'.1	
123° 57'.2	50'.5	152° 25'.6	8'.4	32'.9	14'.0	
138° 57'.3	51'.3	166° 53'.0	8'.4	46'.9	14'.1	61'.0
153° 57'.4	52'.2	181° 20'.4	8'.3	6° 01'.0 S	14'.0	
168° 57'.4	53'.1	195° 47'.7	8'.3	15'.0	13'.9	
SD 16'.1	d 0'.9	SD	16'.1	16'.4	16'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 22	Moonrise 23	Moonrise 24
N 72°	05:28	06:47	08:03	-	01:28	03:38
N 70°	05:28	06:39	07:46	-	01:34	03:35
68°	05:28	06:33	07:33	-	01:39	03:33
66°	05:28	06:27	07:22	-	01:43	03:32
64°	05:27	06:23	07:13	00:07	01:47	03:30
62°	05:27	06:19	07:05	00:14	01:50	03:29
60°	05:26	06:15	06:58	00:21	01:53	03:28
N 58°	05:26	06:12	06:52	00:26	01:55	03:27
56°	05:25	06:09	06:47	00:31	01:57	03:26
54°	05:25	06:06	06:42	00:36	01:59	03:25
52°	05:24	06:03	06:38	00:40	02:01	03:24
50°	05:23	06:01	06:34	00:44	02:02	03:24
45°	05:21	05:56	06:26	00:52	02:06	03:22
N 40°	05:19	05:51	06:18	00:58	02:09	03:21
35°	05:17	05:47	06:12	01:04	02:11	03:20
30°	05:15	05:43	06:07	01:09	02:13	03:19
20°	05:09	05:35	05:57	01:18	02:17	03:18
N 10°	05:03	05:28	05:49	01:25	02:20	03:16
0°	04:55	05:20	05:41	01:32	02:23	03:15
S 10°	04:46	05:11	05:33	01:39	02:26	03:14
20°	04:35	05:02	05:24	01:47	02:30	03:13
30°	04:20	04:49	05:14	01:55	02:33	03:11
35°	04:11	04:42	05:08	02:00	02:36	03:11
40°	03:59	04:33	05:01	02:06	02:38	03:10
45°	03:45	04:22	04:54	02:12	02:41	03:09
S 50°	03:26	04:09	04:44	02:20	02:44	03:08
52°	03:17	04:03	04:40	02:24	02:46	03:07
54°	03:07	03:56	04:35	02:27	02:47	03:07
56°	02:55	03:48	04:29	02:32	02:49	03:06
58°	02:41	03:39	04:23	02:36	02:51	03:05
S 60°	02:24	03:29	04:16	02:42	02:53	03:05
S 62°	02:02	03:17	04:09	02:48	02:56	03:04

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 22	Moonset 23	Moonset 24
N 72°	15:24	16:40	17:59	15:22	15:03	14:43
N 70°	15:41	16:48	17:59	15:13	15:01	14:49
68°	15:55	16:54	17:59	15:06	15:00	14:54
66°	16:06	17:00	17:59	14:59	14:59	14:58
64°	16:15	17:05	18:00	14:54	14:58	15:02
62°	16:23	17:09	18:00	14:49	14:57	15:05
60°	16:29	17:13	18:01	14:45	14:56	15:08
N 58°	16:35	17:16	18:02	14:42	14:56	15:10
56°	16:41	17:19	18:02	14:38	14:55	15:12
54°	16:46	17:22	18:03	14:35	14:55	15:14
52°	16:50	17:25	18:04	14:33	14:54	15:16
50°	16:54	17:27	18:05	14:30	14:54	15:18
45°	17:02	17:32	18:07	14:25	14:53	15:21
N 40°	17:10	17:37	18:09	14:20	14:52	15:24
35°	17:16	17:42	18:11	14:16	14:51	15:27
30°	17:21	17:46	18:14	14:13	14:51	15:29
20°	17:31	17:53	18:19	14:07	14:50	15:33
N 10°	17:40	18:01	18:26	14:02	14:49	15:37
0°	17:48	18:09	18:33	13:56	14:48	15:40
S 10°	17:56	18:17	18:43	13:51	14:47	15:44
20°	18:05	18:28	18:54	13:46	14:46	15:47
30°	18:15	18:40	19:09	13:39	14:44	15:51
35°	18:21	18:48	19:19	13:36	14:44	15:53
40°	18:28	18:56	19:31	13:32	14:43	15:56
45°	18:36	19:07	19:45	13:27	14:42	15:59
S 50°	18:46	19:21	20:04	13:21	14:40	16:03
52°	18:50	19:27	20:13	13:18	14:40	16:04
54°	18:55	19:34	20:24	13:15	14:39	16:06
56°	19:01	19:42	20:36	13:12	14:39	16:08
58°	19:07	19:51	20:51	13:08	14:38	16:11
S 60°	19:14	20:02	21:08	13:04	14:37	16:13
S 62°	19:22	20:15	21:31	12:59	14:36	16:16

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
22	15 25	15 29	11:45	07:44	20:10	25d 25%
23	15 34	15 38	11:44	08:35	21:01	26d 16%
24	15 42	15 46	11:44	09:28	21:54	27d 8%

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2011 October 25, 26, 27 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +1.1		JUPITER -2.9		SATURN +0.7	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
25 Tuesday 00	33° 02'.4	165° 53'.0	17° 35'.3 S	249° 12'.8	15° 55'.8 N	359° 00'.3	12° 03'.9 N	192° 17'.1	6° 18'.3 S
01	48° 04'.9	180° 52'.3	36'.2	264° 13'.9	55'.4	14° 03'.1	03'.8	207° 19'.3	18'.4
02	63° 07'.3	195° 51'.7	37'.2	279° 15'.0	55'.0	29° 05'.9	03'.7	222° 21'.5	18'.5
03	78° 09'.8	210° 51'.1	38'.1	294° 16'.1	54'.6	44° 08'.7	03'.6	237° 23'.7	18'.6
04	93° 12'.3	225° 50'.4	39'.1	309° 17'.2	54'.2	59° 11'.5	03'.5	252° 25'.9	18'.7
05	108° 14'.7	240° 49'.8	40'.0	324° 18'.3	53'.8	74° 14'.3	03'.4	267° 28'.1	18'.8
06	123° 17'.2	255° 49'.1	40'.9	339° 19'.4	53'.4	89° 17'.1	03'.3	282° 30'.2	18'.9
07	138° 19'.7	270° 48'.5	41'.9	354° 20'.5	53'.0	104° 19'.9	03'.2	297° 32'.4	19'.0
08	153° 22'.1	285° 47'.8	42'.8	9° 21'.6	52'.6	119° 22'.7	03'.1	312° 34'.6	19'.1
09	168° 24'.6	300° 47'.2	43'.8	24° 22'.7	52'.2	134° 25'.5	02'.9	327° 36'.8	19'.3
10	183° 27'.0	315° 46'.5	44'.7	39° 23'.8	51'.8	149° 28'.3	02'.8	342° 39'.0	19'.4
11	198° 29'.5	330° 45'.9	45'.6	54° 24'.9	51'.4	164° 31'.0	02'.7	357° 41'.1	19'.5
12	213° 32'.0	345° 45'.2	17° 46'.6 S	69° 26'.0	15° 51'.0 N	179° 33'.8	12° 02'.6 N	12° 43'.3	6° 19'.6 S
13	228° 34'.4	0° 44'.6	47'.5	84° 27'.1	50'.6	194° 36'.6	02'.5	27° 45'.5	19'.7
14	243° 36'.9	15° 43'.9	48'.4	99° 28'.3	50'.2	209° 39'.4	02'.4	42° 47'.7	19'.8
15	258° 39'.4	30° 43'.3	49'.4	114° 29'.4	49'.8	224° 42'.2	02'.3	57° 49'.9	19'.9
16	273° 41'.8	45° 42'.6	50'.3	129° 30'.5	49'.4	239° 45'.0	02'.2	72° 52'.0	20'.0
17	288° 44'.3	60° 41'.9	51'.2	144° 31'.6	49'.0	254° 47'.8	02'.1	87° 54'.2	20'.1
18	303° 46'.8	75° 41'.3	52'.1	159° 32'.7	48'.6	269° 50'.6	02'.0	102° 56'.4	20'.2
19	318° 49'.2	90° 40'.6	53'.1	174° 33'.8	48'.2	284° 53'.4	01'.8	117° 58'.6	20'.4
20	333° 51'.7	105° 40'.0	54'.0	189° 34'.9	47'.8	299° 56'.2	01'.7	133° 00'.8	20'.5
21	348° 54'.2	120° 39'.3	54'.9	204° 36'.0	47'.4	314° 59'.0	01'.6	148° 03'.0	20'.6
22	3° 56'.6	135° 38'.7	55'.9	219° 37'.1	47'.0	330° 01'.8	01'.5	163° 05'.1	20'.7
23	18° 59'.1	150° 38'.0	56'.8	234° 38'.2	46'.6	345° 04'.5	01'.4	178° 07'.3	20'.8
26 Wednesday 00	34° 01'.5	165° 37'.3	17° 57'.7 S	249° 39'.3	15° 46'.2 N	0° 07'.3	12° 01'.3 N	193° 09'.5	6° 20'.9 S
01	49° 04'.0	180° 36'.7	58'.6	264° 40'.4	45'.8	15° 10'.1	01'.2	208° 11'.7	21'.0
02	64° 06'.5	195° 36'.0	59'.6	279° 41'.5	45'.4	30° 12'.9	01'.1	223° 13'.9	21'.1
03	79° 08'.9	210° 35'.4	18° 00'.5 S	294° 42'.6	45'.0	45° 15'.7	01'.0	238° 16'.0	21'.2
04	94° 11'.4	225° 34'.7	01'.4	309° 43'.7	44'.6	60° 18'.5	00'.9	253° 18'.2	21'.4
05	109° 13'.9	240° 34'.0	02'.3	324° 44'.8	44'.2	75° 21'.3	00'.7	268° 20'.4	21'.5
06	124° 16'.3	255° 33'.4	03'.2	339° 46'.0	43'.8	90° 24'.1	00'.6	283° 22'.6	21'.6
07	139° 18'.8	270° 32'.7	04'.2	354° 47'.1	43'.4	105° 26'.9	00'.5	298° 24'.8	21'.7
08	154° 21'.3	285° 32'.1	05'.1	9° 48'.2	43'.0	120° 29'.7	00'.4	313° 26'.9	21'.8
09	169° 23'.7	300° 31'.4	06'.0	24° 49'.3	42'.6	135° 32'.5	00'.3	328° 29'.1	21'.9
10	184° 26'.2	315° 30'.7	06'.9	39° 50'.4	42'.1	150° 35'.3	00'.2	343° 31'.3	22'.0
11	199° 28'.6	330° 30'.1	07'.8	54° 51'.5	41'.7	165° 38'.0	00'.1	358° 33'.5	22'.1
12	214° 31'.1	345° 29'.4	18° 08'.7 S	69° 52'.6	15° 41'.3 N	180° 40'.8	12° 00'.0 N	13° 35'.7	6° 22'.2 S
13	229° 33'.6	0° 28'.7	09'.7	84° 53'.7	40'.9	195° 43'.6	11° 59'.9 N	28° 37'.9	22'.3
14	244° 36'.0	15° 28'.1	10'.6	99° 54'.8	40'.5	210° 46'.4	59'.8	43° 40'.0	22'.5
15	259° 38'.5	30° 27'.4	11'.5	114° 56'.0	40'.1	225° 49'.2	59'.6	58° 42'.2	22'.6
16	274° 41'.0	45° 26'.7	12'.4	129° 57'.1	39'.7	240° 52'.0	59'.5	73° 44'.4	22'.7
17	289° 43'.4	60° 26'.1	13'.3	144° 58'.2	39'.3	255° 54'.8	59'.4	88° 46'.6	22'.8
18	304° 45'.9	75° 25'.4	14'.2	159° 59'.3	38'.9	270° 57'.6	59'.3	103° 48'.8	22'.9
19	319° 48'.4	90° 24'.7	15'.1	175° 00'.4	38'.5	286° 00'.4	59'.2	118° 50'.9	23'.0
20	334° 50'.8	105° 24'.1	16'.0	190° 01'.5	38'.1	301° 03'.2	59'.1	133° 53'.1	23'.1
21	349° 53'.3	120° 23'.4	16'.9	205° 02'.6	37'.7	316° 06'.0	59'.0	148° 55'.3	23'.2
22	4° 55'.8	135° 22'.7	17'.8	220° 03'.7	37'.3	331° 08'.8	58'.9	163° 57'.5	23'.3
23	19° 58'.2	150° 22'.1	18'.7	235° 04'.9	36'.9	346° 11'.6	58'.8	178° 59'.7	23'.4
27 Thursday 00	35° 00'.7	165° 21'.4	18° 19'.7 S	250° 06'.0	15° 36'.5 N	1° 14'.3	11° 58'.7 N	194° 01'.9	6° 23'.6 S
01	50° 03'.1	180° 20'.7	20'.6	265° 07'.1	36'.1	16° 17'.1	58'.5	209° 04'.0	23'.7
02	65° 05'.6	195° 20'.0	21'.5	280° 08'.2	35'.7	31° 19'.9	58'.4	224° 06'.2	23'.8
03	80° 08'.1	210° 19'.4	22'.4	295° 09'.3	35'.3	46° 22'.7	58'.3	239° 08'.4	23'.9
04	95° 10'.5	225° 18'.7	23'.3	310° 10'.4	34'.9	61° 25'.5	58'.2	254° 10'.6	24'.0
05	110° 13'.0	240° 18'.0	24'.2	325° 11'.6	34'.5	76° 28'.3	58'.1	269° 12'.8	24'.1
06	125° 15'.5	255° 17'.4	25'.1	340° 12'.7	34'.1	91° 31'.1	58'.0	284° 14'.9	24'.2
07	140° 17'.9	270° 16'.7	26'.0	355° 13'.8	33'.7	106° 33'.9	57'.9	299° 17'.1	24'.3
08	155° 20'.4	285° 16'.0	26'.9	10° 14'.9	33'.3	121° 36'.7	57'.8	314° 19'.3	24'.4
09	170° 22'.9	300° 15'.3	27'.8	25° 16'.0	32'.9	136° 39'.5	57'.7	329° 21'.5	24'.5
10	185° 25'.3	315° 14'.6	28'.7	40° 17'.1	32'.5	151° 42'.3	57'.6	344° 23'.7	24'.7
11	200° 27'.8	330° 14'.0	29'.5	55° 18'.3	32'.1	166° 45'.1	57'.4	359° 25'.9	24'.8
12	215° 30'.3	345° 13'.3	18° 30'.4 S	70° 19'.4	15° 31'.7 N	181° 47'.9	11° 57'.3 N	14° 28'.0	6° 24'.9 S
13	230° 32'.7	0° 12'.6	31'.3	85° 20'.5	31'.3	196° 50'.6	57'.2	29° 30'.2	25'.0
14	245° 35'.2	15° 11'.9	32'.2	100° 21'.6	30'.9	211° 53'.4	57'.1	44° 32'.4	25'.1
15	260° 37'.6	30° 11'.3	33'.1	115° 22'.7	30'.5	226° 56'.2	57'.0	59° 34'.6	25'.2
16	275° 40'.1	45° 10'.6	34'.0	130° 23'.9	30'.1	241° 59'.0	56'.9	74° 36'.8	25'.3
17	290° 42'.6	60° 09'.9	34'.9	145° 25'.0	29'.6	257° 01'.8	56'.8	89° 38'.9	25'.4
18	305° 45'.0	75° 09'.2	35'.8	160° 26'.1	29'.2	272° 04'.6	56'.7	104° 41'.1	25'.5
19	320° 47'.5	90° 08'.5	36'.7	175° 27'.2	28'.8	287° 07'.4	56'.6	119° 43'.3	25'.6
20	335° 50'.0	105° 07'.9	37'.6	190° 28'.3	28'.4	302° 10'.2	56'.5	134° 45'.5	25'.8
21	350° 52'.4	120° 07'.2	38'.5	205° 29'.5	28'.0	317° 13'.0	56'.3	149° 47'.7	25'.9
22	5° 54'.9	135° 06'.5	39'.3	220° 30'.6	27'.6	332° 15'.8	56'.2	164° 49'.9	26'.0
23	20° 57'.4	150° 05'.8	40'.2	235° 31'.7	27'.2	347° 18'.6	56'.1	179° 52'.0	26'.1
	M.P. 21:40	v -0'.7	d 0'.9	v 1'.1	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.4	63° 09'.8 S
Adhara	255° 13'.3	28° 59'.1 S
Aldebaran	290° 50'.5	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.6 N
Alkaid	153° 00'.3	49° 15'.2 N
Alnair	27° 44'.9	46° 54'.2 S
Alnilam	275° 47'.3	1° 11'.6 S
Alphard	217° 57'.3	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.2 N
Ankaa	353° 16'.4	42° 14'.4 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.3	69° 03'.0 S
Avior	234° 18'.5	59° 32'.6 S
Bellatrix	278° 33'.0	6° 21'.6 N
Betelgeuse	271° 02'.4	7° 24'.6 N
Canopus	263° 56'.4	52° 41'.9 S
Capella	280° 35'.9	46° 00'.4 N
Deneb	49° 32'.3	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.2 S
Dubhe	193° 53'.5	61° 41'.0 N
Elnath	278° 13'.9	28° 37'.0 N
Eltanin	90° 47'.0	51° 29'.6 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.8	57° 10'.7 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.8 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.4 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 16'.0	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.2	69° 45'.7 S
Mirfak	308° 41'.6	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.0	56° 41'.9 S
Polaris	317° 54'.8	89° 18'.9 N
Pollux	243° 29'.1	27° 59'.7 N
Procyon	245° 00'.9	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 12'.9	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.6	16° 43'.8 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.4	43° 28'.6 S
Vega	80° 39'.9	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	131° 35'.8	12:58
Mars	215° 37'.8	07:21
Jupiter	326° 05'.8	23:55
Saturn	159° 08'.0	11:06

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 57'.5	11° 53'.9 S	210° 15'.0	8'.2	6° 28'.9 S	14'.0	61'.0
198° 57'.6	54'.8	224° 42'.2	8'.1	42'.9	13'.9	61'.1
213° 57'.7	55'.7	239° 09'.3	8'.1	56'.8	13'.9	
228° 57'.7	56'.5	253° 36'.4	8'.0	7° 10'.7 S	13'.8	
243° 57'.8	57'.4	268° 03'.4	8'.0	24'.5	13'.8	
258° 57'.9	58'.3	282° 30'.4	7'.9	38'.3	13'.8	
273° 58'.0	59'.1	296° 57'.3	7'.8	52'.1	13'.7	
288° 58'.0	12° 00'.0 S	311° 24'.1	7'.8	8° 05'.8 S	13'.7	61'.2
303° 58'.1	00'.9	325° 50'.9	7'.7	19'.5	13'.6	
318° 58'.2	01'.7	340° 17'.6	7'.7	33'.1	13'.6	
333° 58'.3	02'.6	354° 44'.3	7'.5	46'.7	13'.5	
348° 58'.3	03'.5	9° 10'.8	7'.6	9° 00'.2 S	13'.5	
3° 58'.4	12° 04'.3 S	23° 37'.4	7'.4	9° 13'.7 S	13'.4	61'.2
18° 58'.5	05'.2	38° 03'.8	7'.4	27'.1	13'.4	61'.3
33° 58'.5	06'.0	52° 30'.2	7'.4	40'.5	13'.3	
48° 58'.6	06'.9	66° 56'.6	7'.2	53'.8	13'.3	
63° 58'.7	07'.8	81° 22'.8	7'.2	10° 07'.1 S	13'.2	
78° 58'.8	08'.6	95° 49'.0	7'.2	20'.3	13'.1	
93° 58'.8	09'.5	110° 15'.2	7'.0	33'.4	13'.1	
108° 58'.9	10'.3	124° 41'.2	7'.0	46'.5	13'.0	
123° 59'.0	11'.2	139° 07'.2	7'.0	59'.5	12'.9	
138° 59'.0	12'.1	153° 33'.2	6'.9	11° 12'.4 S	12'.9	
153° 59'.1	12'.9	167° 59'.1	6'.8	25'.3	12'.8	61'.4
168° 59'.2	13'.8	182° 24'.9	6'.7	38'.1	12'.7	
183° 59'.2	12° 14'.6 S	196° 50'.6	6'.7	11° 50'.8 S	12'.6	61'.4
198° 59'.3	15'.5	211° 16'.3	6'.6	12° 03'.4 S	12'.6	
213° 59'.4	16'.4	225° 41'.9	6'.5	16'.0	12'.5	
228° 59'.5	17'.2	240° 07'.4	6'.5	28'.5	12'.4	
243° 59'.5	18'.1	254° 32'.9	6'.4	40'.9	12'.3	
258° 59'.6	18'.9	268° 58'.3	6'.3	53'.2	12'.3	
273° 59'.7	19'.8	283° 23'.6	6'.3	13° 05'.5 S	12'.1	
288° 59'.7	20'.6	297° 48'.9	6'.2	17'.6	12'.1	
303° 59'.8	21'.5	312° 14'.1	6'.1	29'.7	11'.9	
318° 59'.9	22'.4	326° 39'.2	6'.1	41'.6	11'.9	
333° 59'.9	23'.2	341° 04'.3	6'.0	53'.5	11'.8	
349° 00'.0	24'.1	355° 29'.3	5'.9	14° 05'.3 S	11'.7	
4° 00'.0	12° 24'.9 S	9° 54'.2	5'.9	14° 17'.0 S	11'.6	61'.4
19° 00'.1	25'.8	24° 19'.1	5'.8	28'.6	11'.5	
34° 00'.2	26'.6	38° 43'.9	5'.8	40'.1	11'.3	
49° 00'.2	27'.5	53° 08'.7	5'.6	51'.4	11'.3	
64° 00'.3	28'.3	67° 33'.3	5'.7	15° 02'.7 S	11'.2	
79° 00'.4	29'.2	81° 58'.0	5'.5	13'.9	11'.1	
94° 00'.4	30'.0	96° 22'.5	5'.5	25'.0	10'.9	
109° 00'.5	30'.9	110° 47'.0	5'.4	35'.9	10'.9	
124° 00'.6	31'.7	125° 11'.4	5'.4	46'.8	10'.7	
139° 00'.6	32'.6	139° 35'.8	5'.3	57'.5	10'.6	
154° 00'.7	33'.4	154° 00'.1	5'.2	16° 08'.1 S	10'.6	
169° 00'.7	34'.3	168° 24'.3	5'.2	18'.7	10'.3	
184° 00'.8	12° 35'.1 S	182° 48'.5	5'.1	16° 29'.0 S	10'.3	61'.4
199° 00'.9	36'.0	197° 12'.6	5'.1	39'.3	10'.2	
214° 00'.9	36'.8	211° 36'.7	5'.0	49'.5	10'.0	
229° 01'.0	37'.7	226° 00'.7	4'.9	59'.5	9'.9	61'.3
244° 01'.0	38'.5	240° 24'.6	4'.9	17° 09'.4 S	9'.8	
259° 01'.1	39'.4	254° 48'.5	4'.9	19'.2	9'.6	
274° 01'.2	40'.2	269° 12'.4	4'.7	28'.8	9'.6	
289° 01'.2	41'.1	283° 36'.1	4'.8	38'.4	9'.4	
304° 01'.3	41'.9	297° 59'.9	4'.6	47'.8	9'.2	
319° 01'.3	42'.8	312° 23'.5	4'.7	57'.0	9'.2	
334° 01'.4	43'.6	326° 47'.2	4'.5	18° 06'.2 S	9'.0	
349° 01'.5	44'.5	341° 10'.7	4'.6	15'.2	8'.8	
4° 01'.5	12° 45'.3 S	355° 34'.3	4'.4	18° 24'.0 S	8'.7	61'.2
19° 01'.6	46'.2	9° 57'.7	4'.5	32'.7	8'.6	
34° 01'.6	47'.0	24° 21'.2	4'.4	41'.3	8'.5	
49° 01'.7	47'.9	38° 44'.6	4'.3	49'.8	8'.3	
64° 01'.7	48'.7	53° 07'.9	4'.3	58'.1	8'.2	
79° 01'.8	49'.6	67° 31'.2	4'.3	19° 06'.3 S	8'.0	
94° 01'.9	50'.4	81° 54'.5	4'.2	14'.3	7'.9	
109° 01'.9	51'.2	96° 17'.7	4'.1	22'.2	7'.7	61'.1
124° 02'.0	52'.1	110° 40'.8	4'.2	29'.9	7'.6	
139° 02'.0	52'.9	125° 04'.0	4'.1	37'.5	7'.4	
154° 02'.1	53'.8	139° 27'.1	4'.1	44'.9	7'.3	
169° 02'.1	54'.6	153° 50'.2	4'.0	52'.2	7'.2	
SD 16'.1	d 0'.9	SD	16'.7	16'.7	16'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 25	Moonrise 26	Moonrise 27
N 72°	05:40	07:00	08:19	05:55	08:28	-
N 70°	05:39	06:51	08:00	05:42	07:59	10:38
68°	05:38	06:43	07:45	05:32	07:37	09:52
66°	05:37	06:37	07:32	05:24	07:21	09:22
64°	05:35	06:31	07:22	05:17	07:07	08:59
62°	05:34	06:26	07:13	05:11	06:56	08:41
60°	05:33	06:22	07:06	05:06	06:46	08:27
N 58°	05:32	06:18	06:59	05:01	06:38	08:14
56°	05:31	06:15	06:53	04:57	06:30	08:03
54°	05:30	06:11	06:48	04:53	06:24	07:54
52°	05:29	06:08	06:43	04:50	06:18	07:46
50°	05:28	06:06	06:39	04:47	06:13	07:38
45°	05:25	05:59	06:30	04:41	06:01	07:22
N 40°	05:22	05:54	06:22	04:36	05:52	07:09
35°	05:19	05:49	06:15	04:31	05:44	06:58
30°	05:17	05:45	06:09	04:27	05:37	06:48
20°	05:10	05:36	05:59	04:20	05:25	06:32
N 10°	05:03	05:28	05:49	04:14	05:15	06:17
0°	04:55	05:19	05:41	04:09	05:05	06:04
S 10°	04:45	05:10	05:32	04:03	04:55	05:51
20°	04:33	04:59	05:22	03:58	04:45	05:37
30°	04:17	04:46	05:11	03:51	04:34	05:21
35°	04:07	04:38	05:05	03:47	04:27	05:12
40°	03:54	04:29	04:57	03:43	04:20	05:01
45°	03:39	04:17	04:49	03:38	04:11	04:49
S 50°	03:19	04:03	04:38	03:33	04:01	04:34
52°	03:09	03:56	04:33	03:30	03:56	04:27
54°	02:58	03:49	04:28	03:27	03:51	04:20
56°	02:45	03:40	04:22	03:24	03:45	04:11
58°	02:30	03:30	04:15	03:21	03:39	04:02
S 60°	02:11	03:19	04:08	03:17	03:31	03:51
S 62°	01:46	03:06	03:59	03:12	03:23	03:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 25	Moonset 26	Moonset 27
N 72°	15:07	16:26	17:46	14:20	13:47	-
N 70°	15:27	16:35	17:47	14:36	14:18	13:44
68°	15:42	16:43	17:49	14:48	14:41	14:31
66°	15:54	16:50	17:50	14:58	14:59	15:02
64°	16:05	16:56	17:51	15:07	15:14	15:25
62°	16:14	17:01	17:52	15:14	15:26	15:44
60°	16:21	17:05	17:54	15:21	15:37	15:59
N 58°	16:28	17:09	17:55	15:26	15:46	16:13
56°	16:34	17:12	17:56	15:31	15:54	16:24
54°	16:39	17:16	17:57	15:36	16:02	16:34
52°	16:44	17:19	17:58	15:40	16:08	16:43
50°	16:48	17:22	17:59	15:44	16:14	16:51
45°	16:58	17:28	18:02	15:52	16:27	17:08
N 40°	17:06	17:33	18:05	15:59	16:38	17:22
35°	17:13	17:38	18:08	16:05	16:47	17:34
30°	17:19	17:43	18:11	16:10	16:55	17:44
20°	17:29	17:52	18:18	16:19	17:09	18:02
N 10°	17:38	18:00	18:25	16:27	17:21	18:18
0°	17:47	18:09	18:33	16:35	17:33	18:33
S 10°	17:56	18:18	18:43	16:43	17:44	18:48
20°	18:06	18:29	18:56	16:51	17:57	19:04
30°	18:17	18:42	19:12	17:00	18:11	19:22
35°	18:24	18:50	19:22	17:05	18:19	19:32
40°	18:31	19:00	19:35	17:12	18:28	19:45
45°	18:40	19:12	19:50	17:19	18:40	19:59
S 50°	18:51	19:26	20:10	17:27	18:53	20:17
52°	18:56	19:33	20:20	17:31	18:59	20:25
54°	19:01	19:41	20:32	17:36	19:06	20:34
56°	19:07	19:50	20:45	17:41	19:14	20:45
58°	19:14	20:00	21:01	17:46	19:23	20:57
S 60°	19:22	20:11	21:21	17:52	19:33	21:11
S 62°	19:31	20:25	21:47	17:59	19:45	21:28

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
25	15 50	15 53	11:44	10:22	22:50	28d 3%
26	15 57	16 00	11:44	11:19	23:48	29d 0%
27	16 03	16 06	11:44	12:18	24:49	1d 1%

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2011 October 28, 29, 30 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +1.1		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
28 00	35° 59'.8	165° 05'.1	18° 41'.1 S	250° 32'.8	15° 26'.8 N	2° 21'.4	11° 56'.0 N	194° 54'.2	6° 26'.2 S
01	51° 02'.3	180° 04'.4	42'.0	265° 33'.9	26'.4	17° 24'.2	55'.9	209° 56'.4	26'.3
02	66° 04'.7	195° 03'.8	42'.9	280° 35'.1	26'.0	32° 27'.0	55'.8	224° 58'.6	26'.4
03	81° 07'.2	210° 03'.1	43'.8	295° 36'.2	25'.6	47° 29'.7	55'.7	240° 00'.8	26'.5
04	96° 09'.7	225° 02'.4	44'.6	310° 37'.3	25'.2	62° 32'.5	55'.6	255° 03'.0	26'.6
05	111° 12'.1	240° 01'.7	45'.5	325° 38'.4	24'.8	77° 35'.3	55'.5	270° 05'.1	26'.7
06	126° 14'.6	255° 01'.0	46'.4	340° 39'.6	24'.4	92° 38'.1	55'.4	285° 07'.3	26'.9
07	141° 17'.1	270° 00'.3	47'.3	355° 40'.7	24'.0	107° 40'.9	55'.2	300° 09'.5	27'.0
08	156° 19'.5	284° 59'.6	48'.2	10° 41'.8	23'.6	122° 43'.7	55'.1	315° 11'.7	27'.1
09	171° 22'.0	299° 58'.9	49'.0	25° 42'.9	23'.2	137° 46'.5	55'.0	330° 13'.9	27'.2
10	186° 24'.5	314° 58'.3	49'.9	40° 44'.1	22'.8	152° 49'.3	54'.9	345° 16'.0	27'.3
11	201° 26'.9	329° 57'.6	50'.8	55° 45'.2	22'.4	167° 52'.1	54'.8	0° 18'.2	27'.4
12	216° 29'.4	344° 56'.9	18° 51'.7 S	70° 46'.3	15° 22'.0 N	182° 54'.9	11° 54'.7 N	15° 20'.4	6° 27'.5 S
13	231° 31'.9	359° 56'.2	52'.5	85° 47'.4	21'.6	197° 57'.7	54'.6	30° 22'.6	27'.6
14	246° 34'.3	14° 55'.5	53'.4	100° 48'.6	21'.2	213° 00'.5	54'.5	45° 24'.8	27'.7
15	261° 36'.8	29° 54'.8	54'.3	115° 49'.7	20'.8	228° 03'.3	54'.4	60° 27'.0	27'.8
16	276° 39'.2	44° 54'.1	55'.1	130° 50'.8	20'.4	243° 06'.1	54'.3	75° 29'.1	27'.9
17	291° 41'.7	59° 53'.4	56'.0	145° 52'.0	19'.9	258° 08'.8	54'.1	90° 31'.3	28'.1
18	306° 44'.2	74° 52'.7	56'.9	160° 53'.1	19'.5	273° 11'.6	54'.0	105° 33'.5	28'.2
19	321° 46'.6	89° 52'.0	57'.8	175° 54'.2	19'.1	288° 14'.4	53'.9	120° 35'.7	28'.3
20	336° 49'.1	104° 51'.3	58'.6	190° 55'.3	18'.7	303° 17'.2	53'.8	135° 37'.9	28'.4
21	351° 51'.6	119° 50'.6	59'.5	205° 56'.5	18'.3	318° 20'.0	53'.7	150° 40'.1	28'.5
22	6° 54'.0	134° 49'.9	19° 00'.4 S	220° 57'.6	17'.9	333° 22'.8	53'.6	165° 42'.2	28'.6
23	21° 56'.5	149° 49'.2	01'.2	235° 58'.7	17'.5	348° 25'.6	53'.5	180° 44'.4	28'.7
29 00	36° 59'.0	164° 48'.5	19° 02'.1 S	250° 59'.9	15° 17'.1 N	3° 28'.4	11° 53'.4 N	195° 46'.6	6° 28'.8 S
01	52° 01'.4	179° 47'.8	02'.9	266° 01'.0	16'.7	18° 31'.2	53'.3	210° 48'.8	28'.9
02	67° 03'.9	194° 47'.1	03'.8	281° 02'.1	16'.3	33° 34'.0	53'.2	225° 51'.0	29'.0
03	82° 06'.4	209° 46'.4	04'.7	296° 03'.3	15'.9	48° 36'.8	53'.0	240° 53'.2	29'.1
04	97° 08'.8	224° 45'.8	05'.5	311° 04'.4	15'.5	63° 39'.6	52'.9	255° 55'.3	29'.3
05	112° 11'.3	239° 45'.1	06'.4	326° 05'.5	15'.1	78° 42'.4	52'.8	270° 57'.5	29'.4
06	127° 13'.7	254° 44'.4	07'.2	341° 06'.7	14'.7	93° 45'.1	52'.7	285° 59'.7	29'.5
07	142° 16'.2	269° 43'.6	08'.1	356° 07'.8	14'.3	108° 47'.9	52'.6	301° 01'.9	29'.6
08	157° 18'.7	284° 42'.9	09'.0	11° 08'.9	13'.9	123° 50'.7	52'.5	316° 04'.1	29'.7
09	172° 21'.1	299° 42'.2	09'.8	26° 10'.1	13'.5	138° 53'.5	52'.4	331° 06'.3	29'.8
10	187° 23'.6	314° 41'.5	10'.7	41° 11'.2	13'.1	153° 56'.3	52'.3	346° 08'.4	29'.9
11	202° 26'.1	329° 40'.8	11'.5	56° 12'.3	12'.7	168° 59'.1	52'.2	1° 10'.6	30'.0
12	217° 28'.5	344° 40'.1	19° 12'.4 S	71° 13'.5	15° 12'.3 N	184° 01'.9	11° 52'.1 N	16° 12'.8	6° 30'.1 S
13	232° 31'.0	359° 39'.4	13'.2	86° 14'.6	11'.9	199° 04'.7	51'.9	31° 15'.0	30'.2
14	247° 33'.5	14° 38'.7	14'.1	101° 15'.7	11'.4	214° 07'.5	51'.8	46° 17'.2	30'.3
15	262° 35'.9	29° 38'.0	14'.9	116° 16'.9	11'.0	229° 10'.3	51'.7	61° 19'.4	30'.5
16	277° 38'.4	44° 37'.3	15'.8	131° 18'.0	10'.6	244° 13'.1	51'.6	76° 21'.5	30'.6
17	292° 40'.9	59° 36'.6	16'.6	146° 19'.1	10'.2	259° 15'.9	51'.5	91° 23'.7	30'.7
18	307° 43'.3	74° 35'.9	17'.5	161° 20'.3	09'.8	274° 18'.7	51'.4	106° 25'.9	30'.8
19	322° 45'.8	89° 35'.2	18'.3	176° 21'.4	09'.4	289° 21'.5	51'.3	121° 28'.1	30'.9
20	337° 48'.2	104° 34'.5	19'.2	191° 22'.5	09'.0	304° 24'.2	51'.2	136° 30'.3	31'.0
21	352° 50'.7	119° 33'.8	20'.0	206° 23'.7	08'.6	319° 27'.0	51'.1	151° 32'.4	31'.1
22	7° 53'.2	134° 33'.1	20'.9	221° 24'.8	08'.2	334° 29'.8	51'.0	166° 34'.6	31'.2
23	22° 55'.6	149° 32'.4	21'.7	236° 26'.0	07'.8	349° 32'.6	50'.8	181° 36'.8	31'.3
30 00	37° 58'.1	164° 31'.7	19° 22'.5 S	251° 27'.1	15° 07'.4 N	4° 35'.4	11° 50'.7 N	196° 39'.0	6° 31'.4 S
01	53° 00'.6	179° 30'.9	23'.4	266° 28'.2	07'.0	19° 38'.2	50'.6	211° 41'.2	31'.5
02	68° 03'.0	194° 30'.2	24'.2	281° 29'.4	06'.6	34° 41'.0	50'.5	226° 43'.4	31'.7
03	83° 05'.5	209° 29'.5	25'.1	296° 30'.5	06'.2	49° 43'.8	50'.4	241° 45'.6	31'.8
04	98° 08'.0	224° 28'.8	25'.9	311° 31'.6	05'.8	64° 46'.6	50'.3	256° 47'.7	31'.9
05	113° 10'.4	239° 28'.1	26'.7	326° 32'.8	05'.4	79° 49'.4	50'.2	271° 49'.9	32'.0
06	128° 12'.9	254° 27'.4	27'.6	341° 33'.9	05'.0	94° 52'.2	50'.1	286° 52'.1	32'.1
07	143° 15'.4	269° 26'.7	28'.4	356° 35'.1	04'.6	109° 55'.0	50'.0	301° 54'.3	32'.2
08	158° 17'.8	284° 26'.0	29'.2	11° 36'.2	04'.2	124° 57'.8	49'.9	316° 56'.5	32'.3
09	173° 20'.3	299° 25'.2	30'.1	26° 37'.4	03'.8	140° 00'.5	49'.8	331° 58'.7	32'.4
10	188° 22'.7	314° 24'.5	30'.9	41° 38'.5	03'.3	155° 03'.3	49'.6	347° 00'.8	32'.5
11	203° 25'.2	329° 23'.8	31'.7	56° 39'.6	02'.9	170° 06'.1	49'.5	2° 03'.0	32'.6
12	218° 27'.7	344° 23'.1	19° 32'.6 S	71° 40'.8	15° 02'.5 N	185° 08'.9	11° 49'.4 N	17° 05'.2	6° 32'.7 S
13	233° 30'.1	359° 22'.4	33'.4	86° 41'.9	02'.1	200° 11'.7	49'.3	32° 07'.4	32'.8
14	248° 32'.6	14° 21'.7	34'.2	101° 43'.1	01'.7	215° 14'.5	49'.2	47° 09'.6	33'.0
15	263° 35'.1	29° 20'.9	35'.1	116° 44'.2	01'.3	230° 17'.3	49'.1	62° 11'.8	33'.1
16	278° 37'.5	44° 20'.2	35'.9	131° 45'.3	00'.9	245° 20'.1	49'.0	77° 13'.9	33'.2
17	293° 40'.0	59° 19'.5	36'.7	146° 46'.5	00'.5	260° 22'.9	48'.9	92° 16'.1	33'.3
18	308° 42'.5	74° 18'.8	37'.5	161° 47'.6	00'.1	275° 25'.7	48'.8	107° 18'.3	33'.4
19	323° 44'.9	89° 18'.1	38'.4	176° 48'.8	14° 59'.7 N	290° 28'.5	48'.7	122° 20'.5	33'.5
20	338° 47'.4	104° 17'.3	39'.2	191° 49'.9	59'.3	305° 31'.3	48'.5	137° 22'.7	33'.6
21	353° 49'.8	119° 16'.6	40'.0	206° 51'.1	58'.9	320° 34'.1	48'.4	152° 24'.9	33'.7
22	8° 52'.3	134° 15'.9	40'.8	221° 52'.2	58'.5	335° 36'.8	48'.3	167° 27'.0	33'.8
23	23° 54'.8	149° 15'.2	41'.7	236° 53'.4	58'.1	350° 39'.6	48'.2	182° 29'.2	33'.9
	M.P. 21:29	v -0'.7	d 0'.9	v 1'.1	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.5 S
Acrux	173° 11'.3	63° 09'.8 S
Adhara	255° 13'.3	28° 59'.1 S
Aldebaran	290° 50'.4	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.6 N
Alkaid	153° 00'.3	49° 15'.2 N
Alnair	27° 45'.0	46° 54'.2 S
Alnilam	275° 47'.3	1° 11'.6 S
Alphard	217° 57'.3	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.3 N
Ankaa	353° 16'.4	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.3	69° 03'.0 S
Avior	234° 18'.5	59° 32'.6 S
Bellatrix	278° 33'.0	6° 21'.6 N
Betelgeuse	271° 02'.4	7° 24'.5 N
Canopus	263° 56'.4	52° 41'.9 S
Capella	280° 35'.8	46° 00'.4 N
Deneb	49° 32'.3	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.2 S
Dubhe	193° 53'.5	61° 40'.9 N
Elnath	278° 13'.8	28° 37'.0 N
Eltanin	90° 47'.0	51° 29'.6 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.8	57° 10'.7 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.3	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.4 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.2	69° 45'.7 S
Mirfak	308° 41'.6	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.9 S
Polaris	317° 54'.1	89° 18'.9 N
Pollux	243° 29'.1	27° 59'.7 N
Procyon	245° 00'.9	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 12'.9	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.6	16° 43'.9 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.4	43° 28'.6 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.1	16° 05'.4 S

	SHA	Mer.Pass.
Venus	127° 49'.6	13:01
Mars	214° 00'.9	07:15
Jupiter	326° 29'.4	23:42
Saturn	158° 47'.6	10:55

SUN

GHA	Dec
184° 02'.2	12° 55'.5 S
199° 02'.2	56'.3
214° 02'.3	57'.1
229° 02'.3	58'.0
244° 02'.4	58'.8
259° 02'.4	59'.7
274° 02'.5	13° 00'.5 S
289° 02'.5	01'.3
304° 02'.6	02'.2
319° 02'.6	03'.0
334° 02'.7	03'.9
349° 02'.7	04'.7
4° 02'.8	13° 05'.5 S
19° 02'.8	06'.4
34° 02'.9	07'.2
49° 02'.9	08'.0
64° 03'.0	08'.9
79° 03'.0	09'.7
94° 03'.1	10'.6
109° 03'.1	11'.4
124° 03'.2	12'.2
139° 03'.2	13'.1
154° 03'.3	13'.9
169° 03'.3	14'.7
184° 03'.4	13° 15'.6 S
199° 03'.4	16'.4
214° 03'.5	17'.2
229° 03'.5	18'.1
244° 03'.5	18'.9
259° 03'.6	19'.7
274° 03'.6	20'.6
289° 03'.7	21'.4
304° 03'.7	22'.2
319° 03'.8	23'.1
334° 03'.8	23'.9
349° 03'.9	24'.7
4° 03'.9	13° 25'.5 S
19° 03'.9	26'.4
34° 04'.0	27'.2
49° 04'.0	28'.0
64° 04'.1	28'.9
79° 04'.1	29'.7
94° 04'.1	30'.5
109° 04'.2	31'.3
124° 04'.2	32'.2
139° 04'.3	33'.0
154° 04'.3	33'.8
169° 04'.3	34'.6
184° 04'.4	13° 35'.5 S
199° 04'.4	36'.3
214° 04'.4	37'.1
229° 04'.5	37'.9
244° 04'.5	38'.8
259° 04'.6	39'.6
274° 04'.6	40'.4
289° 04'.6	41'.2
304° 04'.7	42'.0
319° 04'.7	42'.9
334° 04'.7	43'.7
349° 04'.8	44'.5
4° 04'.8	13° 45'.3 S
19° 04'.8	46'.2
34° 04'.9	47'.0
49° 04'.9	47'.8
64° 04'.9	48'.6
79° 05'.0	49'.4
94° 05'.0	50'.2
109° 05'.0	51'.1
124° 05'.1	51'.9
139° 05'.1	52'.7
154° 05'.1	53'.5
169° 05'.2	54'.3
SD 16'.1	d 0'.8

MOON

GHA	v	Dec	d	HP
168° 13'.2	4'.0	19° 59'.4 S	6'.9	61'.0
182° 36'.2	4'.0	20° 06'.3 S	6'.9	
196° 59'.2	3'.9	13'.2	6'.7	
211° 22'.1	3'.9	19'.9	6'.5	
225° 45'.0	3'.9	26'.4	6'.4	
240° 07'.9	3'.9	32'.8	6'.2	60'.9
254° 30'.8	3'.8	39'.0	6'.1	
268° 53'.6	3'.9	45'.1	5'.9	
283° 16'.5	3'.8	51'.0	5'.7	
297° 39'.3	3'.8	56'.7	5'.6	60'.8
312° 02'.1	3'.8	21° 02'.3 S	5'.5	
326° 24'.9	3'.7	07'.8	5'.3	
340° 47'.6	3'.8	21° 13'.1 S	5'.1	60'.8
355° 10'.4	3'.8	18'.2	4'.9	60'.7
9° 33'.2	3'.7	23'.1	4'.8	
23° 55'.9	3'.7	27'.9	4'.7	
38° 18'.6	3'.8	32'.6	4'.4	
52° 41'.4	3'.7	37'.0	4'.4	60'.6
67° 04'.1	3'.7	41'.4	4'.1	
81° 26'.8	3'.8	45'.5	4'.0	
95° 49'.6	3'.7	49'.5	3'.8	60'.5
110° 12'.3	3'.8	53'.3	3'.7	
124° 35'.1	3'.7	57'.0	3'.5	
138° 57'.8	3'.8	22° 00'.5 S	3'.3	
153° 20'.6	3'.8	22° 03'.8 S	3'.2	60'.4
167° 43'.4	3'.8	07'.0	3'.0	
182° 06'.2	3'.8	10'.0	2'.9	
196° 29'.0	3'.8	12'.9	2'.6	60'.3
210° 51'.8	3'.9	15'.5	2'.6	
225° 14'.7	3'.8	18'.1	2'.3	
239° 37'.5	3'.9	20'.4	2'.2	60'.2
254° 00'.4	4'.0	22'.6	2'.0	
268° 23'.4	3'.9	24'.6	1'.9	
282° 46'.3	4'.0	26'.5	1'.7	60'.1
297° 09'.3	4'.0	28'.2	1'.6	
311° 32'.3	4'.1	29'.8	1'.3	
325° 55'.4	4'.1	22° 31'.1 S	1'.3	60'.0
340° 18'.5	4'.1	32'.4	1'.0	
354° 41'.6	4'.1	33'.4	0'.9	
9° 04'.7	4'.2	34'.3	0'.8	59'.9
23° 27'.9	4'.3	35'.1	0'.5	
37° 51'.2	4'.3	35'.6	0'.5	
52° 14'.5	4'.3	36'.1	0'.2	59'.8
66° 37'.8	4'.4	36'.3	0'.1	
81° 01'.2	4'.5	36'.4	0'.0	59'.7
95° 24'.7	4'.5	36'.4	0'.3	
109° 48'.2	4'.5	36'.1	0'.3	
124° 11'.7	4'.6	35'.8	0'.5	59'.6
138° 35'.3	4'.7	22° 35'.3 S	0'.7	59'.6
152° 59'.0	4'.7	34'.6	0'.9	
167° 22'.7	4'.8	33'.7	1'.0	59'.5
181° 46'.5	4'.8	32'.7	1'.1	
196° 10'.3	4'.9	31'.6	1'.3	59'.4
210° 34'.2	5'.0	30'.3	1'.4	
224° 58'.2	5'.1	28'.9	1'.6	
239° 22'.3	5'.1	27'.3	1'.8	59'.3
253° 46'.4	5'.1	25'.5	1'.9	
268° 10'.5	5'.3	23'.6	2'.0	59'.2
282° 34'.8	5'.3	21'.6	2'.2	
296° 59'.1	5'.4	19'.4	2'.3	
311° 23'.5	5'.5	22° 17'.1 S	2'.5	59'.1
325° 48'.0	5'.6	14'.6	2'.6	
340° 12'.6	5'.6	12'.0	2'.8	59'.0
354° 37'.2	5'.7	09'.2	2'.9	
9° 01'.9	5'.8	06'.3	3'.0	
23° 26'.7	5'.9	03'.3	3'.2	58'.9
37° 51'.6	5'.9	00'.1	3'.3	
52° 16'.5	6'.0	21° 56'.8 S	3'.5	58'.8
66° 41'.5	6'.2	53'.3	3'.5	
81° 06'.7	6'.2	49'.8	3'.8	
95° 31'.9	6'.3	46'.0	3'.8	58'.7
109° 57'.2	6'.3	42'.2	4'.0	
SD 16'.6		16'.4	16'.1	

Twilight / Sunrise / Moonrise

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 28	Moonrise 29	Moonrise 30
N 72°	05:53	07:14	08:36	-	-	-
N 70°	05:50	07:03	08:14	-	-	-
68°	05:48	06:54	07:57	12:22	-	-
66°	05:45	06:46	07:43	11:20	12:59	13:49
64°	05:43	06:40	07:31	10:46	12:13	13:08
62°	05:42	06:34	07:22	10:21	11:43	12:39
60°	05:40	06:29	07:13	10:01	11:20	12:18
N 58°	05:38	06:25	07:06	09:45	11:02	12:00
56°	05:37	06:21	07:00	09:31	10:46	11:45
54°	05:35	06:17	06:54	09:19	10:33	11:32
52°	05:34	06:13	06:49	09:09	10:22	11:21
50°	05:32	06:10	06:44	08:59	10:11	11:11
45°	05:29	06:03	06:34	08:40	09:50	10:50
N 40°	05:25	05:57	06:25	08:24	09:32	10:33
35°	05:22	05:52	06:18	08:10	09:18	10:18
30°	05:19	05:47	06:11	07:59	09:05	10:06
20°	05:11	05:37	06:00	07:39	08:44	09:44
N 10°	05:03	05:28	05:50	07:21	08:25	09:26
0°	04:54	05:19	05:40	07:05	08:07	09:08
S 10°	04:44	05:09	05:31	06:49	07:50	08:51
20°	04:31	04:57	05:20	06:32	07:32	08:32
30°	04:14	04:43	05:08	06:13	07:10	08:11
35°	04:03	04:35	05:01	06:02	06:58	07:59
40°	03:50	04:25	04:53	05:49	06:43	07:44
45°	03:33	04:12	04:44	05:34	06:27	07:27
S 50°	03:12	03:57	04:33	05:15	06:06	07:06
52°	03:02	03:50	04:27	05:06	05:56	06:56
54°	02:50	03:42	04:21	04:57	05:45	06:45
56°	02:35	03:32	04:15	04:46	05:32	06:32
58°	02:18	03:22	04:08	04:33	05:17	06:17
S 60°	01:57	03:09	03:59	04:19	05:00	05:59
S 62°	01:28	02:54	03:50	04:01	04:39	05:37

Sunset / Twilight / Moonset

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 28	Moonset 29	Moonset 30
N 72°	14:50	16:12	17:33	-	-	-
N 70°	15:12	16:23	17:36	-	-	-
68°	15:29	16:32	17:38	14:10	-	-
66°	15:43	16:40	17:41	15:12	15:44	17:00
64°	15:55	16:47	17:43	15:48	16:30	17:41
62°	16:05	16:52	17:45	16:13	17:00	18:09
60°	16:13	16:57	17:46	16:33	17:23	18:31
N 58°	16:20	17:02	17:48	16:50	17:41	18:48
56°	16:27	17:06	17:50	17:04	17:57	19:03
54°	16:33	17:10	17:51	17:16	18:10	19:16
52°	16:38	17:13	17:53	17:27	18:22	19:27
50°	16:43	17:16	17:54	17:36	18:32	19:37
45°	16:53	17:24	17:58	17:57	18:54	19:57
N 40°	17:02	17:30	18:02	18:13	19:11	20:14
35°	17:09	17:35	18:05	18:27	19:26	20:28
30°	17:16	17:40	18:09	18:39	19:39	20:41
20°	17:27	17:50	18:16	19:00	20:00	21:01
N 10°	17:38	17:59	18:24	19:18	20:19	21:19
0°	17:47	18:08	18:33	19:35	20:37	21:36
S 10°	17:57	18:19	18:44	19:52	20:54	21:53
20°	18:07	18:30	18:57	20:10	21:13	22:11
30°	18:20	18:45	19:14	20:31	21:35	22:32
35°	18:27	18:53	19:25	20:43	21:47	22:44
40°	18:35	19:04	19:39	20:57	22:02	22:57
45°	18:44	19:16	19:55	21:13	22:19	23:13
S 50°	18:56	19:32	20:17	21:34	22:40	23:33
52°	19:01	19:39	20:28	21:44	22:50	23:43
54°	19:07	19:47	20:40	21:55	23:02	23:53
56°	19:14	19:57	20:55	22:07	23:15	24:05
58°	19:21	20:08	21:12	22:22	23:30	24:19
S 60°	19:30	20:21	21:35	22:39	23:48	24:35
S 62°	19:40	20:36	22:05	23:00	-	00:10

SUN / MOON

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
28	16 09	16 11	11:44	13:20	00:49	2d 4%
29	16 13	16 15	11:44	14:22	01:51	3d 10%
30	16 17	16 19	11:44	15:22	02:53	4d 18%

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2011 Oct 31, Nov. 1, 2 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +1.1		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
31 00	38° 57'.2	164° 14'.5	19° 42'.5 S	251° 54'.5	14° 57'.7 N	5° 42'.4	11° 48'.1 N	197° 31'.4	6° 34'.0 S
01	53° 59'.7	179° 13'.7	43'.3	266° 55'.7	57'.3	20° 45'.2	48'.0	212° 33'.6	34'.1
02	69° 02'.2	194° 13'.0	44'.1	281° 56'.8	56'.9	35° 48'.0	47'.9	227° 35'.8	34'.3
03	84° 04'.6	209° 12'.3	44'.9	296° 57'.9	56'.5	50° 50'.8	47'.8	242° 38'.0	34'.4
04	99° 07'.1	224° 11'.6	45'.7	311° 59'.1	56'.0	65° 53'.6	47'.7	257° 40'.1	34'.5
05	114° 09'.6	239° 10'.8	46'.6	327° 00'.2	55'.6	80° 56'.4	47'.6	272° 42'.3	34'.6
06	129° 12'.0	254° 10'.1	47'.4	342° 01'.4	55'.2	95° 59'.2	47'.5	287° 44'.5	34'.7
07	144° 14'.5	269° 09'.4	48'.2	357° 02'.5	54'.8	111° 02'.0	47'.3	302° 46'.7	34'.8
08	159° 17'.0	284° 08'.7	49'.0	12° 03'.7	54'.4	126° 04'.8	47'.2	317° 48'.9	34'.9
09	174° 19'.4	299° 07'.9	49'.8	27° 04'.8	54'.0	141° 07'.6	47'.1	332° 51'.1	35'.0
10	189° 21'.9	314° 07'.2	50'.6	42° 06'.0	53'.6	156° 10'.3	47'.0	347° 53'.3	35'.1
11	204° 24'.3	329° 06'.5	51'.4	57° 07'.1	53'.2	171° 13'.1	46'.9	2° 55'.4	35'.2
12	219° 26'.8	344° 05'.7	19° 52'.2 S	72° 08'.3	14° 52'.8 N	186° 15'.9	11° 46'.8 N	17° 57'.6	6° 35'.3 S
13	234° 29'.3	359° 05'.0	53'.1	87° 09'.4	52'.4	201° 18'.7	46'.7	32° 59'.8	35'.4
14	249° 31'.7	14° 04'.3	53'.9	102° 10'.6	52'.0	216° 21'.5	46'.6	48° 02'.0	35'.5
15	264° 34'.2	29° 03'.6	54'.7	117° 11'.7	51'.6	231° 24'.3	46'.5	63° 04'.2	35'.7
16	279° 36'.7	44° 02'.8	55'.5	132° 12'.9	51'.2	246° 27'.1	46'.4	78° 06'.4	35'.8
17	294° 39'.1	59° 02'.1	56'.3	147° 14'.0	50'.8	261° 29'.9	46'.3	93° 08'.5	35'.9
18	309° 41'.6	74° 01'.4	57'.1	162° 15'.2	50'.4	276° 32'.7	46'.1	108° 10'.7	36'.0
19	324° 44'.1	89° 00'.6	57'.9	177° 16'.3	50'.0	291° 35'.5	46'.0	123° 12'.9	36'.1
20	339° 46'.5	103° 59'.9	58'.7	192° 17'.5	49'.6	306° 38'.3	45'.9	138° 15'.1	36'.2
21	354° 49'.0	118° 59'.2	59'.5	207° 18'.7	49'.2	321° 41'.1	45'.8	153° 17'.3	36'.3
22	9° 51'.5	133° 58'.4	20° 00'.3 S	222° 19'.8	48'.7	336° 43'.8	45'.7	168° 19'.5	36'.4
23	24° 53'.9	148° 57'.7	01'.1	237° 21'.0	48'.3	351° 46'.6	45'.6	183° 21'.7	36'.5
1 00	39° 56'.4	163° 57'.0	20° 01'.9 S	252° 22'.1	14° 47'.9 N	6° 49'.4	11° 45'.5 N	198° 23'.8	6° 36'.6 S
01	54° 58'.8	178° 56'.2	02'.7	267° 23'.3	47'.5	21° 52'.2	45'.4	213° 26'.0	36'.7
02	70° 01'.3	193° 55'.5	03'.5	282° 24'.4	47'.1	36° 55'.0	45'.3	228° 28'.2	36'.8
03	85° 03'.8	208° 54'.8	04'.3	297° 25'.6	46'.7	51° 57'.8	45'.2	243° 30'.4	36'.9
04	100° 06'.2	223° 54'.0	05'.1	312° 26'.7	46'.3	67° 00'.6	45'.1	258° 32'.6	37'.1
05	115° 08'.7	238° 53'.3	05'.9	327° 27'.9	45'.9	82° 03'.4	44'.9	273° 34'.8	37'.2
06	130° 11'.2	253° 52'.5	06'.6	342° 29'.0	45'.5	97° 06'.2	44'.8	288° 36'.9	37'.3
07	145° 13'.6	268° 51'.8	07'.4	357° 30'.2	45'.1	112° 09'.0	44'.7	303° 39'.1	37'.4
08	160° 16'.1	283° 51'.1	08'.2	12° 31'.4	44'.7	127° 11'.8	44'.6	318° 41'.3	37'.5
09	175° 18'.6	298° 50'.3	09'.0	27° 32'.5	44'.3	142° 14'.5	44'.5	333° 43'.5	37'.6
10	190° 21'.0	313° 49'.6	09'.8	42° 33'.7	43'.9	157° 17'.3	44'.4	348° 45'.7	37'.7
11	205° 23'.5	328° 48'.8	10'.6	57° 34'.8	43'.5	172° 20'.1	44'.3	3° 47'.9	37'.8
12	220° 26'.0	343° 48'.1	20° 11'.4 S	72° 36'.0	14° 43'.1 N	187° 22'.9	11° 44'.2 N	18° 50'.1	6° 37'.9 S
13	235° 28'.4	358° 47'.4	12'.2	87° 37'.1	42'.7	202° 25'.7	44'.1	33° 52'.2	38'.0
14	250° 30'.9	13° 46'.6	13'.0	102° 38'.3	42'.3	217° 28'.5	44'.0	48° 54'.4	38'.1
15	265° 33'.3	28° 45'.9	13'.7	117° 39'.5	41'.8	232° 31'.3	43'.9	63° 56'.6	38'.2
16	280° 35'.8	43° 45'.1	14'.5	132° 40'.6	41'.4	247° 34'.1	43'.7	78° 58'.8	38'.3
17	295° 38'.3	58° 44'.4	15'.3	147° 41'.8	41'.0	262° 36'.9	43'.6	94° 01'.0	38'.5
18	310° 40'.7	73° 43'.6	16'.1	162° 42'.9	40'.6	277° 39'.7	43'.5	109° 03'.2	38'.6
19	325° 43'.2	88° 42'.9	16'.9	177° 44'.1	40'.2	292° 42'.5	43'.4	124° 05'.4	38'.7
20	340° 45'.7	103° 42'.1	17'.6	192° 45'.3	39'.8	307° 45'.2	43'.3	139° 07'.5	38'.8
21	355° 48'.1	118° 41'.4	18'.4	207° 46'.4	39'.4	322° 48'.0	43'.2	154° 09'.7	38'.9
22	10° 50'.6	133° 40'.6	19'.2	222° 47'.6	39'.0	337° 50'.8	43'.1	169° 11'.9	39'.0
23	25° 53'.1	148° 39'.9	20'.0	237° 48'.7	38'.6	352° 53'.6	43'.0	184° 14'.1	39'.1
2 00	40° 55'.5	163° 39'.2	20° 20'.7 S	252° 49'.9	14° 38'.2 N	7° 56'.4	11° 42'.9 N	199° 16'.3	6° 39'.2 S
01	55° 58'.0	178° 38'.4	21'.5	267° 51'.1	37'.8	22° 59'.2	42'.8	214° 18'.5	39'.3
02	71° 00'.4	193° 37'.7	22'.3	282° 52'.2	37'.4	38° 02'.0	42'.7	229° 20'.6	39'.4
03	86° 02'.9	208° 36'.9	23'.1	297° 53'.4	37'.0	53° 04'.8	42'.5	244° 22'.8	39'.5
04	101° 05'.4	223° 36'.2	23'.8	312° 54'.6	36'.6	68° 07'.6	42'.4	259° 25'.0	39'.6
05	116° 07'.8	238° 35'.4	24'.6	327° 55'.7	36'.2	83° 10'.4	42'.3	274° 27'.2	39'.7
06	131° 10'.3	253° 34'.7	25'.4	342° 56'.9	35'.8	98° 13'.1	42'.2	289° 29'.4	39'.8
07	146° 12'.8	268° 33'.9	26'.1	357° 58'.1	35'.3	113° 15'.9	42'.1	304° 31'.6	40'.0
08	161° 15'.2	283° 33'.2	26'.9	12° 59'.2	34'.9	128° 18'.7	42'.0	319° 33'.8	40'.1
09	176° 17'.7	298° 32'.4	27'.7	28° 00'.4	34'.5	143° 21'.5	41'.9	334° 35'.9	40'.2
10	191° 20'.2	313° 31'.6	28'.4	43° 01'.5	34'.1	158° 24'.3	41'.8	349° 38'.1	40'.3
11	206° 22'.6	328° 30'.9	29'.2	58° 02'.7	33'.7	173° 27'.1	41'.7	4° 40'.3	40'.4
12	221° 25'.1	343° 30'.1	20° 30'.0 S	73° 03'.9	14° 33'.3 N	188° 29'.9	11° 41'.6 N	19° 42'.5	6° 40'.5 S
13	236° 27'.6	358° 29'.4	30'.7	88° 05'.0	32'.9	203° 32'.7	41'.5	34° 44'.7	40'.6
14	251° 30'.0	13° 28'.6	31'.5	103° 06'.2	32'.5	218° 35'.5	41'.4	49° 46'.9	40'.7
15	266° 32'.5	28° 27'.9	32'.2	118° 07'.4	32'.1	233° 38'.3	41'.2	64° 49'.1	40'.8
16	281° 34'.9	43° 27'.1	33'.0	133° 08'.5	31'.7	248° 41'.0	41'.1	79° 51'.2	40'.9
17	296° 37'.4	58° 26'.4	33'.8	148° 09'.7	31'.3	263° 43'.8	41'.0	94° 53'.4	41'.0
18	311° 39'.9	73° 25'.6	34'.5	163° 10'.9	30'.9	278° 46'.6	40'.9	109° 55'.6	41'.1
19	326° 42'.3	88° 24'.8	35'.3	178° 12'.1	30'.5	293° 49'.4	40'.8	124° 57'.8	41'.2
20	341° 44'.8	103° 24'.1	36'.0	193° 13'.2	30'.1	308° 52'.2	40'.7	140° 00'.0	41'.3
21	356° 47'.3	118° 23'.3	36'.8	208° 14'.4	29'.7	323° 55'.0	40'.6	155° 02'.2	41'.4
22	11° 49'.7	133° 22'.6	37'.5	223° 15'.6	29'.3	338° 57'.8	40'.5	170° 04'.4	41'.6
23	26° 52'.2	148° 21'.8	38'.3	238° 16'.7	28'.9	354° 00'.6	40'.4	185° 06'.6	41'.7
	M.P. 21:17	v -0'.7	d 0'.8	v 1'.2	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.6 S
Acrux	173° 11'.3	63° 09'.8 S
Adhara	255° 13'.3	28° 59'.2 S
Aldebaran	290° 50'.4	16° 32'.0 N
Alioth	166° 22'.2	55° 53'.6 N
Alkaid	153° 00'.2	49° 15'.2 N
Alnair	27° 45'.0	46° 54'.2 S
Alnilam	275° 47'.3	1° 11'.6 S
Alphard	217° 57'.3	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.4	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.4	69° 03'.0 S
Avior	234° 18'.5	59° 32'.6 S
Bellatrix	278° 33'.0	6° 21'.6 N
Betelgeuse	271° 02'.3	7° 24'.5 N
Canopus	263° 56'.4	52° 41'.9 S
Capella	280° 35'.8	46° 00'.4 N
Deneb	49° 32'.3	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.2 S
Dubhe	193° 53'.4	61° 40'.9 N
Elnath	278° 13'.8	28° 37'.0 N
Eltanin	90° 47'.0	51° 29'.6 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.8	57° 10'.6 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.4 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.1	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.9 S
Polaris	317° 53'.6	89° 18'.9 N
Pollux	243° 29'.0	27° 59'.7 N
Procyon	245° 00'.8	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.9	11° 54'.5 N
Rigel	281° 12'.9	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.6	16° 43'.9 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.4	43° 28'.6 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	124° 00'.6	13:05
Mars	212° 25'.7	07:10
Jupiter	326° 53'.0	23:28
Saturn	158° 27'.5	10:45

SUN

GHA	Dec
184° 05'.2	13° 55'.1 S
199° 05'.2	56'.0
214° 05'.2	56'.8
229° 05'.3	57'.6
244° 05'.3	58'.4
259° 05'.3	59'.2
274° 05'.4	14° 00'.0 S
289° 05'.4	00'.8
304° 05'.4	01'.7
319° 05'.4	02'.5
334° 05'.5	03'.3
349° 05'.5	04'.1
4° 05'.5	14° 04'.9 S
19° 05'.5	05'.7
34° 05'.6	06'.5
49° 05'.6	07'.3
64° 05'.6	08'.1
79° 05'.6	09'.0
94° 05'.7	09'.8
109° 05'.7	10'.6
124° 05'.7	11'.4
139° 05'.7	12'.2
154° 05'.8	13'.0
169° 05'.8	13'.8
184° 05'.8	14° 14'.6 S
199° 05'.8	15'.4
214° 05'.8	16'.2
229° 05'.9	17'.0
244° 05'.9	17'.8
259° 05'.9	18'.6
274° 05'.9	19'.4
289° 05'.9	20'.2
304° 06'.0	21'.0
319° 06'.0	21'.8
334° 06'.0	22'.7
349° 06'.0	23'.5
4° 06'.0	14° 24'.3 S
19° 06'.1	25'.1
34° 06'.1	25'.9
49° 06'.1	26'.7
64° 06'.1	27'.5
79° 06'.1	28'.3
94° 06'.1	29'.1
109° 06'.2	29'.9
124° 06'.2	30'.7
139° 06'.2	31'.5
154° 06'.2	32'.2
169° 06'.2	33'.0
184° 06'.2	14° 33'.8 S
199° 06'.2	34'.6
214° 06'.3	35'.4
229° 06'.3	36'.2
244° 06'.3	37'.0
259° 06'.3	37'.8
274° 06'.3	38'.6
289° 06'.3	39'.4
304° 06'.3	40'.2
319° 06'.3	41'.0
334° 06'.3	41'.8
349° 06'.4	42'.6
4° 06'.4	14° 43'.4 S
19° 06'.4	44'.2
34° 06'.4	45'.0
49° 06'.4	45'.7
64° 06'.4	46'.5
79° 06'.4	47'.3
94° 06'.4	48'.1
109° 06'.4	48'.9
124° 06'.4	49'.7
139° 06'.4	50'.5
154° 06'.4	51'.3
169° 06'.5	52'.1
SD 16'.1	d 0'.8

MOON

GHA	v	Dec	d	HP
124° 22'.5	6'.5	21° 38'.2 S	4'.1	58'.6
138° 48'.0	6'.6	34'.1	4'.3	
153° 13'.6	6'.6	29'.8	4'.4	
167° 39'.2	6'.8	25'.4	4'.5	58'.5
182° 05'.0	6'.8	20'.9	4'.6	
196° 30'.8	6'.9	16'.3	4'.8	58'.4
210° 56'.7	7'.0	11'.5	4'.9	
225° 22'.7	7'.1	06'.6	5'.0	
239° 48'.8	7'.3	01'.6	5'.1	58'.3
254° 15'.1	7'.2	20° 56'.5 S	5'.2	
268° 41'.3	7'.4	51'.3	5'.4	58'.2
283° 07'.7	7'.5	45'.9	5'.5	
297° 34'.2	7'.6	20° 40'.4 S	5'.6	58'.2
312° 00'.8	7'.7	34'.8	5'.7	58'.1
326° 27'.5	7'.8	29'.1	5'.8	
340° 54'.3	7'.9	23'.3	6'.0	58'.0
355° 21'.2	7'.9	17'.3	6'.0	
9° 48'.1	8'.1	11'.3	6'.2	
24° 15'.2	8'.2	05'.1	6'.2	57'.9
38° 42'.4	8'.2	19° 58'.9 S	6'.4	
53° 09'.6	8'.4	52'.5	6'.5	57'.8
67° 37'.0	8'.5	46'.0	6'.6	
82° 04'.5	8'.5	39'.4	6'.7	
96° 32'.0	8'.7	32'.7	6'.8	57'.7
110° 59'.7	8'.7	19° 25'.9 S	6'.9	57'.7
125° 27'.4	8'.9	19'.0	6'.9	57'.6
139° 55'.3	8'.9	12'.1	7'.1	
154° 23'.2	9'.1	05'.0	7'.2	
168° 51'.3	9'.1	18° 57'.8 S	7'.3	57'.5
183° 19'.4	9'.3	50'.5	7'.4	
197° 47'.7	9'.3	43'.1	7'.4	57'.4
212° 16'.0	9'.5	35'.7	7'.6	
226° 44'.5	9'.5	28'.1	7'.7	
241° 13'.0	9'.7	20'.4	7'.7	57'.3
255° 41'.7	9'.7	12'.7	7'.8	
270° 10'.4	9'.8	04'.9	7'.9	
284° 39'.2	10'.0	17° 57'.0 S	8'.0	57'.2
299° 08'.2	10'.0	49'.0	8'.1	
313° 37'.2	10'.1	40'.9	8'.2	57'.1
328° 06'.3	10'.2	32'.7	8'.2	
342° 35'.5	10'.4	24'.5	8'.4	
357° 04'.9	10'.4	16'.1	8'.4	57'.0
11° 34'.3	10'.5	07'.7	8'.4	
26° 03'.8	10'.6	16° 59'.3 S	8'.6	56'.9
40° 33'.4	10'.7	50'.7	8'.6	
55° 03'.1	10'.7	42'.1	8'.7	
69° 32'.8	10'.9	33'.4	8'.8	56'.8
84° 02'.7	11'.0	24'.6	8'.9	
98° 32'.7	11'.0	16° 15'.7 S	8'.9	56'.8
113° 02'.7	11'.2	06'.8	9'.0	56'.7
127° 32'.9	11'.2	15° 57'.8 S	9'.1	
142° 03'.1	11'.4	48'.7	9'.1	
156° 33'.5	11'.4	39'.6	9'.2	56'.6
171° 03'.9	11'.5	30'.4	9'.3	
185° 34'.4	11'.6	21'.1	9'.3	56'.5
200° 05'.0	11'.7	11'.8	9'.4	
214° 35'.7	11'.7	02'.4	9'.4	
229° 06'.4	11'.9	14° 53'.0 S	9'.6	56'.4
243° 37'.3	11'.9	43'.4	9'.5	
258° 08'.2	12'.0	33'.9	9'.7	
272° 39'.2	12'.1	14° 24'.2 S	9'.6	56'.3
287° 10'.3	12'.2	14'.6	9'.8	
301° 41'.5	12'.3	04'.8	9'.8	
316° 12'.8	12'.3	13° 55'.0 S	9'.8	56'.2
330° 44'.1	12'.5	45'.2	10'.0	
345° 15'.6	12'.5	35'.2	9'.9	
359° 47'.1	12'.6	25'.3	10'.0	56'.1
14° 18'.7	12'.6	15'.3	10'.1	
28° 50'.3	12'.8	05'.2	10'.1	
43° 22'.1	12'.8	12° 55'.1 S	10'.2	56'.0
57° 53'.9	12'.9	44'.9	10'.2	
72° 25'.8	13'.0	34'.7	10'.2	
SD 15'.8		15'.6	15'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 31	Moonrise 1	Moonrise 2
N 72°	06:05	07:27	08:54	-	16:14	15:16
N 70°	06:01	07:15	08:29	-	15:12	14:49
68°	05:57	07:04	08:09	14:48	14:36	14:28
66°	05:54	06:56	07:54	14:05	14:10	14:12
64°	05:51	06:48	07:41	13:36	13:50	13:58
62°	05:49	06:42	07:30	13:14	13:34	13:47
60°	05:47	06:36	07:21	12:56	13:20	13:37
N 58°	05:44	06:31	07:13	12:41	13:09	13:29
56°	05:42	06:26	07:06	12:28	12:58	13:21
54°	05:40	06:22	07:00	12:16	12:49	13:14
52°	05:39	06:19	06:54	12:07	12:41	13:08
50°	05:37	06:15	06:49	11:58	12:34	13:03
45°	05:33	06:07	06:38	11:39	12:18	12:51
N 40°	05:28	06:00	06:29	11:23	12:05	12:41
35°	05:25	05:54	06:21	11:10	11:54	12:32
30°	05:21	05:49	06:14	10:59	11:45	12:25
20°	05:12	05:39	06:01	10:39	11:28	12:12
N 10°	05:04	05:29	05:50	10:22	11:13	12:00
0°	04:54	05:19	05:40	10:06	11:00	11:50
S 10°	04:43	05:08	05:30	09:50	10:46	11:39
20°	04:29	04:56	05:19	09:33	10:31	11:27
30°	04:11	04:41	05:06	09:13	10:15	11:14
35°	03:59	04:31	04:58	09:02	10:05	11:06
40°	03:45	04:21	04:50	08:48	09:54	10:58
45°	03:28	04:07	04:39	08:33	09:40	10:47
S 50°	03:05	03:51	04:27	08:13	09:24	10:35
52°	02:54	03:43	04:21	08:04	09:16	10:29
54°	02:41	03:34	04:15	07:54	09:08	10:23
56°	02:25	03:24	04:08	07:42	08:58	10:16
58°	02:06	03:13	04:00	07:29	08:48	10:07
S 60°	01:42	02:59	03:51	07:13	08:35	09:58
S 62°	01:07	02:43	03:41	06:54	08:20	09:48

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 31	Moonset 1	Moonset 2
N 72°	14:31	15:58	17:21	-	18:26	21:05
N 70°	14:57	16:11	17:25	-	19:27	21:31
68°	15:17	16:22	17:28	18:00	20:02	21:50
66°	15:32	16:30	17:32	18:43	20:26	22:05
64°	15:45	16:38	17:35	19:11	20:46	22:18
62°	15:56	16:44	17:37	19:33	21:01	22:28
60°	16:05	16:50	17:40	19:50	21:14	22:37
N 58°	16:13	16:55	17:42	20:05	21:25	22:45
56°	16:20	17:00	17:44	20:17	21:35	22:52
54°	16:27	17:04	17:46	20:28	21:43	22:58
52°	16:32	17:08	17:48	20:38	21:51	23:03
50°	16:38	17:11	17:50	20:46	21:58	23:08
45°	16:49	17:19	17:54	21:05	22:12	23:19
N 40°	16:58	17:26	17:58	21:19	22:24	23:28
35°	17:06	17:32	18:02	21:32	22:35	23:35
30°	17:13	17:38	18:06	21:43	22:43	23:42
20°	17:26	17:48	18:15	22:01	22:59	23:53
N 10°	17:37	17:58	18:23	22:17	23:12	24:03
0°	17:47	18:08	18:33	22:32	23:24	24:12
S 10°	17:58	18:19	18:45	22:47	23:36	24:21
20°	18:09	18:32	18:59	23:03	23:49	24:31
30°	18:22	18:47	19:17	23:21	-	00:04
35°	18:30	18:57	19:29	23:32	-	00:13
40°	18:38	19:07	19:43	23:44	-	00:22
45°	18:49	19:21	20:01	23:58	-	00:34
S 50°	19:01	19:37	20:24	-	00:15	00:47
52°	19:07	19:45	20:35	-	00:23	00:54
54°	19:13	19:54	20:48	-	00:32	01:01
56°	19:20	20:05	21:04	00:05	00:42	01:08
58°	19:29	20:16	21:24	00:19	00:53	01:17
S 60°	19:38	20:30	21:50	00:35	01:06	01:27
S 62°	19:49	20:47	22:28	00:55	01:22	01:39

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
31	16 21	16 22	11:44	16:19	03:51	5d 28%
1	16 23	16 24	11:44	17:12	04:46	6d 38%
2	16 25	16 25	11:44	18:01	05:37	7d 48%

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2011 November 3, 4, 5 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +1.1		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
3 00	41° 54'.7	163° 21'.1	20° 39'.0 S	253° 17'.9	14° 28'.4 N	9° 03'.4	11° 40'.3 N	200° 08'.7	6° 41'.8 S
01	56° 57'.1	178° 20'.3	39'.8	268° 19'.1	28'.0	24° 06'.1	40'.2	215° 10'.9	41'.9
02	71° 59'.6	193° 19'.5	40'.5	283° 20'.2	27'.6	39° 08'.9	40'.1	230° 13'.1	42'.0
03	87° 02'.1	208° 18'.8	41'.3	298° 21'.4	27'.2	54° 11'.7	39'.9	245° 15'.3	42'.1
04	102° 04'.5	223° 18'.0	42'.0	313° 22'.6	26'.8	69° 14'.5	39'.8	260° 17'.5	42'.2
05	117° 07'.0	238° 17'.2	42'.8	328° 23'.8	26'.4	84° 17'.3	39'.7	275° 19'.7	42'.3
Thursday 06	132° 09'.4	253° 16'.5	43'.5	343° 24'.9	26'.0	99° 20'.1	39'.6	290° 21'.9	42'.4
07	147° 11'.9	268° 15'.7	44'.3	358° 26'.1	25'.6	114° 22'.9	39'.5	305° 24'.0	42'.5
08	162° 14'.4	283° 14'.9	45'.0	13° 27'.3	25'.2	129° 25'.7	39'.4	320° 26'.2	42'.6
09	177° 16'.8	298° 14'.2	45'.8	28° 28'.4	24'.8	144° 28'.5	39'.3	335° 28'.4	42'.7
10	192° 19'.3	313° 13'.4	46'.5	43° 29'.6	24'.4	159° 31'.2	39'.2	350° 30'.6	42'.8
11	207° 21'.8	328° 12'.7	47'.2	58° 30'.8	24'.0	174° 34'.0	39'.1	5° 32'.8	42'.9
12	222° 24'.2	343° 11'.9	20° 48'.0 S	73° 32'.0	14° 23'.6 N	189° 36'.8	11° 39'.0 N	20° 35'.0	6° 43'.0 S
13	237° 26'.7	358° 11'.1	48'.7	88° 33'.1	23'.2	204° 39'.6	38'.9	35° 37'.2	43'.2
14	252° 29'.2	13° 10'.4	49'.5	103° 34'.3	22'.8	219° 42'.4	38'.8	50° 39'.3	43'.3
15	267° 31'.6	28° 09'.6	50'.2	118° 35'.5	22'.4	234° 45'.2	38'.7	65° 41'.5	43'.4
16	282° 34'.1	43° 08'.8	50'.9	133° 36'.7	21'.9	249° 48'.0	38'.5	80° 43'.7	43'.5
17	297° 36'.5	58° 08'.0	51'.7	148° 37'.8	21'.5	264° 50'.8	38'.4	95° 45'.9	43'.6
18	312° 39'.0	73° 07'.3	52'.4	163° 39'.0	21'.1	279° 53'.5	38'.3	110° 48'.1	43'.7
19	327° 41'.5	88° 06'.5	53'.1	178° 40'.2	20'.7	294° 56'.3	38'.2	125° 50'.3	43'.8
20	342° 43'.9	103° 05'.7	53'.9	193° 41'.4	20'.3	309° 59'.1	38'.1	140° 52'.5	43'.9
21	357° 46'.4	118° 05'.0	54'.6	208° 42'.5	19'.9	325° 01'.9	38'.0	155° 54'.7	44'.0
22	12° 48'.9	133° 04'.2	55'.3	223° 43'.7	19'.5	340° 04'.7	37'.9	170° 56'.8	44'.1
23	27° 51'.3	148° 03'.4	56'.1	238° 44'.9	19'.1	355° 07'.5	37'.8	185° 59'.0	44'.2
Friday 4 00	42° 53'.8	163° 02'.6	20° 56'.8 S	253° 46'.1	14° 18'.7 N	10° 10'.3	11° 37'.7 N	201° 01'.2	6° 44'.3 S
01	57° 56'.3	178° 01'.9	57'.5	268° 47'.3	18'.3	25° 13'.1	37'.6	216° 03'.4	44'.4
02	72° 58'.7	193° 01'.1	58'.2	283° 48'.4	17'.9	40° 15'.8	37'.5	231° 05'.6	44'.5
03	88° 01'.2	208° 00'.3	59'.0	298° 49'.6	17'.5	55° 18'.6	37'.4	246° 07'.8	44'.6
04	103° 03'.7	222° 59'.6	59'.7	313° 50'.8	17'.1	70° 21'.4	37'.3	261° 10'.0	44'.7
05	118° 06'.1	237° 58'.8	21° 00'.4 S	328° 52'.0	16'.7	85° 24'.2	37'.1	276° 12'.2	44'.8
06	133° 08'.6	252° 58'.0	01'.1	343° 53'.2	16'.3	100° 27'.0	37'.0	291° 14'.3	45'.0
07	148° 11'.0	267° 57'.2	01'.8	358° 54'.3	15'.9	115° 29'.8	36'.9	306° 16'.5	45'.1
08	163° 13'.5	282° 56'.4	02'.6	13° 55'.5	15'.4	130° 32'.6	36'.8	321° 18'.7	45'.2
09	178° 16'.0	297° 55'.7	03'.3	28° 56'.7	15'.0	145° 35'.4	36'.7	336° 20'.9	45'.3
10	193° 18'.4	312° 54'.9	04'.0	43° 57'.9	14'.6	160° 38'.1	36'.6	351° 23'.1	45'.4
11	208° 20'.9	327° 54'.1	04'.7	58° 59'.1	14'.2	175° 40'.9	36'.5	6° 25'.3	45'.5
12	223° 23'.4	342° 53'.3	21° 05'.4 S	74° 00'.2	14° 13'.8 N	190° 43'.7	11° 36'.4 N	21° 27'.5	6° 45'.6 S
13	238° 25'.8	357° 52'.6	06'.1	89° 01'.4	13'.4	205° 46'.5	36'.3	36° 29'.7	45'.7
14	253° 28'.3	12° 51'.8	06'.9	104° 02'.6	13'.0	220° 49'.3	36'.2	51° 31'.8	45'.8
15	268° 30'.8	27° 51'.0	07'.6	119° 03'.8	12'.6	235° 52'.1	36'.1	66° 34'.0	45'.9
16	283° 33'.2	42° 50'.2	08'.3	134° 05'.0	12'.2	250° 54'.9	36'.0	81° 36'.2	46'.0
17	298° 35'.7	57° 49'.4	09'.0	149° 06'.2	11'.8	265° 57'.7	35'.9	96° 38'.4	46'.1
18	313° 38'.2	72° 48'.7	09'.7	164° 07'.3	11'.4	281° 00'.4	35'.8	111° 40'.6	46'.2
19	328° 40'.6	87° 47'.9	10'.4	179° 08'.5	11'.0	296° 03'.2	35'.6	126° 42'.8	46'.3
20	343° 43'.1	102° 47'.1	11'.1	194° 09'.7	10'.6	311° 06'.0	35'.5	141° 45'.0	46'.4
21	358° 45'.5	117° 46'.3	11'.8	209° 10'.9	10'.2	326° 08'.8	35'.4	156° 47'.2	46'.5
22	13° 48'.0	132° 45'.5	12'.5	224° 12'.1	09'.8	341° 11'.6	35'.3	171° 49'.3	46'.6
23	28° 50'.5	147° 44'.7	13'.2	239° 13'.3	09'.4	356° 14'.4	35'.2	186° 51'.5	46'.7
Saturday 5 00	43° 52'.9	162° 44'.0	21° 13'.9 S	254° 14'.5	14° 09'.0 N	11° 17'.2	11° 35'.1 N	201° 53'.7	6° 46'.9 S
01	58° 55'.4	177° 43'.2	14'.6	269° 15'.6	08'.5	26° 19'.9	35'.0	216° 55'.9	47'.0
02	73° 57'.9	192° 42'.4	15'.3	284° 16'.8	08'.1	41° 22'.7	34'.9	231° 58'.1	47'.1
03	89° 00'.3	207° 41'.6	16'.0	299° 18'.0	07'.7	56° 25'.5	34'.8	247° 00'.3	47'.2
04	104° 02'.8	222° 40'.8	16'.7	314° 19'.2	07'.3	71° 28'.3	34'.7	262° 02'.5	47'.3
05	119° 05'.3	237° 40'.0	17'.4	329° 20'.4	06'.9	86° 31'.1	34'.6	277° 04'.7	47'.4
06	134° 07'.7	252° 39'.2	18'.1	344° 21'.6	06'.5	101° 33'.9	34'.5	292° 06'.8	47'.5
07	149° 10'.2	267° 38'.4	18'.8	359° 22'.8	06'.1	116° 36'.7	34'.4	307° 09'.0	47'.6
08	164° 12'.6	282° 37'.7	19'.5	14° 24'.0	05'.7	131° 39'.4	34'.3	322° 11'.2	47'.7
09	179° 15'.1	297° 36'.9	20'.2	29° 25'.1	05'.3	146° 42'.2	34'.2	337° 13'.4	47'.8
10	194° 17'.6	312° 36'.1	20'.9	44° 26'.3	04'.9	161° 45'.0	34'.0	352° 15'.6	47'.9
11	209° 20'.0	327° 35'.3	21'.6	59° 27'.5	04'.5	176° 47'.8	33'.9	7° 17'.8	48'.0
12	224° 22'.5	342° 34'.5	21° 22'.3 S	74° 28'.7	14° 04'.1 N	191° 50'.6	11° 33'.8 N	22° 20'.0	6° 48'.1 S
13	239° 25'.0	357° 33'.7	23'.0	89° 29'.9	03'.7	206° 53'.4	33'.7	37° 22'.2	48'.2
14	254° 27'.4	12° 32'.9	23'.7	104° 31'.1	03'.3	221° 56'.1	33'.6	52° 24'.4	48'.3
15	269° 29'.9	27° 32'.1	24'.3	119° 32'.3	02'.9	236° 58'.9	33'.5	67° 26'.5	48'.4
16	284° 32'.4	42° 31'.3	25'.0	134° 33'.5	02'.5	252° 01'.7	33'.4	82° 28'.7	48'.5
17	299° 34'.8	57° 30'.5	25'.7	149° 34'.7	02'.1	267° 04'.5	33'.3	97° 30'.9	48'.6
18	314° 37'.3	72° 29'.7	26'.4	164° 35'.9	01'.6	282° 07'.3	33'.2	112° 33'.1	48'.7
19	329° 39'.8	87° 29'.0	27'.1	179° 37'.1	01'.2	297° 10'.1	33'.1	127° 35'.3	48'.9
20	344° 42'.2	102° 28'.2	27'.8	194° 38'.2	00'.8	312° 12'.9	33'.0	142° 37'.5	49'.0
21	359° 44'.7	117° 27'.4	28'.4	209° 39'.4	00'.4	327° 15'.6	32'.9	157° 39'.7	49'.1
22	14° 47'.1	132° 26'.6	29'.1	224° 40'.6	00'.0	342° 18'.4	32'.8	172° 41'.9	49'.2
23	29° 49'.6	147° 25'.8	29'.8	239° 41'.8	13° 59'.6 N	357° 21'.2	32'.7	187° 44'.1	49'.3
	M.P. 21:05	v -0'.8	d 0'.7	v 1'.2	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.6 S
Acrux	173° 11'.3	63° 09'.7 S
Adhara	255° 13'.3	28° 59'.2 S
Aldebaran	290° 50'.4	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.6 N
Alkaid	153° 00'.2	49° 15'.2 N
Alnair	27° 45'.0	46° 54'.2 S
Alnilam	275° 47'.3	1° 11'.6 S
Alphard	217° 57'.3	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.4	69° 03'.0 S
Avior	234° 18'.4	59° 32'.6 S
Bellatrix	278° 33'.0	6° 21'.6 N
Betelgeuse	271° 02'.3	7° 24'.5 N
Canopus	263° 56'.3	52° 41'.9 S
Capella	280° 35'.8	46° 00'.5 N
Deneb	49° 32'.3	45° 19'.8 N
Denebola	182° 35'.1	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.2 S
Dubhe	193° 53'.4	61° 40'.9 N
Elnath	278° 13'.8	28° 37'.0 N
Eltanin	90° 47'.0	51° 29'.5 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.0	29° 33'.5 S
Gacrux	172° 02'.7	57° 10'.6 S
Gienah	175° 53'.8	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.4 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.4	36° 25'.6 S
Miaplacidus	221° 40'.1	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.9 S
Polaris	317° 53'.4	89° 19'.0 N
Pollux	243° 29'.0	27° 59'.7 N
Procyon	245° 00'.8	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.8	11° 54'.5 N
Rigel	281° 12'.9	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 53'.0 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.5	16° 43'.9 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.6 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	120° 08'.9	13:09
Mars	210° 52'.3	07:04
Jupiter	327° 16'.5	23:15
Saturn	158° 07'.4	10:34

SUN				
GHA	Dec	GHA	v	Dec	d	HP
184° 06'.5	14° 52'.8 S	86° 57'.8	13'.0	12° 24'.5 S	10'.3	56'.0
199° 06'.5	53'.6	101° 29'.8	13'.1	14'.2	10'.3	55'.9
214° 06'.5	54'.4	116° 01'.9	13'.2	03'.9	10'.4	
229° 06'.5	55'.2	130° 34'.1	13'.3	11° 53'.5 S	10'.5	
244° 06'.5	56'.0	145° 06'.4	13'.3	43'.0	10'.4	55'.8
259° 06'.5	56'.8	159° 38'.7	13'.4	32'.6	10'.5	
274° 06'.5	57'.5	174° 11'.1	13'.4	22'.1	10'.6	
289° 06'.5	58'.3	188° 43'.5	13'.6	11'.5	10'.6	55'.7
304° 06'.5	59'.1	203° 16'.1	13'.6	00'.9	10'.6	
319° 06'.5	59'.9	217° 48'.7	13'.6	10° 50'.3 S	10'.7	
334° 06'.5	15° 00'.7 S	232° 21'.3	13'.8	39'.6	10'.7	
349° 06'.5	01'.5	246° 54'.1	13'.8	28'.9	10'.7	55'.6
4° 06'.5	15° 02'.2 S	261° 26'.9	13'.8	10° 18'.2 S	10'.8	55'.6
19° 06'.5	03'.0	275° 59'.7	13'.9	07'.4	10'.8	
34° 06'.5	03'.8	290° 32'.6	14'.0	9° 56'.6 S	10'.8	55'.5
49° 06'.5	04'.6	305° 05'.6	14'.1	45'.8	10'.9	
64° 06'.5	05'.4	319° 38'.7	14'.1	34'.9	10'.9	
79° 06'.5	06'.1	334° 11'.8	14'.1	24'.0	10'.9	
94° 06'.5	06'.9	348° 44'.9	14'.2	13'.1	10'.9	55'.4
109° 06'.5	07'.7	3° 18'.1	14'.3	02'.2	11'.0	
124° 06'.5	08'.5	17° 51'.4	14'.3	8° 51'.2 S	11'.0	
139° 06'.5	09'.3	32° 24'.7	14'.4	40'.2	11'.1	
154° 06'.5	10'.0	46° 58'.1	14'.5	29'.1	11'.0	55'.3
169° 06'.5	10'.8	61° 31'.6	14'.5	18'.1	11'.1	
184° 06'.5	15° 11'.6 S	76° 05'.1	14'.5	8° 07'.0 S	11'.1	55'.3
199° 06'.5	12'.4	90° 38'.6	14'.6	7° 55'.9 S	11'.2	55'.2
214° 06'.5	13'.1	105° 12'.2	14'.6	44'.7	11'.1	
229° 06'.5	13'.9	119° 45'.8	14'.7	33'.6	11'.2	
244° 06'.5	14'.7	134° 19'.5	14'.8	22'.4	11'.2	
259° 06'.5	15'.5	148° 53'.3	14'.7	11'.2	11'.2	
274° 06'.5	16'.2	163° 27'.0	14'.9	7° 00'.0 S	11'.3	55'.1
289° 06'.5	17'.0	178° 00'.9	14'.9	48'.7	11'.3	
304° 06'.5	17'.8	192° 34'.8	14'.9	37'.4	11'.2	
319° 06'.5	18'.6	207° 08'.7	14'.9	26'.2	11'.3	
334° 06'.4	19'.3	221° 42'.6	15'.0	14'.9	11'.4	55'.0
349° 06'.4	20'.1	236° 16'.6	15'.1	03'.5	11'.3	
4° 06'.4	15° 20'.9 S	250° 50'.7	15'.1	5° 52'.2 S	11'.3	55'.0
19° 06'.4	21'.6	265° 24'.8	15'.1	40'.9	11'.4	
34° 06'.4	22'.4	279° 58'.9	15'.2	29'.5	11'.4	54'.9
49° 06'.4	23'.2	294° 33'.1	15'.2	18'.1	11'.4	
64° 06'.4	24'.0	309° 07'.3	15'.2	06'.7	11'.4	
79° 06'.4	24'.7	323° 41'.5	15'.3	4° 55'.3 S	11'.4	
94° 06'.4	25'.5	338° 15'.8	15'.3	43'.9	11'.4	
109° 06'.4	26'.3	352° 50'.1	15'.4	32'.5	11'.4	54'.8
124° 06'.4	27'.0	7° 24'.5	15'.3	21'.1	11'.5	
139° 06'.4	27'.8	21° 58'.8	15'.4	09'.6	11'.4	
154° 06'.3	28'.6	36° 33'.2	15'.5	3° 58'.2 S	11'.5	
169° 06'.3	29'.3	51° 07'.7	15'.4	46'.7	11'.5	
184° 06'.3	15° 30'.1 S	65° 42'.1	15'.5	3° 35'.2 S	11'.4	54'.7
199° 06'.3	30'.9	80° 16'.6	15'.6	23'.8	11'.5	
214° 06'.3	31'.6	94° 51'.2	15'.5	12'.3	11'.5	
229° 06'.3	32'.4	109° 25'.7	15'.6	00'.8	11'.5	
244° 06'.3	33'.2	124° 00'.3	15'.6	2° 49'.3 S	11'.5	
259° 06'.3	33'.9	138° 34'.9	15'.6	37'.8	11'.5	
274° 06'.3	34'.7	153° 09'.5	15'.7	26'.3	11'.5	54'.6
289° 06'.2	35'.4	167° 44'.2	15'.7	14'.8	11'.5	
304° 06'.2	36'.2	182° 18'.9	15'.7	03'.3	11'.5	
319° 06'.2	37'.0	196° 53'.6	15'.7	1° 51'.8 S	11'.5	
334° 06'.2	37'.7	211° 28'.3	15'.7	40'.3	11'.5	
349° 06'.2	38'.5	226° 03'.0	15'.8	28'.8	11'.5	54'.5
4° 06'.2	15° 39'.2 S	240° 37'.8	15'.8	1° 17'.3 S	11'.5	54'.5
19° 06'.2	40'.0	255° 12'.6	15'.8	05'.8	11'.5	
34° 06'.1	40'.8	269° 47'.4	15'.8	0° 54'.3 S	11'.6	
49° 06'.1	41'.5	284° 22'.2	15'.8	42'.7	11'.5	
64° 06'.1	42'.3	298° 57'.0	15'.8	31'.2	11'.4	
79° 06'.1	43'.0	313° 31'.8	15'.9	19'.8	11'.5	
94° 06'.1	43'.8	328° 06'.7	15'.9	08'.3	11'.5	54'.4
109° 06'.1	44'.6	342° 41'.6	15'.8	0° 03'.2 N	11'.5	
124° 06'.0	45'.3	357° 16'.4	15'.9	14'.7	11'.5	
139° 06'.0	46'.1	11° 51'.3	15'.9	26'.2	11'.5	
154° 06'.0	46'.8	26° 26'.2	15'.9	37'.7	11'.4	
169° 06'.0	47'.6	41° 01'.1	15'.9	49'.1	11'.5	
SD 16'.1	d 0'.8	SD	15'.1	15'.0	14'.9	

MOON						
GHA	v	Dec	d	HP
86° 57'.8	13'.0	12° 24'.5 S	10'.3	56'.0
101° 29'.8	13'.1	14'.2	10'.3	55'.9
116° 01'.9	13'.2	03'.9	10'.4	
130° 34'.1	13'.3	11° 53'.5 S	10'.5	
145° 06'.4	13'.3	43'.0	10'.4	55'.8
159° 38'.7	13'.4	32'.6	10'.5	
174° 11'.1	13'.4	22'.1	10'.6	
188° 43'.5	13'.6	11'.5	10'.6	55'.7
203° 16'.1	13'.6	00'.9	10'.6	
217° 48'.7	13'.6	10° 50'.3 S	10'.7	
232° 21'.3	13'.8	39'.6	10'.7	
246° 54'.1	13'.8	28'.9	10'.7	55'.6
261° 26'.9	13'.8	10° 18'.2 S	10'.8	55'.6
275° 59'.7	13'.9	07'.4	10'.8	
290° 32'.6	14'.0	9° 56'.6 S	10'.8	55'.5
305° 05'.6	14'.1	45'.8	10'.9	
319° 38'.7	14'.1	34'.9	10'.9	
334° 11'.8	14'.1	24'.0	10'.9	
348° 44'.9	14'.2	13'.1	10'.9	55'.4
3° 18'.1	14'.3	02'.2	11'.0	
17° 51'.4	14'.3	8° 51'.2 S	11'.0	
32° 24'.7	14'.4	40'.2	11'.1	
46° 58'.1	14'.5	29'.1	11'.0	55'.3
61° 31'.6	14'.5	18'.1	11'.1	
76° 05'.1	14'.5	8° 07'.0 S	11'.1	55'.3
90° 38'.6	14'.6	7° 55'.9 S	11'.2	55'.2
105° 12'.2	14'.6	44'.7	11'.1	
119° 45'.8	14'.7	33'.6	11'.2	
134° 19'.5	14'.8	22'.4	11'.2	
148° 53'.3	14'.7	11'.2	11'.2	
163° 27'.0	14'.9	7° 00'.0 S	11'.3	55'.1
178° 00'.9	14'.9	48'.7	11'.3	
192° 34'.8	14'.9	37'.4	11'.2	
207° 08'.7	14'.9	26'.2	11'.3	
221° 42'.6	15'.0	14'.9	11'.4	55'.0
236° 16'.6	15'.1	03'.5	11'.3	
250° 50'.7	15'.1	5° 52'.2 S	11'.3	55'.0
265° 24'.8	15'.1	40'.9	11'.4	
279° 58'.9	15'.2	29'.5	11'.4	54'.9
294° 33'.1	15'.2	18'.1	11'.4	
309° 07'.3	15'.2	06'.7	11'.4	
323° 41'.5	15'.3	4° 55'.3 S	11'.4	
338° 15'.8	15'.3	43'.9	11'.4	
352° 50'.1	15'.4	32'.5	11'.4	54'.8
7° 24'.5	15'.3	21'.1	11'.5	
21° 58'.8	15'.4	09'.6	11'.4	
36° 33'.2	15'.5	3° 58'.2 S	11'.5	
51° 07'.7	15'.4	46'.7	11'.5	
65° 42'.1	15'.5	3° 35'.2 S	11'.4	54'.7
80° 16'.6	15'.6	23'.8	11'.5	
94° 51'.2	15'.5	12'.3	11'.5	
109° 25'.7	15'.6	00'.8	11'.5	
124° 00'.3	15'.6	2° 49'.3 S	11'.5	
138° 34'.9	15'.6	37'.8	11'.5	
153° 09'.5	15'.7	26'.3	11'.5	54'.6
167° 44'.2	15'.7	14'.8	11'.5	
182° 18'.9	15'.7	03'.3	11'.5	
196° 53'.6	15'.7	1° 51'.8 S	11'.5	
211° 28'.3	15'.7	40'.3	11'.5	
226° 03'.0	15'.8	28'.8	11'.5	54'.5
240° 37'.8	15'.8	1° 17'.3 S	11'.5	54'.5
255° 12'.6	15'.8	05'.8	11'.5	
269° 47'.4	15'.8	0° 54'.3 S	11'.6	
284° 22'.2	15'.8	42'.7	11'.5	
298° 57'.0	15'.8	31'.2	11'.4	
313° 31'.8	15'.9	19'.8	11'.5	
328° 06'.7	15'.9	08'.3	11'.5	54'.4
342° 41'.6	15'.8	0° 03'.2 N	11'.5	
357° 16'.4	15'.9	14'.7	11'.5	
11° 51'.3	15'.9	26'.2	11'.5	
26° 26'.2	15'.9	37'.7	11'.4	
41° 01'.1	15'.9	49'.1	11'.5	
SD	15'.1	15'.0	14'.9	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 3	Moonrise 4	Moonrise 5
N 72°	06:16	07:41	09:14	14:49	14:30	14:13
N 70°	06:11	07:27	08:44	14:34	14:22	14:12
68°	06:07	07:15	08:22	14:22	14:16	14:11
66°	06:03	07:05	08:05	14:12	14:11	14:10
64°	05:59	06:57	07:51	14:03	14:06	14:09
62°	05:56	06:49	07:39	13:56	14:03	14:08
60°	05:53	06:43	07:29	13:49	13:59	14:08
N 58°	05:50	06:37	07:20	13:44	13:56	14:07
56°	05:48	06:32	07:12	13:39	13:54	14:07
54°	05:46	06:28	07:06	13:34	13:51	14:07
52°	05:43	06:24	06:59	13:30	13:49	14:06
50°	05:41	06:20	06:54	13:26	13:47	14:06
45°	05:36	06:11	06:42	13:18	13:42	14:05
N 40°	05:32	06:04	06:32	13:11	13:39	14:04
35°	05:27	05:57	06:23	13:05	13:36	14:04
30°	05:23	05:51	06:16	13:00	13:33	14:03
20°	05:14	05:40	06:03	12:51	13:28	14:03
N 10°	05:04	05:29	05:51	12:43	13:23	14:02
0°	04:54	05:19	05:40	12:36	13:19	14:01
S 10°	04:42	05:07	05:29	12:28	13:15	14:01
20°	04:27	04:54	05:17	12:20	13:11	14:00
30°	04:08	04:38	05:03	12:11	13:06	13:59
35°	03:56	04:28	04:55	12:06	13:03	13:59
40°	03:41	04:17	04:46	12:00	13:00	13:58
45°	03:

2011 November 6, 7, 8 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +1.0		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
6 00	44° 52'.1	162° 25'.0	21° 30'.5 S	254° 43'.0	13° 59'.2 N	12° 24'.0	11° 32'.6 N	202° 46'.2	6° 49'.4 S
01	59° 54'.5	177° 24'.2	31'.2	269° 44'.2	58'.8	27° 26'.8	32'.5	217° 48'.4	49'.5
02	74° 57'.0	192° 23'.4	31'.8	284° 45'.4	58'.4	42° 29'.6	32'.3	232° 50'.6	49'.6
03	89° 59'.5	207° 22'.6	32'.5	299° 46'.6	58'.0	57° 32'.3	32'.2	247° 52'.8	49'.7
04	105° 01'.9	222° 21'.8	33'.2	314° 47'.8	57'.6	72° 35'.1	32'.1	262° 55'.0	49'.8
Sunday 05	120° 04'.4	237° 21'.0	33'.9	329° 49'.0	57'.2	87° 37'.9	32'.0	277° 57'.2	49'.9
06	135° 06'.9	252° 20'.2	34'.5	344° 50'.2	56'.8	102° 40'.7	31'.9	292° 59'.4	50'.0
07	150° 09'.3	267° 19'.4	35'.2	359° 51'.4	56'.4	117° 43'.5	31'.8	308° 01'.6	50'.1
08	165° 11'.8	282° 18'.6	35'.9	14° 52'.6	56'.0	132° 46'.3	31'.7	323° 03'.8	50'.2
09	180° 14'.2	297° 17'.8	36'.5	29° 53'.8	55'.6	147° 49'.0	31'.6	338° 05'.9	50'.3
10	195° 16'.7	312° 17'.0	37'.2	44° 55'.0	55'.2	162° 51'.8	31'.5	353° 08'.1	50'.4
11	210° 19'.2	327° 16'.2	37'.9	59° 56'.2	54'.7	177° 54'.6	31'.4	8° 10'.3	50'.5
12	225° 21'.6	342° 15'.4	21° 38'.5 S	74° 57'.4	13° 54'.3 N	192° 57'.4	11° 31'.3 N	23° 12'.5	6° 50'.6 S
13	240° 24'.1	357° 14'.6	39'.2	89° 58'.6	53'.9	208° 00'.2	31'.2	38° 14'.7	50'.7
14	255° 26'.6	12° 13'.8	39'.9	104° 59'.8	53'.5	223° 02'.9	31'.1	53° 16'.9	50'.8
15	270° 29'.0	27° 13'.0	40'.5	120° 01'.0	53'.1	238° 05'.7	31'.0	68° 19'.1	50'.9
16	285° 31'.5	42° 12'.2	41'.2	135° 02'.2	52'.7	253° 08'.5	30'.9	83° 21'.3	51'.0
17	300° 34'.0	57° 11'.4	41'.8	150° 03'.4	52'.3	268° 11'.3	30'.8	98° 23'.5	51'.2
18	315° 36'.4	72° 10'.5	42'.5	165° 04'.6	51'.9	283° 14'.1	30'.7	113° 25'.6	51'.3
19	330° 38'.9	87° 09'.7	43'.2	180° 05'.8	51'.5	298° 16'.9	30'.6	128° 27'.8	51'.4
20	345° 41'.4	102° 08'.9	43'.8	195° 07'.0	51'.1	313° 19'.6	30'.4	143° 30'.0	51'.5
21	0° 43'.8	117° 08'.1	44'.5	210° 08'.2	50'.7	328° 22'.4	30'.3	158° 32'.2	51'.6
22	15° 46'.3	132° 07'.3	45'.1	225° 09'.4	50'.3	343° 25'.2	30'.2	173° 34'.4	51'.7
23	30° 48'.7	147° 06'.5	45'.8	240° 10'.6	49'.9	358° 28'.0	30'.1	188° 36'.6	51'.8
7 00	45° 51'.2	162° 05'.7	21° 46'.4 S	255° 11'.8	13° 49'.5 N	13° 30'.8	11° 30'.0 N	203° 38'.8	6° 51'.9 S
01	60° 53'.7	177° 04'.9	47'.1	270° 13'.0	49'.1	28° 33'.6	29'.9	218° 41'.0	52'.0
02	75° 56'.1	192° 04'.1	47'.7	285° 14'.2	48'.7	43° 36'.3	29'.8	233° 43'.2	52'.1
03	90° 58'.6	207° 03'.3	48'.4	300° 15'.4	48'.3	58° 39'.1	29'.7	248° 45'.4	52'.2
04	106° 01'.1	222° 02'.5	49'.0	315° 16'.6	47'.9	73° 41'.9	29'.6	263° 47'.5	52'.3
Monday 05	121° 03'.5	237° 01'.7	49'.7	330° 17'.8	47'.4	88° 44'.7	29'.5	278° 49'.7	52'.4
06	136° 06'.0	252° 00'.8	50'.3	345° 19'.0	47'.0	103° 47'.5	29'.4	293° 51'.9	52'.5
07	151° 08'.5	267° 00'.0	51'.0	0° 20'.2	46'.6	118° 50'.2	29'.3	308° 54'.1	52'.6
08	166° 10'.9	281° 59'.2	51'.6	15° 21'.4	46'.2	133° 53'.0	29'.2	323° 56'.3	52'.7
09	181° 13'.4	296° 58'.4	52'.3	30° 22'.6	45'.8	148° 55'.8	29'.1	338° 58'.5	52'.8
10	196° 15'.9	311° 57'.6	52'.9	45° 23'.8	45'.4	163° 58'.6	29'.0	354° 00'.7	52'.9
11	211° 18'.3	326° 56'.8	53'.5	60° 25'.0	45'.0	179° 01'.4	28'.9	9° 02'.9	53'.0
12	226° 20'.8	341° 56'.0	21° 54'.2 S	75° 26'.2	13° 44'.6 N	194° 04'.1	11° 28'.8 N	24° 05'.1	6° 53'.1 S
13	241° 23'.2	356° 55'.2	54'.8	90° 27'.4	44'.2	209° 06'.9	28'.7	39° 07'.3	53'.2
14	256° 25'.7	11° 54'.3	55'.5	105° 28'.7	43'.8	224° 09'.7	28'.6	54° 09'.4	53'.3
15	271° 28'.2	26° 53'.5	56'.1	120° 29'.9	43'.4	239° 12'.5	28'.5	69° 11'.6	53'.4
16	286° 30'.6	41° 52'.7	56'.7	135° 31'.1	43'.0	254° 15'.3	28'.4	84° 13'.8	53'.5
17	301° 33'.1	56° 51'.9	57'.4	150° 32'.3	42'.6	269° 18'.0	28'.2	99° 16'.0	53'.7
18	316° 35'.6	71° 51'.1	58'.0	165° 33'.5	42'.2	284° 20'.8	28'.1	114° 18'.2	53'.8
19	331° 38'.0	86° 50'.3	58'.6	180° 34'.7	41'.8	299° 23'.6	28'.0	129° 20'.4	53'.9
20	346° 40'.5	101° 49'.4	59'.3	195° 35'.9	41'.4	314° 26'.4	27'.9	144° 22'.6	54'.0
21	1° 43'.0	116° 48'.6	59'.9	210° 37'.1	41'.0	329° 29'.2	27'.8	159° 24'.8	54'.1
22	16° 45'.4	131° 47'.8	22° 00'.5 S	225° 38'.3	40'.6	344° 31'.9	27'.7	174° 27'.0	54'.2
23	31° 47'.9	146° 47'.0	01'.2	240° 39'.5	40'.2	359° 34'.7	27'.6	189° 29'.2	54'.3
8 00	46° 50'.3	161° 46'.2	22° 01'.8 S	255° 40'.7	13° 39'.7 N	14° 37'.5	11° 27'.5 N	204° 31'.3	6° 54'.4 S
01	61° 52'.8	176° 45'.3	02'.4	270° 42'.0	39'.3	29° 40'.3	27'.4	219° 33'.5	54'.5
02	76° 55'.3	191° 44'.5	03'.0	285° 43'.2	38'.9	44° 43'.1	27'.3	234° 35'.7	54'.6
03	91° 57'.7	206° 43'.7	03'.7	300° 44'.4	38'.5	59° 45'.8	27'.2	249° 37'.9	54'.7
04	107° 00'.2	221° 42'.9	04'.3	315° 45'.6	38'.1	74° 48'.6	27'.1	264° 40'.1	54'.8
Tuesday 05	122° 02'.7	236° 42'.1	04'.9	330° 46'.8	37'.7	89° 51'.4	27'.0	279° 42'.3	54'.9
06	137° 05'.1	251° 41'.2	05'.5	345° 48'.0	37'.3	104° 54'.2	26'.9	294° 44'.5	55'.0
07	152° 07'.6	266° 40'.4	06'.1	0° 49'.2	36'.9	119° 56'.9	26'.8	309° 46'.7	55'.1
08	167° 10'.1	281° 39'.6	06'.8	15° 50'.4	36'.5	134° 59'.7	26'.7	324° 48'.9	55'.2
09	182° 12'.5	296° 38'.8	07'.4	30° 51'.7	36'.1	150° 02'.5	26'.6	339° 51'.1	55'.3
10	197° 15'.0	311° 37'.9	08'.0	45° 52'.9	35'.7	165° 05'.3	26'.5	354° 53'.3	55'.4
11	212° 17'.5	326° 37'.1	08'.6	60° 54'.1	35'.3	180° 08'.1	26'.4	9° 55'.4	55'.5
12	227° 19'.9	341° 36'.3	22° 09'.2 S	75° 55'.3	13° 34'.9 N	195° 10'.8	11° 26'.3 N	24° 57'.6	6° 55'.6 S
13	242° 22'.4	356° 35'.5	09'.8	90° 56'.5	34'.5	210° 13'.6	26'.2	39° 59'.8	55'.7
14	257° 24'.8	11° 34'.6	10'.4	105° 57'.7	34'.1	225° 16'.4	26'.1	55° 02'.0	55'.8
15	272° 27'.3	26° 33'.8	11'.0	120° 58'.9	33'.7	240° 19'.2	26'.0	70° 04'.2	55'.9
16	287° 29'.8	41° 33'.0	11'.7	136° 00'.2	33'.3	255° 21'.9	25'.9	85° 06'.4	56'.0
17	302° 32'.2	56° 32'.2	12'.3	151° 01'.4	32'.9	270° 24'.7	25'.8	100° 08'.6	56'.1
18	317° 34'.7	71° 31'.3	12'.9	166° 02'.6	32'.5	285° 27'.5	25'.6	115° 10'.8	56'.2
19	332° 37'.2	86° 30'.5	13'.5	181° 03'.8	32'.1	300° 30'.3	25'.5	130° 13'.0	56'.3
20	347° 39'.6	101° 29'.7	14'.1	196° 05'.0	31'.7	315° 33'.1	25'.4	145° 15'.2	56'.4
21	2° 42'.1	116° 28'.8	14'.7	211° 06'.2	31'.2	330° 35'.8	25'.3	160° 17'.4	56'.5
22	17° 44'.6	131° 28'.0	15'.3	226° 07'.5	30'.8	345° 38'.6	25'.2	175° 19'.6	56'.6
23	32° 47'.0	146° 27'.2	15'.9	241° 08'.7	30'.4	0° 41'.4	25'.1	190° 21'.7	56'.7
	M.P. 20:53	v -0'.8	d 0'.6	v 1'.2	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.3 S
Achernar	335° 27'.0	57° 10'.6 S
Acrux	173° 11'.2	63° 09'.7 S
Adhara	255° 13'.2	28° 59'.2 S
Aldebaran	290° 50'.4	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.5 N
Alkaid	153° 00'.2	49° 15'.2 N
Alnair	27° 45'.0	46° 54'.3 S
Alnilam	275° 47'.3	1° 11'.6 S
Alphard	217° 57'.3	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.6 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.4	69° 03'.0 S
Avior	234° 18'.4	59° 32'.6 S
Bellatrix	278° 33'.0	6° 21'.6 N
Betelgeuse	271° 02'.3	7° 24'.5 N
Canopus	263° 56'.3	52° 41'.9 S
Capella	280° 35'.8	46° 00'.5 N
Deneb	49° 32'.3	45° 19'.8 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 56'.7	17° 55'.2 S
Dubhe	193° 53'.4	61° 40'.9 N
Elnath	278° 13'.8	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.7	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.4 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.6 S
Miaplacidus	221° 40'.0	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.2 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.1	56° 41'.9 S
Polaris	317° 53'.3	89° 19'.0 N
Pollux	243° 29'.0	27° 59'.7 N
Procyon	245° 00'.8	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.8	11° 54'.5 N
Rigel	281° 12'.9	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.4 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.5	16° 43'.9 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	116° 14'.5	13:12
Mars	209° 20'.6	06:59
Jupiter	327° 39'.6	23:02
Saturn	157° 47'.6	10:24

SUN				
GHA		Dec		
184° 06'.0	15° 48'.3 S	55° 36'.0	16'.0	1° 00'.6 N
199° 05'.9	49'.1	70° 11'.0	15'.9	12'.0
214° 05'.9	49'.8	84° 45'.9	15'.9	23'.5
229° 05'.9	50'.6	99° 20'.8	16'.0	34'.9
244° 05'.9	51'.4	113° 55'.8	15'.9	46'.3
259° 05'.9	52'.1	128° 30'.7	16'.0	57'.7
274° 05'.8	52'.9	143° 05'.7	15'.9	2° 09'.1 N
289° 05'.8	53'.6	157° 40'.6	16'.0	20'.5
304° 05'.8	54'.4	172° 15'.6	15'.9	31'.9
319° 05'.8	55'.1	186° 50'.5	16'.0	43'.2
334° 05'.7	55'.9	201° 25'.5	15'.9	54'.6
349° 05'.7	56'.6	216° 00'.4	16'.0	3° 05'.9 N
4° 05'.7	15° 57'.4 S	230° 35'.4	15'.9	3° 17'.2 N
19° 05'.7	58'.1	245° 10'.3	16'.0	28'.5
34° 05'.6	58'.9	259° 45'.3	15'.9	39'.8
49° 05'.6	59'.6	274° 20'.2	15'.9	51'.1
64° 05'.6	16° 00'.4 S	288° 55'.1	15'.9	4° 02'.3 N
79° 05'.6	01'.1	303° 30'.0	16'.0	13'.5
94° 05'.5	01'.9	318° 05'.0	15'.9	24'.7
109° 05'.5	02'.6	332° 39'.9	15'.9	35'.9
124° 05'.5	03'.3	347° 14'.8	15'.9	47'.1
139° 05'.5	04'.1	1° 49'.7	15'.9	58'.2
154° 05'.4	04'.8	16° 24'.6	15'.8	5° 09'.4 N
169° 05'.4	05'.6	30° 59'.4	15'.9	20'.5
184° 05'.4	16° 06'.3 S	45° 34'.3	15'.9	5° 31'.6 N
199° 05'.4	07'.1	60° 09'.2	15'.8	42'.6
214° 05'.3	07'.8	74° 44'.0	15'.8	53'.6
229° 05'.3	08'.6	89° 18'.8	15'.8	6° 04'.7 N
244° 05'.3	09'.3	103° 53'.6	15'.8	15'.6
259° 05'.2	10'.0	118° 28'.4	15'.8	26'.6
274° 05'.2	10'.8	133° 03'.2	15'.8	37'.5
289° 05'.2	11'.5	147° 38'.0	15'.7	48'.4
304° 05'.1	12'.3	162° 12'.7	15'.7	59'.3
319° 05'.1	13'.0	176° 47'.4	15'.7	7° 10'.1 N
334° 05'.1	13'.7	191° 22'.1	15'.7	21'.0
349° 05'.1	14'.5	205° 56'.8	15'.7	31'.8
4° 05'.0	16° 15'.2 S	220° 31'.5	15'.6	7° 42'.5 N
19° 05'.0	16'.0	235° 06'.1	15'.7	53'.2
34° 05'.0	16'.7	249° 40'.8	15'.6	8° 03'.9 N
49° 04'.9	17'.4	264° 15'.4	15'.5	14'.6
64° 04'.9	18'.2	278° 49'.9	15'.6	25'.2
79° 04'.9	18'.9	293° 24'.5	15'.5	35'.8
94° 04'.8	19'.6	307° 59'.0	15'.5	46'.4
109° 04'.8	20'.4	322° 33'.5	15'.5	56'.9
124° 04'.7	21'.1	337° 08'.0	15'.5	9° 07'.4 N
139° 04'.7	21'.8	351° 42'.5	15'.4	17'.9
154° 04'.7	22'.6	6° 16'.9	15'.4	28'.3
169° 04'.6	23'.3	20° 51'.3	15'.4	38'.7
184° 04'.6	16° 24'.0 S	35° 25'.7	15'.3	9° 49'.0 N
199° 04'.6	24'.8	50° 00'.0	15'.3	59'.3
214° 04'.5	25'.5	64° 34'.3	15'.3	10° 09'.6 N
229° 04'.5	26'.2	79° 08'.6	15'.2	19'.8
244° 04'.5	27'.0	93° 42'.8	15'.3	30'.0
259° 04'.4	27'.7	108° 17'.1	15'.1	40'.1
274° 04'.4	28'.4	122° 51'.2	15'.2	50'.2
289° 04'.3	29'.2	137° 25'.4	15'.1	11° 00'.3 N
304° 04'.3	29'.9	151° 59'.5	15'.1	10'.3
319° 04'.3	30'.6	166° 33'.6	15'.1	20'.2
334° 04'.2	31'.3	181° 07'.7	15'.0	30'.2
349° 04'.2	32'.1	195° 41'.7	15'.0	40'.0
4° 04'.1	16° 32'.8 S	210° 15'.7	14'.9	11° 49'.9 N
19° 04'.1	33'.5	224° 49'.6	14'.9	59'.7
34° 04'.1	34'.2	239° 23'.5	14'.9	12° 09'.4 N
49° 04'.0	35'.0	253° 57'.4	14'.8	19'.1
64° 04'.0	35'.7	268° 31'.2	14'.8	28'.7
79° 03'.9	36'.4	283° 05'.0	14'.8	38'.3
94° 03'.9	37'.1	297° 38'.8	14'.7	47'.8
109° 03'.8	37'.9	312° 12'.5	14'.7	57'.3
124° 03'.8	38'.6	326° 46'.2	14'.6	13° 06'.8 N
139° 03'.8	39'.3	341° 19'.8	14'.6	16'.1
154° 03'.7	40'.0	355° 53'.4	14'.6	25'.5
169° 03'.7	40'.8	10° 27'.0	14'.5	34'.8
SD 16'.1	d 0'.7	SD	14'.8	14'.7

MOON				
GHA	v	Dec	d	HP
55° 36'.0	16'.0	1° 00'.6 N	11'.4	54'.4
70° 11'.0	15'.9	12'.0	11'.5	54'.3
84° 45'.9	15'.9	23'.5	11'.4	
99° 20'.8	16'.0	34'.9	11'.4	
113° 55'.8	15'.9	46'.3	11'.4	
128° 30'.7	16'.0	57'.7	11'.4	
143° 05'.7	15'.9	2° 09'.1 N	11'.4	
157° 40'.6	16'.0	20'.5	11'.4	
172° 15'.6	15'.9	31'.9	11'.3	
186° 50'.5	16'.0	43'.2	11'.4	
201° 25'.5	15'.9	54'.6	11'.3	54'.2
216° 00'.4	16'.0	3° 05'.9 N	11'.3	
230° 35'.4	15'.9	3° 17'.2 N	11'.3	54'.2
245° 10'.3	16'.0	28'.5	11'.3	
259° 45'.3	15'.9	39'.8	11'.3	
274° 20'.2	15'.9	51'.1	11'.2	
288° 55'.1	15'.9	4° 02'.3 N	11'.2	
303° 30'.0	16'.0	13'.5	11'.2	
318° 05'.0	15'.9	24'.7	11'.2	
332° 39'.9	15'.9	35'.9	11'.2	
347° 14'.8	15'.9	47'.1	11'.1	54'.1
1° 49'.7	15'.9	58'.2	11'.2	
16° 24'.6	15'.8	5° 09'.4 N	11'.1	
30° 59'.4	15'.9	20'.5	11'.1	
45° 34'.3	15'.9	5° 31'.6 N	11'.0	54'.1
60° 09'.2	15'.8	42'.6	11'.0	
74° 44'.0	15'.8	53'.6	11'.1	
89° 18'.8	15'.8	6° 04'.7 N	10'.9	
103° 53'.6	15'.8	15'.6	11'.0	
118° 28'.4	15'.8	26'.6	10'.9	
133° 03'.2	15'.8	37'.5	10'.9	
147° 38'.0	15'.7	48'.4	10'.9	
162° 12'.7	15'.7	59'.3	10'.8	
176° 47'.4	15'.7	7° 10'.1 N	10'.9	
191° 22'.1	15'.7	21'.0	10'.8	
205° 56'.8	15'.7	31'.8	10'.7	54'.0
220° 31'.5	15'.6	7° 42'.5 N	10'.7	54'.0
235° 06'.1	15'.7	53'.2	10'.7	
249° 40'.8	15'.6	8° 03'.9 N	10'.7	
264° 15'.4	15'.5	14'.6	10'.6	
278° 49'.9	15'.6	25'.2	10'.6	
293° 24'.5	15'.5	35'.8	10'.6	
307° 59'.0	15'.5	46'.4	10'.5	
322° 33'.5	15'.5	56'.9	10'.5	
337° 08'.0	15'.5	9° 07'.4 N	10'.5	
351° 42'.5	15'.4	17'.9	10'.4	
6° 16'.9	15'.4	28'.3	10'.4	
20° 51'.3	15'.4	38'.7	10'.3	
35° 25'.7	15'.3	9° 49'.0 N	10'.3	54'.0
50° 00'.0	15'.3	59'.3	10'.3	
64° 34'.3	15'.3	10° 09'.6 N	10'.2	
79° 08'.6	15'.2	19'.8	10'.2	
93° 42'.8	15'.3	30'.0	10'.1	
108° 17'.1	15'.1	40'.1	10'.1	
122° 51'.2	15'.2	50'.2	10'.1	
137° 25'.4	15'.1	11° 00'.3 N	10'.0	
151° 59'.5	15'.1	10'.3	9'.9	
166° 33'.6	15'.1	20'.2	10'.0	
181° 07'.7	15'.0	30'.2	9'.8	
195° 41'.7	15'.0	40'.0	9'.9	
210° 15'.7	14'.9	11° 49'.9 N	9'.8	54'.0
224° 49'.6	14'.9	59'.7	9'.7	
239° 23'.5	14'.9	12° 09'.4 N	9'.7	
253° 57'.4	14'.8	19'.1	9'.6	
268° 31'.2	14'.8	28'.7	9'.6	
283° 05'.0	14'.8	38'.3	9'.5	
297° 38'.8	14'.7	47'.8	9'.5	
312° 12'.5	14'.7	57'.3	9'.5	
326° 46'.2	14'.6	13° 06'.8 N	9'.3	
341° 19'.8	14'.6	16'.1	9'.4	
355° 53'.4	14'.6	25'.5	9'.3	
10° 27'.0	14'.5	34'.8	9'.2	
SD	14'.8	14'.7	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 6	Moonrise 7	Moonrise 8
N 72°	06:28	07:55	09:35	13:57	13:39	13:19
N 70°	06:22	07:38	09:00	14:02	13:51	13:39
68°	06:16	07:25	08:35	14:05	14:00	13:55
66°	06:11	07:14	08:16	14:09	14:08	14:08
64°	06:07	07:05	08:00	14:12	14:15	14:19
62°	06:03	06:57	07:47	14:14	14:20	14:28
60°	06:00	06:50	07:37	14:16	14:25	14:36
N 58°	05:56	06:44	07:27	14:18	14:30	14:43
56°	05:54	06:38	07:19	14:20	14:34	14:49
54°	05:51	06:33	07:11	14:22	14:37	14:55
52°	05:48	06:29	07:05	14:23	14:41	15:00
50°	05:46	06:24	06:59	14:24	14:44	15:04
45°	05:40	06:15	06:46	14:27	14:50	15:14
N 40°	05:35	06:07	06:35	14:30	14:55	15:23
35°	05:30	06:00	06:26	14:32	15:00	15:30
30°	05:25	05:53	06:18	14:34	15:04	15:36
20°	05:15	05:41	06:04	14:37	15:12	15:48
N 10°	05:05	05:30	05:52	14:40	15:18	15:57
0°	04:54	05:19	05:40	14:43	15:24	16:06
S 10°	04:41	05:06	05:28	14:45	15:30	16:16
20°	04:25	04:53	05:16	14:48	15:37	16:26
30°	04:05	04:36	05:01	14:52	15:44	16:37
35°	03:52	04:25	04:52	14:54	15:48	16:44
40°	03:37	04:13	04:43	14:56	15:53	16:51
45°	03:17	03:58	04:31	14:59	15:59	17:00
S 50°	02:52	03:40	04:17	15:02	16:06	17:11
52°	02:39	03:31	04:10	15:03	16:09	17:16
54°	02:24	03:21	04:03	15:05	16:13	17:21
56°	02:05	03:09	03:55	15:07	16:17	17:27
58°	01:41	02:56	03:46	15:08	16:21	17:34
S 60°	01:08	02:40	03:35	15:11	16:26	17:42
S 62°	-	02:20	03:23	15:13	16:32	17:51

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 6	Moonset 7	Moonset 8
N 72°	13:51	15:31	16:58	02:40	04:24	06:12
N 70°	14:26	15:48	17:04	02:38	04:14	05:54
68°	14:51	16:01	17:10	02:36	04:07	05:39
66°	15:11	16:12	17:15	02:34	04:01	05:28
64°	15:26	16:21	17:19	02:33	03:55	05:18
62°	15:39	16:29	17:23	02:32	03:51	05:10
60°	15:50	16:36	17:27	02:31	03:47	05:02
N 58°	15:59	16:43	17:30	02:31	03:43	04:56
56°	16:08	16:48	17:33	02:30	03:40	04:51
54°	16:15	16:53	17:36

2011 November 9, 10, 11 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +1.0		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
9 00	47° 49'.5	161° 26'.4	22° 16'.5 S	256° 09'.9	13° 30'.0 N	15° 44'.2	11° 25'.0 N	205° 23'.9	6° 56'.9 S
01	62° 51'.9	176° 25'.5	17'.1	271° 11'.1	29'.6	30° 46'.9	24'.9	220° 26'.1	57'.0
02	77° 54'.4	191° 24'.7	17'.7	286° 12'.3	29'.2	45° 49'.7	24'.8	235° 28'.3	57'.1
03	92° 56'.9	206° 23'.9	18'.3	301° 13'.6	28'.8	60° 52'.5	24'.7	250° 30'.5	57'.2
04	107° 59'.3	221° 23'.0	18'.9	316° 14'.8	28'.4	75° 55'.3	24'.6	265° 32'.7	57'.3
05	123° 01'.8	236° 22'.2	19'.5	331° 16'.0	28'.0	90° 58'.0	24'.5	280° 34'.9	57'.4
06	138° 04'.3	251° 21'.4	20'.1	346° 17'.2	27'.6	106° 00'.8	24'.4	295° 37'.1	57'.5
07	153° 06'.7	266° 20'.5	20'.7	1° 18'.4	27'.2	121° 03'.6	24'.3	310° 39'.3	57'.6
08	168° 09'.2	281° 19'.7	21'.3	16° 19'.7	26'.8	136° 06'.4	24'.2	325° 41'.5	57'.7
09	183° 11'.7	296° 18'.9	21'.8	31° 20'.9	26'.4	151° 09'.1	24'.1	340° 43'.7	57'.8
10	198° 14'.1	311° 18'.0	22'.4	46° 22'.1	26'.0	166° 11'.9	24'.0	355° 45'.9	57'.9
11	213° 16'.6	326° 17'.2	23'.0	61° 23'.3	25'.6	181° 14'.7	23'.9	10° 48'.1	58'.0
12	228° 19'.1	341° 16'.4	22° 23'.6 S	76° 24'.6	13° 25'.2 N	196° 17'.5	11° 23'.8 N	25° 50'.2	6° 58'.1 S
13	243° 21'.5	356° 15'.5	24'.2	91° 25'.8	24'.8	211° 20'.2	23'.7	40° 52'.4	58'.2
14	258° 24'.0	11° 14'.7	24'.8	106° 27'.0	24'.4	226° 23'.0	23'.6	55° 54'.6	58'.3
15	273° 26'.4	26° 13'.8	25'.4	121° 28'.2	24'.0	241° 25'.8	23'.5	70° 56'.8	58'.4
16	288° 28'.9	41° 13'.0	25'.9	136° 29'.4	23'.6	256° 28'.6	23'.4	85° 59'.0	58'.5
17	303° 31'.4	56° 12'.2	26'.5	151° 30'.7	23'.2	271° 31'.3	23'.3	101° 01'.2	58'.6
18	318° 33'.8	71° 11'.3	27'.1	166° 31'.9	22'.8	286° 34'.1	23'.2	116° 03'.4	58'.7
19	333° 36'.3	86° 10'.5	27'.7	181° 33'.1	22'.4	301° 36'.9	23'.1	131° 05'.6	58'.8
20	348° 38'.8	101° 09'.6	28'.3	196° 34'.3	22'.0	316° 39'.7	23'.0	146° 07'.8	58'.9
21	3° 41'.2	116° 08'.8	28'.8	211° 35'.6	21'.5	331° 42'.4	22'.9	161° 10'.0	59'.0
22	18° 43'.7	131° 08'.0	29'.4	226° 36'.8	21'.1	346° 45'.2	22'.8	176° 12'.2	59'.1
23	33° 46'.2	146° 07'.1	30'.0	241° 38'.0	20'.7	1° 48'.0	22'.7	191° 14'.4	59'.2
10 00	48° 48'.6	161° 06'.3	22° 30'.6 S	256° 39'.3	13° 20'.3 N	16° 50'.8	11° 22'.6 N	206° 16'.6	6° 59'.3 S
01	63° 51'.1	176° 05'.4	31'.1	271° 40'.5	19'.9	31° 53'.5	22'.5	221° 18'.7	59'.4
02	78° 53'.6	191° 04'.6	31'.7	286° 41'.7	19'.5	46° 56'.3	22'.4	236° 20'.9	59'.5
03	93° 56'.0	206° 03'.8	32'.3	301° 42'.9	19'.1	61° 59'.1	22'.3	251° 23'.1	59'.6
04	108° 58'.5	221° 02'.9	32'.8	316° 44'.2	18'.7	77° 01'.9	22'.2	266° 25'.3	59'.7
05	124° 00'.9	236° 02'.1	33'.4	331° 45'.4	18'.3	92° 04'.6	22'.1	281° 27'.5	59'.8
06	139° 03'.4	251° 01'.2	34'.0	346° 46'.6	17'.9	107° 07'.4	22'.0	296° 29'.7	59'.9
07	154° 05'.9	266° 00'.4	34'.5	1° 47'.9	17'.5	122° 10'.2	21'.9	311° 31'.9	7° 00'.0 S
08	169° 08'.3	280° 59'.5	35'.1	16° 49'.1	17'.1	137° 12'.9	21'.8	326° 34'.1	00'.1
09	184° 10'.8	295° 58'.7	35'.7	31° 50'.3	16'.7	152° 15'.7	21'.7	341° 36'.3	00'.2
10	199° 13'.3	310° 57'.8	36'.2	46° 51'.5	16'.3	167° 18'.5	21'.5	356° 38'.5	00'.3
11	214° 15'.7	325° 57'.0	36'.8	61° 52'.8	15'.9	182° 21'.3	21'.4	11° 40'.7	00'.4
12	229° 18'.2	340° 56'.1	22° 37'.4 S	76° 54'.0	13° 15'.5 N	197° 24'.0	11° 21'.3 N	26° 42'.9	7° 00'.5 S
13	244° 20'.7	355° 55'.3	37'.9	91° 55'.2	15'.1	212° 26'.8	21'.2	41° 45'.1	00'.6
14	259° 23'.1	10° 54'.5	38'.5	106° 56'.5	14'.7	227° 29'.6	21'.1	56° 47'.3	00'.7
15	274° 25'.6	25° 53'.6	39'.0	121° 57'.7	14'.3	242° 32'.3	21'.0	71° 49'.5	00'.8
16	289° 28'.0	40° 52'.8	39'.6	136° 58'.9	13'.9	257° 35'.1	20'.9	86° 51'.6	00'.9
17	304° 30'.5	55° 51'.9	40'.1	152° 00'.2	13'.5	272° 37'.9	20'.8	101° 53'.8	01'.0
18	319° 33'.0	70° 51'.1	40'.7	167° 01'.4	13'.1	287° 40'.7	20'.7	116° 56'.0	01'.1
19	334° 35'.4	85° 50'.2	41'.3	182° 02'.6	12'.7	302° 43'.4	20'.6	131° 58'.2	01'.3
20	349° 37'.9	100° 49'.4	41'.8	197° 03'.9	12'.3	317° 46'.2	20'.5	147° 00'.4	01'.4
21	4° 40'.4	115° 48'.5	42'.4	212° 05'.1	11'.9	332° 49'.0	20'.4	162° 02'.6	01'.5
22	19° 42'.8	130° 47'.7	42'.9	227° 06'.3	11'.5	347° 51'.7	20'.3	177° 04'.8	01'.6
23	34° 45'.3	145° 46'.8	43'.4	242° 07'.6	11'.1	2° 54'.5	20'.2	192° 07'.0	01'.7
11 00	49° 47'.8	160° 46'.0	22° 44'.0 S	257° 08'.8	13° 10'.7 N	17° 57'.3	11° 20'.1 N	207° 09'.2	7° 01'.8 S
01	64° 50'.2	175° 45'.1	44'.5	272° 10'.0	10'.3	33° 00'.1	20'.0	222° 11'.4	01'.9
02	79° 52'.7	190° 44'.2	45'.1	287° 11'.3	09'.9	48° 02'.8	19'.9	237° 13'.6	02'.0
03	94° 55'.2	205° 43'.4	45'.6	302° 12'.5	09'.4	63° 05'.6	19'.8	252° 15'.8	02'.1
04	109° 57'.6	220° 42'.5	46'.2	317° 13'.8	09'.0	78° 08'.4	19'.7	267° 18'.0	02'.2
05	125° 00'.1	235° 41'.7	46'.7	332° 15'.0	08'.6	93° 11'.1	19'.6	282° 20'.2	02'.3
06	140° 02'.5	250° 40'.8	47'.3	347° 16'.2	08'.2	108° 13'.9	19'.5	297° 22'.4	02'.4
07	155° 05'.0	265° 40'.0	47'.8	2° 17'.5	07'.8	123° 16'.7	19'.4	312° 24'.6	02'.5
08	170° 07'.5	280° 39'.1	48'.3	17° 18'.7	07'.4	138° 19'.4	19'.3	327° 26'.7	02'.6
09	185° 09'.9	295° 38'.3	48'.9	32° 19'.9	07'.0	153° 22'.2	19'.2	342° 28'.9	02'.7
10	200° 12'.4	310° 37'.4	49'.4	47° 21'.2	06'.6	168° 25'.0	19'.1	357° 31'.1	02'.8
11	215° 14'.9	325° 36'.6	49'.9	62° 22'.4	06'.2	183° 27'.7	19'.0	12° 33'.3	02'.9
12	230° 17'.3	340° 35'.7	22° 50'.5 S	77° 23'.7	13° 05'.8 N	198° 30'.5	11° 18'.9 N	27° 35'.5	7° 03'.0 S
13	245° 19'.8	355° 34'.8	51'.0	92° 24'.9	05'.4	213° 33'.3	18'.8	42° 37'.7	03'.1
14	260° 22'.3	10° 34'.0	51'.5	107° 26'.1	05'.0	228° 36'.1	18'.7	57° 39'.9	03'.2
15	275° 24'.7	25° 33'.1	52'.1	122° 27'.4	04'.6	243° 38'.8	18'.6	72° 42'.1	03'.3
16	290° 27'.2	40° 32'.3	52'.6	137° 28'.6	04'.2	258° 41'.6	18'.5	87° 44'.3	03'.4
17	305° 29'.7	55° 31'.4	53'.1	152° 29'.9	03'.8	273° 44'.4	18'.4	102° 46'.5	03'.5
18	320° 32'.1	70° 30'.5	53'.6	167° 31'.1	03'.4	288° 47'.1	18'.3	117° 48'.7	03'.6
19	335° 34'.6	85° 29'.7	54'.2	182° 32'.3	03'.0	303° 49'.9	18'.2	132° 50'.9	03'.7
20	350° 37'.0	100° 28'.8	54'.7	197° 33'.6	02'.6	318° 52'.7	18'.1	147° 53'.1	03'.8
21	5° 39'.5	115° 28'.0	55'.2	212° 34'.8	02'.2	333° 55'.4	18'.0	162° 55'.3	03'.9
22	20° 42'.0	130° 27'.1	55'.7	227° 36'.1	01'.8	348° 58'.2	17'.9	177° 57'.5	04'.0
23	35° 44'.4	145° 26'.2	56'.2	242° 37'.3	01'.4	4° 01'.0	17'.8	192° 59'.7	04'.1
	M.P. 20:41	v -0'.8	d 0'.6	v 1'.2	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.4 S
Achernar	335° 27'.0	57° 10'.6 S
Acrux	173° 11'.2	63° 09'.7 S
Adhara	255° 13'.2	28° 59'.2 S
Aldebaran	290° 50'.4	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.5 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 45'.0	46° 54'.3 S
Alnilam	275° 47'.3	1° 11'.6 S
Alphard	217° 57'.2	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.4	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.3 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.4	59° 32'.6 S
Bellatrix	278° 33'.0	6° 21'.6 N
Betelgeuse	271° 02'.3	7° 24'.5 N
Canopus	263° 56'.3	52° 42'.0 S
Capella	280° 35'.7	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.8 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.3	61° 40'.9 N
Elnath	278° 13'.7	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.7	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.4 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.6 S
Miaplacidus	221° 39'.9	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.2 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.9 S
Polaris	317° 53'.0	89° 19'.0 N
Pollux	243° 29'.0	27° 59'.7 N
Procyon	245° 00'.8	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.8	11° 54'.4 N
Rigel	281° 12'.9	8° 11'.2 S
Rigil Kent	139° 54'.0	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.5	16° 43'.9 S
Spica	158° 32'.8	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	112° 17'.7	13:16
Mars	207° 50'.6	06:53
Jupiter	328° 02'.1	22:48
Saturn	157° 27'.9	10:13

SUN									
GHA	Dec	GHA	v	Dec	d	HP
184° 03'.6	16° 41'.5 S	25° 00'.5	14'.5	13° 44'.0 N	9'.1	54'.0
199° 03'.6	42'.2	39° 34'.0	14'.4	53'.1	9'.2	
214° 03'.5	42'.9	54° 07'.4	14'.4	14° 02'.3 N	9'.0	
229° 03'.5	43'.6	68° 40'.8	14'.4	11'.3	9'.0	
244° 03'.4	44'.4	83° 14'.2	14'.3	20'.3	8'.9	
259° 03'.4	45'.1	97° 47'.5	14'.2	29'.2	8'.9	
274° 03'.3	45'.8	112° 20'.7	14'.3	38'.1	8'.8	
289° 03'.3	46'.5	126° 54'.0	14'.1	46'.9	8'.8	
304° 03'.2	47'.2	141° 27'.1	14'.2	55'.7	8'.7	
319° 03'.2	47'.9	156° 00'.3	14'.0	15° 04'.4 N	8'.6	
334° 03'.1	48'.7	170° 33'.3	14'.1	13'.0	8'.6	
349° 03'.1	49'.4	185° 06'.4	14'.0	21'.6	8'.5	
4° 03'.0	16° 50'.1 S	199° 39'.4	13'.9	15° 30'.1 N	8'.5	54'.0
19° 03'.0	50'.8	214° 12'.3	13'.9	38'.6	8'.3	
34° 02'.9	51'.5	228° 45'.2	13'.9	46'.9	8'.4	
49° 02'.9	52'.2	243° 18'.1	13'.8	55'.3	8'.2	
64° 02'.8	53'.0	257° 50'.9	13'.8	16° 03'.5 N	8'.2	
79° 02'.8	53'.7	272° 23'.7	13'.7	11'.7	8'.1	
94° 02'.7	54'.4	286° 56'.4	13'.6	19'.8	8'.1	54'.1
109° 02'.7	55'.1	301° 29'.0	13'.7	27'.9	7'.9	
124° 02'.6	55'.8	316° 01'.7	13'.5	35'.8	8'.0	
139° 02'.6	56'.5	330° 34'.2	13'.6	43'.8	7'.8	
154° 02'.5	57'.2	345° 06'.8	13'.4	51'.6	7'.8	
169° 02'.5	57'.9	359° 39'.2	13'.5	59'.4	7'.7	
184° 02'.4	16° 58'.6 S	14° 11'.7	13'.3	17° 07'.1 N	7'.6	54'.1
199° 02'.4	59'.3	28° 44'.0	13'.4	14'.7	7'.5	
214° 02'.3	17° 00'.1 S	43° 16'.4	13'.3	22'.2	7'.5	
229° 02'.3	00'.8	57° 48'.7	13'.2	29'.7	7'.4	
244° 02'.2	01'.5	72° 20'.9	13'.2	37'.1	7'.3	
259° 02'.1	02'.2	86° 53'.1	13'.1	44'.4	7'.3	
274° 02'.1	02'.9	101° 25'.2	13'.1	51'.7	7'.2	
289° 02'.0	03'.6	115° 57'.3	13'.0	58'.9	7'.1	
304° 02'.0	04'.3	130° 29'.3	13'.0	18° 06'.0 N	7'.0	
319° 01'.9	05'.0	145° 01'.3	13'.0	13'.0	6'.9	
334° 01'.9	05'.7	159° 33'.3	12'.9	19'.9	6'.9	
349° 01'.8	06'.4	174° 05'.2	12'.8	26'.8	6'.8	54'.2
4° 01'.7	17° 07'.1 S	188° 37'.0	12'.8	18° 33'.6 N	6'.7	54'.2
19° 01'.7	07'.8	203° 08'.8	12'.7	40'.3	6'.6	
34° 01'.6	08'.5	217° 40'.5	12'.7	46'.9	6'.6	
49° 01'.6	09'.2	232° 12'.2	12'.7	53'.5	6'.4	
64° 01'.5	09'.9	246° 43'.9	12'.6	59'.9	6'.4	
79° 01'.4	10'.6	261° 15'.5	12'.5	19° 06'.3 N	6'.3	
94° 01'.4	11'.3	275° 47'.0	12'.5	12'.6	6'.2	
109° 01'.3	12'.0	290° 18'.5	12'.5	18'.8	6'.1	
124° 01'.3	12'.7	304° 50'.0	12'.4	24'.9	6'.0	
139° 01'.2	13'.4	319° 21'.4	12'.4	30'.9	6'.0	
154° 01'.1	14'.1	333° 52'.8	12'.3	36'.9	5'.8	
169° 01'.1	14'.8	348° 24'.1	12'.2	42'.7	5'.8	
184° 01'.0	17° 15'.5 S	2° 55'.3	12'.2	19° 48'.5 N	5'.7	54'.3
199° 00'.9	16'.2	17° 26'.5	12'.2	54'.2	5'.6	
214° 00'.9	16'.9	31° 57'.7	12'.1	59'.8	5'.5	
229° 00'.8	17'.6	46° 28'.8	12'.1	20° 05'.3 N	5'.4	
244° 00'.8	18'.3	60° 59'.9	12'.0	10'.7	5'.3	
259° 00'.7	19'.0	75° 30'.9	12'.0	16'.0	5'.2	
274° 00'.6	19'.7	90° 01'.9	11'.9	21'.2	5'.2	
289° 00'.6	20'.4	104° 32'.8	11'.9	26'.4	5'.0	
304° 00'.5	21'.1	119° 03'.7	11'.9	31'.4	4'.9	
319° 00'.4	21'.8	133° 34'.6	11'.8	36'.3	4'.9	
334° 00'.4	22'.5	148° 05'.4	11'.7	41'.2	4'.8	54'.4
349° 00'.3	23'.1	162° 36'.1	11'.7	46'.0	4'.6	
4° 00'.2	17° 23'.8 S	177° 06'.8	11'.7	20° 50'.6 N	4'.6	54'.4
19° 00'.2	24'.5	191° 37'.5	11'.6	55'.2	4'.5	
34° 00'.1	25'.2	206° 08'.1	11'.6	59'.7	4'.3	
49° 00'.0	25'.9	220° 38'.7	11'.5	21° 04'.0 N	4'.3	
64° 00'.0	26'.6	235° 09'.2	11'.5	08'.3	4'.2	
78° 59'.9	27'.3	249° 39'.7	11'.4	12'.5	4'.0	
93° 59'.8	28'.0	264° 10'.1	11'.5	16'.5	4'.0	
108° 59'.7	28'.7	278° 40'.6	11'.3	20'.5	3'.9	
123° 59'.7	29'.3	293° 10'.9	11'.3	24'.4	3'.8	54'.5
138° 59'.6	30'.0	307° 41'.2	11'.3	28'.2	3'.7	
153° 59'.5	30'.7	322° 11'.5	11'.3	31'.9	3'.5	
168° 59'.5	31'.4	336° 41'.8	11'.2	35'.4	3'.5	
SD 16'.2	d 0'.7	SD	14'.7	14'.8	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 9	Moonrise 10	Moonrise 11
N 72°	06:40	08:09	09:59	12:48	-	-
N 70°	06:32	07:50	09:16	13:23	12:58	-
68°	06:25	07:35	08:48	13:49	13:42	13:32
66°	06:19	07:23	08:27	14:09	14:12	14:19
64°	06:14	07:13	08:10	14:24	14:34	14:50
62°	06:10	07:04	07:56	14:38	14:52	15:13
60°	06:06	06:57	07:44	14:49	15:07	15:32
N 58°	06:02	06:50	07:34	14:59	15:20	15:47
56°	05:59	06:44	07:25	15:08	15:31	16:00
54°	05:56	06:39	07:17	15:15	15:40	16:12
52°	05:53	06:34	07:10	15:22	15:49	16:22
50°	05:50	06:29	07:04	15:28	15:57	16:31
45°	05:44	06:19	06:50	15:42	16:13	16:50
N 40°	05:38	06:10	06:39	15:53	16:27	17:06
35°	05:32	06:03	06:29	16:03	16:39	17:19
30°	05:27	05:56	06:21	16:11	16:49	17:31
20°	05:16	05:43	06:06	16:26	17:07	17:51
N 10°	05:05	05:31	05:53	16:38	17:22	18:08
0°	04:54	05:19	05:40	16:51	17:37	18:25
S 10°	04:40	05:06	05:28	17:03	17:51	18:41
20°	04:24	04:51	05:15	17:16	18:07	18:58
30°	04:03	04:33	04:59	17:31	18:25	19:19
35°	03:49	04:22	04:50	17:39	18:35	19:30
40°	03:33	04:10	04:40	17:49	18:47	19:44
45°	03:12	03:54	04:27	18:01	19:01	20:00
S 50°	02:45	03:35	04:12	18:15	19:19	20:20
52°	02:31	03:25	04:05	18:22	19:27	20:30
54°	02:15	03:14	03:58	18:29	19:36	20:40
56°	01:54	03:02	03:49	18:38	19:47	20:52
58°	01:28	02:47	03:39	18:47	19:59	21:07
S 60°	00:46	02:30	03:27	18:58	20:13	21:23
S 62°	-	02:08	03:14	19:11	20:29	21:43

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 9	Moonset 10	Moonset 11
N 72°	13:27	15:18	16:47	08:14	-	-
N 70°	14:10	15:36	16:55	07:40	09:40	-
68°	14:39	15:51	17:01	07:15	08:56	10:45
66°	15:00	16:03	17:07	06:56	08:27	09:58
64°	15:17	16:14	17:12	06:41	08:05	09:27
62°	15:31	16:22	17:17	06:29	07:48	09:05
60°	15:43	16:30	17:21	06:18	07:34	08:47
N 58°	15:53	16:37	17:25	06:09	07:22	08:31
56°	16:02	16:43	17:28	06:01	07:11	08:19
54°	16:10	16:49	17:31	05:54	07:02	08:07
52°	16:17	16:54	17:34	05:48	06:53	07:57
50°	16:23	16:58	17:37	05:42	06:46	07:49
45°	16:37	17:08	17:44	05:29	06:30	07:30
N 40°	16:48	17:17	17:50	05:19	06:17	07:15
35°	16:58	17:25	17:55	05:10	06:06	07:02
30°	17:07	17:32	18:01	05:03	05:57	06:51
20°	17:22	17:45	18:11	04:50	05:40	06:32
N 10°	17:35	17:57	18:22	04:38	05:26	06:15
0°	17:47	18:09	18:34	04:28	05:12	05:59
S 10°	18:00	18:22	18:48	04:17	04:59	05:44
20°	18:14	18:37	19:04	04:05	04:45	05:27
30°	18:29	18:55	19:26	03:53	04:29	05:08
35°	18:38	19:06	19:39	03:45	04:19	04:57
40°	18:49	19:19	19:56	03:37	04:08	04:45
45°	19:01	19:35	20:16	03:27	03:56	04:30
S 50°	19:16	19:54	20:44	03:15	03:41	04:12
52°	19:24	20:04	20:58	03:09	03:34	04:03
54°	19:31	20:15	21:15	03:03	03:26	03:54
56°	19:40	20:28	21:36	02:56	03:17	03:43
58°	19:50	20:42	22:04	02:49	03:07	03:30
S 60°	20:02	21:00	22:51	02:40	02:55	03:16
S 62°	20:16	21:23	-	02:31	02:42	02:59

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
9	16 15	16 12	11:44	23:01	10:39	14d 98%
10	16 10	16 07	11:44	23:48	11:24	15d Full
11	16 04	16 01	11:44	24:36	12:12	16d Full

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2011 November 12, 13, 14 (Sat, Sun, Monday)

GMT	ARIES	VENUS -3.9		MARS +1.0		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
12 00	50° 46'.9	160° 25'.4	22° 56'.8 S	257° 38'.6	13° 01'.0 N	19° 03'.7	11° 17'.7 N	208° 01'.9	7° 04'.2 S
01	65° 49'.4	175° 24'.5	57'.3	272° 39'.8	00'.6	34° 06'.5	17'.6	223° 04'.1	04'.3
02	80° 51'.8	190° 23'.7	57'.8	287° 41'.1	00'.2	49° 09'.3	17'.5	238° 06'.3	04'.4
03	95° 54'.3	205° 22'.8	58'.3	302° 42'.3	12° 59'.8 N	64° 12'.0	17'.4	253° 08'.4	04'.5
04	110° 56'.8	220° 21'.9	58'.8	317° 43'.5	59'.4	79° 14'.8	17'.3	268° 10'.6	04'.6
05	125° 59'.2	235° 21'.1	59'.3	332° 44'.8	59'.0	94° 17'.6	17'.2	283° 12'.8	04'.7
06	141° 01'.7	250° 20'.2	59'.9	347° 46'.0	58'.6	109° 20'.3	17'.1	298° 15'.0	04'.8
07	156° 04'.2	265° 19'.3	23° 00'.4 S	2° 47'.3	58'.2	124° 23'.1	17'.0	313° 17'.2	04'.9
08	171° 06'.6	280° 18'.5	00'.9	17° 48'.5	57'.8	139° 25'.9	16'.9	328° 19'.4	05'.0
09	186° 09'.1	295° 17'.6	01'.4	32° 49'.8	57'.4	154° 28'.6	16'.8	343° 21'.6	05'.1
10	201° 11'.5	310° 16'.7	01'.9	47° 51'.0	57'.0	169° 31'.4	16'.7	358° 23'.8	05'.2
11	216° 14'.0	325° 15'.9	02'.4	62° 52'.3	56'.6	184° 34'.2	16'.6	13° 26'.0	05'.3
12	231° 16'.5	340° 15'.0	23° 02'.9 S	77° 53'.5	12° 56'.2 N	199° 36'.9	11° 16'.5 N	28° 28'.2	7° 05'.4 S
13	246° 18'.9	355° 14'.1	03'.4	92° 54'.8	55'.8	214° 39'.7	16'.4	43° 30'.4	05'.5
14	261° 21'.4	10° 13'.3	03'.9	107° 56'.0	55'.4	229° 42'.5	16'.3	58° 32'.6	05'.6
15	276° 23'.9	25° 12'.4	04'.4	122° 57'.3	55'.0	244° 45'.2	16'.2	73° 34'.8	05'.7
16	291° 26'.3	40° 11'.5	04'.9	137° 58'.5	54'.6	259° 48'.0	16'.1	88° 37'.0	05'.8
17	306° 28'.8	55° 10'.7	05'.4	152° 59'.8	54'.2	274° 50'.7	16'.0	103° 39'.2	05'.9
18	321° 31'.3	70° 09'.8	05'.9	168° 01'.0	53'.8	289° 53'.5	15'.9	118° 41'.4	06'.0
19	336° 33'.7	85° 08'.9	06'.4	183° 02'.3	53'.4	304° 56'.3	15'.9	133° 43'.6	06'.1
20	351° 36'.2	100° 08'.1	06'.9	198° 03'.5	53'.0	319° 59'.0	15'.8	148° 45'.8	06'.2
21	6° 38'.6	115° 07'.2	07'.4	213° 04'.8	52'.6	335° 01'.8	15'.7	163° 48'.0	06'.3
22	21° 41'.1	130° 06'.3	07'.9	228° 06'.0	52'.2	350° 04'.6	15'.6	178° 50'.2	06'.4
23	36° 43'.6	145° 05'.4	08'.4	243° 07'.3	51'.8	5° 07'.3	15'.5	193° 52'.4	06'.5
13 00	51° 46'.0	160° 04'.6	23° 08'.9 S	258° 08'.5	12° 51'.4 N	20° 10'.1	11° 15'.4 N	208° 54'.6	7° 06'.6 S
01	66° 48'.5	175° 03'.7	09'.4	273° 09'.8	51'.0	35° 12'.9	15'.3	223° 56'.8	06'.7
02	81° 51'.0	190° 02'.8	09'.9	288° 11'.0	50'.6	50° 15'.6	15'.2	238° 59'.0	06'.8
03	96° 53'.4	205° 02'.0	10'.3	303° 12'.3	50'.2	65° 18'.4	15'.1	254° 01'.1	06'.9
04	111° 55'.9	220° 01'.1	10'.8	318° 13'.5	49'.8	80° 21'.1	15'.0	269° 03'.3	07'.0
05	126° 58'.4	235° 00'.2	11'.3	333° 14'.8	49'.4	95° 23'.9	14'.9	284° 05'.5	07'.1
06	142° 00'.8	249° 59'.3	11'.8	348° 16'.0	49'.0	110° 26'.7	14'.8	299° 07'.7	07'.2
07	157° 03'.3	264° 58'.5	12'.3	3° 17'.3	48'.6	125° 29'.4	14'.7	314° 09'.9	07'.3
08	172° 05'.8	279° 57'.6	12'.8	18° 18'.6	48'.2	140° 32'.2	14'.6	329° 12'.1	07'.4
09	187° 08'.2	294° 56'.7	13'.2	33° 19'.8	47'.8	155° 35'.0	14'.5	344° 14'.3	07'.5
10	202° 10'.7	309° 55'.8	13'.7	48° 21'.1	47'.4	170° 37'.7	14'.4	359° 16'.5	07'.6
11	217° 13'.1	324° 55'.0	14'.2	63° 22'.3	47'.0	185° 40'.5	14'.3	14° 18'.7	07'.7
12	232° 15'.6	339° 54'.1	23° 14'.7 S	78° 23'.6	12° 46'.6 N	200° 43'.2	11° 14'.2 N	29° 20'.9	7° 07'.8 S
13	247° 18'.1	354° 53'.2	15'.2	93° 24'.8	46'.1	215° 46'.0	14'.1	44° 23'.1	07'.9
14	262° 20'.5	9° 52'.3	15'.6	108° 26'.1	45'.7	230° 48'.8	14'.0	59° 25'.3	08'.0
15	277° 23'.0	24° 51'.4	16'.1	123° 27'.4	45'.3	245° 51'.5	13'.9	74° 27'.5	08'.1
16	292° 25'.5	39° 50'.6	16'.6	138° 28'.6	44'.9	260° 54'.3	13'.8	89° 29'.7	08'.2
17	307° 27'.9	54° 49'.7	17'.0	153° 29'.9	44'.5	275° 57'.0	13'.7	104° 31'.9	08'.3
18	322° 30'.4	69° 48'.8	17'.5	168° 31'.1	44'.1	290° 59'.8	13'.6	119° 34'.1	08'.4
19	337° 32'.9	84° 47'.9	18'.0	183° 32'.4	43'.7	306° 02'.6	13'.5	134° 36'.3	08'.5
20	352° 35'.3	99° 47'.1	18'.5	198° 33'.7	43'.3	321° 05'.3	13'.4	149° 38'.5	08'.6
21	7° 37'.8	114° 46'.2	18'.9	213° 34'.9	42'.9	336° 08'.1	13'.3	164° 40'.7	08'.7
22	22° 40'.3	129° 45'.3	19'.4	228° 36'.2	42'.5	351° 10'.8	13'.2	179° 42'.9	08'.8
23	37° 42'.7	144° 44'.4	19'.8	243° 37'.4	42'.1	6° 13'.6	13'.1	194° 45'.1	08'.9
14 00	52° 45'.2	159° 43'.5	23° 20'.3 S	258° 38'.7	12° 41'.7 N	21° 16'.4	11° 13'.0 N	209° 47'.3	7° 09'.0 S
01	67° 47'.6	174° 42'.6	20'.8	273° 40'.0	41'.3	36° 19'.1	12'.9	224° 49'.5	09'.1
02	82° 50'.1	189° 41'.8	21'.2	288° 41'.2	40'.9	51° 21'.9	12'.8	239° 51'.7	09'.2
03	97° 52'.6	204° 40'.9	21'.7	303° 42'.5	40'.5	66° 24'.6	12'.7	254° 53'.9	09'.3
04	112° 55'.0	219° 40'.0	22'.2	318° 43'.7	40'.1	81° 27'.4	12'.6	269° 56'.1	09'.4
05	127° 57'.5	234° 39'.1	22'.6	333° 45'.0	39'.7	96° 30'.2	12'.5	284° 58'.3	09'.5
06	143° 00'.0	249° 38'.2	23'.1	348° 46'.3	39'.4	111° 32'.9	12'.4	300° 00'.5	09'.6
07	158° 02'.4	264° 37'.4	23'.5	3° 47'.5	39'.0	126° 35'.7	12'.3	315° 02'.7	09'.7
08	173° 04'.9	279° 36'.5	24'.0	18° 48'.8	38'.6	141° 38'.4	12'.3	330° 04'.9	09'.8
09	188° 07'.4	294° 35'.6	24'.4	33° 50'.1	38'.2	156° 41'.2	12'.2	345° 07'.1	09'.9
10	203° 09'.8	309° 34'.7	24'.9	48° 51'.3	37'.8	171° 44'.0	12'.1	0° 09'.3	10'.0
11	218° 12'.3	324° 33'.8	25'.3	63° 52'.6	37'.4	186° 46'.7	12'.0	15° 11'.5	10'.1
12	233° 14'.8	339° 32'.9	23° 25'.8 S	78° 53'.9	12° 37'.0 N	201° 49'.5	11° 11'.9 N	30° 13'.7	7° 10'.2 S
13	248° 17'.2	354° 32'.0	26'.2	93° 55'.1	36'.6	216° 52'.2	11'.8	45° 15'.9	10'.3
14	263° 19'.7	9° 31'.2	26'.7	108° 56'.4	36'.2	231° 55'.0	11'.7	60° 18'.1	10'.4
15	278° 22'.1	24° 30'.3	27'.1	123° 57'.7	35'.8	246° 57'.7	11'.6	75° 20'.3	10'.5
16	293° 24'.6	39° 29'.4	27'.6	138° 58'.9	35'.4	262° 00'.5	11'.5	90° 22'.5	10'.6
17	308° 27'.1	54° 28'.5	28'.0	154° 00'.2	35'.0	277° 03'.3	11'.4	105° 24'.7	10'.7
18	323° 29'.5	69° 27'.6	28'.4	169° 01'.5	34'.6	292° 06'.0	11'.3	120° 26'.9	10'.8
19	338° 32'.0	84° 26'.7	28'.9	184° 02'.7	34'.2	307° 08'.8	11'.2	135° 29'.0	10'.9
20	353° 34'.5	99° 25'.8	29'.3	199° 04'.0	33'.8	322° 11'.5	11'.1	150° 31'.2	11'.0
21	8° 36'.9	114° 24'.9	29'.8	214° 05'.3	33'.4	337° 14'.3	11'.0	165° 33'.4	11'.1
22	23° 39'.4	129° 24'.1	30'.2	229° 06'.5	33'.0	352° 17'.0	10'.9	180° 35'.6	11'.2
23	38° 41'.9	144° 23'.2	30'.6	244° 07'.8	32'.6	7° 19'.8	10'.8	195° 37'.8	11'.3
	M.P. 20:30	v -0'.9	d 0'.5	v 1'.3	d 0'.4	v 2'.8	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.4 S
Achernar	335° 27'.0	57° 10'.6 S
Acrux	173° 11'.2	63° 09'.7 S
Adhara	255° 13'.2	28° 59'.2 S
Aldebaran	290° 50'.4	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.5 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 45'.0	46° 54'.3 S
Alnilam	275° 47'.2	1° 11'.7 S
Alphard	217° 57'.2	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.3	59° 32'.6 S
Bellatrix	278° 32'.9	6° 21'.6 N
Betelgeuse	271° 02'.3	7° 24'.5 N
Canopus	263° 56'.3	52° 42'.0 S
Capella	280° 35'.7	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.8 N
Denebola	182° 35'.0	14° 30'.3 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.3	61° 40'.9 N
Elnath	278° 13'.7	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.6	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.3 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.6 S
Miaplacidus	221° 39'.9	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.2 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.9 S
Polaris	317° 52'.8	89° 19'.0 N
Pollux	243° 28'.9	27° 59'.7 N
Procyon	245° 00'.8	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.8	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.5	16° 43'.9 S
Spica	158° 32'.7	11° 13'.3 S
Suhail	222° 53'.3	43° 28'.7 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	108° 18'.5	13:20
Mars	206° 22'.5	06:47
Jupiter	328° 24'.1	22:35
Saturn	157° 08'.5	10:03

SUN

GHA	v	Dec	d	HP
183° 59'.4	17° 32'.1 S	351° 12'.0	11'.2	21° 38'.9 N	3'.4	54'.5
198° 59'.3	32'.8	5° 42'.2	11'.1	42'.3	3'.2	
213° 59'.2	33'.5	20° 12'.3	11'.1	45'.5	3'.2	
228° 59'.2	34'.1	34° 42'.4	11'.0	48'.7	3'.0	
243° 59'.1	34'.8	49° 12'.4	11'.1	51'.7	3'.0	54'.6
258° 59'.0	35'.5	63° 42'.5	11'.0	54'.7	2'.8	
273° 59'.0	36'.2	78° 12'.5	10'.9	57'.5	2'.8	
288° 58'.9	36'.9	92° 42'.4	10'.9	22° 00'.3 N	2'.6	
303° 58'.8	37'.5	107° 12'.3	10'.9	02'.9	2'.5	
318° 58'.7	38'.2	121° 42'.2	10'.9	05'.4	2'.5	
333° 58'.7	38'.9	136° 12'.1	10'.8	07'.9	2'.3	
348° 58'.6	39'.6	150° 41'.9	10'.8	10'.2	2'.2	
3° 58'.5	17° 40'.3 S	165° 11'.7	10'.7	22° 12'.4 N	2'.1	54'.7
18° 58'.4	40'.9	179° 41'.4	10'.7	14'.5	2'.0	
33° 58'.3	41'.6	194° 11'.1	10'.7	16'.5	1'.9	
48° 58'.3	42'.3	208° 40'.8	10'.7	18'.4	1'.7	
63° 58'.2	43'.0	223° 10'.5	10'.6	20'.1	1'.7	
78° 58'.1	43'.6	237° 40'.1	10'.7	21'.8	1'.6	
93° 58'.0	44'.3	252° 09'.8	10'.5	23'.4	1'.4	
108° 58'.0	45'.0	266° 39'.3	10'.6	24'.8	1'.3	54'.8
123° 57'.9	45'.7	281° 08'.9	10'.5	26'.1	1'.3	
138° 57'.8	46'.3	295° 38'.4	10'.5	27'.4	1'.1	
153° 57'.7	47'.0	310° 07'.9	10'.5	28'.5	1'.0	
168° 57'.6	47'.7	324° 37'.4	10'.5	29'.5	0'.9	
183° 57'.6	17° 48'.4 S	339° 06'.9	10'.4	22° 30'.4 N	0'.7	54'.8
198° 57'.5	49'.0	353° 36'.3	10'.4	31'.1	0'.7	
213° 57'.4	49'.7	8° 05'.7	10'.4	31'.8	0'.5	54'.9
228° 57'.3	50'.4	22° 35'.1	10'.4	32'.3	0'.5	
243° 57'.2	51'.0	37° 04'.5	10'.4	32'.8	0'.3	
258° 57'.2	51'.7	51° 33'.9	10'.3	33'.1	0'.2	
273° 57'.1	52'.4	66° 03'.2	10'.3	33'.3	0'.1	
288° 57'.0	53'.0	80° 32'.5	10'.3	33'.4	0'.0	
303° 56'.9	53'.7	95° 01'.8	10'.3	33'.4	0'.1	55'.0
318° 56'.8	54'.4	109° 31'.1	10'.3	33'.3	0'.3	
333° 56'.7	55'.0	124° 00'.4	10'.2	33'.0	0'.3	
348° 56'.6	55'.7	138° 29'.6	10'.3	32'.7	0'.5	
3° 56'.6	17° 56'.4 S	152° 58'.9	10'.2	22° 32'.2 N	0'.6	55'.0
18° 56'.5	57'.0	167° 28'.1	10'.2	31'.6	0'.7	
33° 56'.4	57'.7	181° 57'.3	10'.2	30'.9	0'.8	55'.1
48° 56'.3	58'.4	196° 26'.5	10'.2	30'.1	0'.9	
63° 56'.2	59'.0	210° 55'.7	10'.2	29'.2	1'.0	
78° 56'.1	59'.7	225° 24'.9	10'.2	28'.2	1'.2	
93° 56'.0	18° 00'.4 S	239° 54'.1	10'.1	27'.0	1'.3	
108° 56'.0	01'.0	254° 23'.2	10'.2	25'.7	1'.4	
123° 55'.9	01'.7	268° 52'.4	10'.1	24'.3	1'.5	55'.2
138° 55'.8	02'.3	283° 21'.5	10'.2	22'.8	1'.6	
153° 55'.7	03'.0	297° 50'.7	10'.1	21'.2	1'.7	
168° 55'.6	03'.7	312° 19'.8	10'.2	19'.5	1'.8	
183° 55'.5	18° 04'.3 S	326° 49'.0	10'.1	22° 17'.7 N	2'.0	55'.2
198° 55'.4	05'.0	341° 18'.1	10'.1	15'.7	2'.1	
213° 55'.3	05'.6	355° 47'.2	10'.1	13'.6	2'.2	55'.3
228° 55'.2	06'.3	10° 16'.3	10'.2	11'.4	2'.3	
243° 55'.2	07'.0	24° 45'.5	10'.1	09'.1	2'.4	
258° 55'.1	07'.6	39° 14'.6	10'.1	06'.7	2'.5	
273° 55'.0	08'.3	53° 43'.7	10'.1	04'.2	2'.7	
288° 54'.9	08'.9	68° 12'.8	10'.1	01'.5	2'.7	55'.4
303° 54'.8	09'.6	82° 41'.9	10'.2	21° 58'.8 N	2'.9	
318° 54'.7	10'.2	97° 11'.1	10'.1	55'.9	3'.0	
333° 54'.6	10'.9	111° 40'.2	10'.1	52'.9	3'.1	
348° 54'.5	11'.5	126° 09'.3	10'.2	49'.8	3'.2	
3° 54'.4	18° 12'.2 S	140° 38'.5	10'.1	21° 46'.6 N	3'.3	55'.5
18° 54'.3	12'.8	155° 07'.6	10'.1	43'.3	3'.5	
33° 54'.2	13'.5	169° 36'.7	10'.2	39'.8	3'.5	
48° 54'.1	14'.1	184° 05'.9	10'.1	36'.3	3'.7	
63° 54'.0	14'.8	198° 35'.0	10'.2	32'.6	3'.8	
78° 53'.9	15'.4	213° 04'.2	10'.2	28'.8	3'.9	55'.6
93° 53'.8	16'.1	227° 33'.4	10'.2	24'.9	4'.0	
108° 53'.7	16'.7	242° 02'.6	10'.1	20'.9	4'.1	
123° 53'.6	17'.4	256° 31'.7	10'.2	16'.8	4'.2	
138° 53'.5	18'.0	271° 00'.9	10'.2	12'.6	4'.4	
153° 53'.4	18'.7	285° 30'.1	10'.3	08'.2	4'.4	55'.7
168° 53'.3	19'.3	299° 59'.4	10'.2	03'.8	4'.6	
SD 16'.2	d 0'.7	SD	14'.9	15'.0	15'.1	

Twilight / Sunrise / Moonrise

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 12	Moonrise 13	Moonrise 14
N 72°	06:51	08:23	10:29	-	-	-
N 70°	06:42	08:02	09:34	-	-	-
68°	06:34	07:46	09:02	-	-	15:38
66°	06:27	07:32	08:38	14:39	15:24	16:41
64°	06:22	07:21	08:20	15:18	16:06	17:15
62°	06:17	07:12	08:05	15:46	16:35	17:40
60°	06:12	07:04	07:52	16:07	16:56	18:00
N 58°	06:08	06:56	07:41	16:25	17:14	18:16
56°	06:04	06:50	07:31	16:39	17:29	18:30
54°	06:01	06:44	07:23	16:52	17:42	18:42
52°	05:57	06:38	07:16	17:03	17:53	18:52
50°	05:54	06:34	07:09	17:13	18:03	19:02
45°	05:47	06:23	06:54	17:34	18:24	19:21
N 40°	05:41	06:13	06:42	17:51	18:41	19:37
35°	05:35	06:05	06:32	18:05	18:56	19:51
30°	05:29	05:58	06:23	18:17	19:08	20:03
20°	05:18	05:44	06:07	18:39	19:29	20:23
N 10°	05:06	05:32	05:54	18:57	19:48	20:40
0°	04:54	05:19	05:41	19:14	20:05	20:56
S 10°	04:39	05:05	05:28	19:32	20:22	21:13
20°	04:22	04:50	05:13	19:50	20:41	21:30
30°	04:00	04:31	04:57	20:11	21:02	21:50
35°	03:46	04:20	04:48	20:24	21:15	22:01
40°	03:29	04:06	04:37	20:38	21:29	22:15
45°	03:08	03:50	04:24	20:56	21:46	22:31
S 50°	02:39	03:29	04:08	21:17	22:07	22:50
52°	02:24	03:19	04:01	21:27	22:17	22:59
54°	02:06	03:08	03:52	21:38	22:28	23:09
56°	01:44	02:55	03:43	21:51	22:41	23:21
58°	01:13	02:39	03:32	22:07	22:56	23:34
S 60°	00:11	02:20	03:20	22:25	23:14	23:50
S 62°	-	01:56	03:06	22:47	23:35	24:08

Sunset / Twilight / Moonset

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 12	Moonset 13	Moonset 14
N 72°	12:59	15:04	16:36	-	-	-
N 70°	13:53	15:25	16:46	-	-	-
68°	14:26	15:42	16:53	-	-	13:53
66°	14:49	15:55	17:00	11:21	12:21	12:51
64°	15:08	16:06	17:06	10:41	11:39	12:16
62°	15:23	16:16	17:11	10:14	11:10	11:51
60°	15:36	16:24	17:15	09:53	10:48	11:31
N 58°	15:47	16:31	17:20	09:36	10:30	11:14
56°	15:56	16:38	17:23	09:21	10:16	11:00
54°	16:05	16:44	17:27	09:09	10:03	10:48
52°	16:12	16:49	17:30	08:57	09:51	10:37
50°	16:19	16:54	17:33	08:48	09:41	10:28
45°	16:34	17:05	17:41	08:27	09:20	10:08
N 40°	16:46	17:15	17:47	08:10	09:03	09:51
35°	16:56	17:23	17:53	07:56	08:49	09:37
30°	17:05	17:30	17:59	07:44	08:36	09:25
20°	17:21	17:44	18:11	07:23	08:15	09:05
N 10°	17:35	17:57	18:22	07:05	07:56	08:47
0°	17:48	18:10	18:35	06:48	07:39	08:30
S 10°	18:01	18:23	18:49	06:31	07:21	08:13
20°	18:15	18:39	19:06	06:13	07:03	07:55
30°	18:32	18:58	19:29	05:53	06:41	07:34
35°	18:41	19:09	19:43	05:40	06:29	07:22
40°	18:52	19:23	20:00	05:26	06:14	07:07
45°	19:05	19:39	20:22	05:10	05:57	06:51
S 50°	19:21	20:00	20:51	04:50	05:36	06:30
52°	19:29	20:10	21:06	04:40	05:25	06:20
54°	19:37	20:22	21:25	04:29	05:14	06:09
56°	19:47	20:35	21:48	04:17	05:01	05:56
58°	19:58	20:51	22:21	04:02	04:46	05:41
S 60°	20:10	21:11	-	03:46	04:27	05:24
S 62°	20:25	21:36	-	03:25	04:05	05:02

SUN / MOON

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
12	15 58	15 54	11:44	00:36	13:01	17d 98%
13	15 50	15 46	11:44	01:26	13:52	18d 94%
14	15 42	15 38	11:44	02:17	14:43	19d 88%

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2011 November 15, 16, 17 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +0.9		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
15 00	53° 44'.3	159° 22'.3	23° 31'.1 S	259° 09'.1	12° 32'.2 N	22° 22'.5	11° 10'.7 N	210° 40'.0	7° 11'.4 S
01	68° 46'.8	174° 21'.4	31'.5	274° 10'.3	31'.8	37° 25'.3	10'.6	225° 42'.2	11'.5
02	83° 49'.3	189° 20'.5	31'.9	289° 11'.6	31'.4	52° 28'.1	10'.5	240° 44'.4	11'.6
03	98° 51'.7	204° 19'.6	32'.4	304° 12'.9	31'.0	67° 30'.8	10'.4	255° 46'.6	11'.7
T 04	113° 54'.2	219° 18'.7	32'.8	319° 14'.2	30'.6	82° 33'.6	10'.3	270° 48'.8	11'.8
u 05	128° 56'.6	234° 17'.8	33'.2	334° 15'.4	30'.2	97° 36'.3	10'.2	285° 51'.0	11'.9
e 06	143° 59'.1	249° 16'.9	33'.6	349° 16'.7	29'.8	112° 39'.1	10'.2	300° 53'.2	12'.0
s 07	159° 01'.6	264° 16'.0	34'.1	4° 18'.0	29'.4	127° 41'.8	10'.1	315° 55'.4	12'.1
d 08	174° 04'.0	279° 15'.1	34'.5	19° 19'.2	29'.0	142° 44'.6	10'.0	330° 57'.6	12'.2
a 09	189° 06'.5	294° 14'.3	34'.9	34° 20'.5	28'.6	157° 47'.3	09'.9	345° 59'.8	12'.3
y 10	204° 09'.0	309° 13'.4	35'.3	49° 21'.8	28'.2	172° 50'.1	09'.8	1° 02'.0	12'.4
11	219° 11'.4	324° 12'.5	35'.8	64° 23'.1	27'.8	187° 52'.8	09'.7	16° 04'.2	12'.5
12	234° 13'.9	339° 11'.6	23° 36'.2 S	79° 24'.3	12° 27'.4 N	202° 55'.6	11° 09'.6 N	31° 06'.4	7° 12'.6 S
13	249° 16'.4	354° 10'.7	36'.6	94° 25'.6	27'.0	217° 58'.4	09'.5	46° 08'.6	12'.7
14	264° 18'.8	9° 09'.8	37'.0	109° 26'.9	26'.6	233° 01'.1	09'.4	61° 10'.8	12'.8
15	279° 21'.3	24° 08'.9	37'.4	124° 28'.2	26'.2	248° 03'.9	09'.3	76° 13'.0	12'.9
16	294° 23'.7	39° 08'.0	37'.8	139° 29'.4	25'.8	263° 06'.6	09'.2	91° 15'.2	12'.9
17	309° 26'.2	54° 07'.1	38'.3	154° 30'.7	25'.4	278° 09'.4	09'.1	106° 17'.4	13'.0
18	324° 28'.7	69° 06'.2	38'.7	169° 32'.0	25'.0	293° 12'.1	09'.0	121° 19'.6	13'.1
19	339° 31'.1	84° 05'.3	39'.1	184° 33'.3	24'.6	308° 14'.9	08'.9	136° 21'.8	13'.2
20	354° 33'.6	99° 04'.4	39'.5	199° 34'.5	24'.2	323° 17'.6	08'.8	151° 24'.0	13'.3
21	9° 36'.1	114° 03'.5	39'.9	214° 35'.8	23'.8	338° 20'.4	08'.7	166° 26'.2	13'.4
22	24° 38'.5	129° 02'.6	40'.3	229° 37'.1	23'.4	353° 23'.1	08'.6	181° 28'.4	13'.5
23	39° 41'.0	144° 01'.7	40'.7	244° 38'.4	23'.0	8° 25'.9	08'.6	196° 30'.6	13'.6
16 00	54° 43'.5	159° 00'.8	23° 41'.1 S	259° 39'.7	12° 22'.6 N	23° 28'.6	11° 08'.5 N	211° 32'.8	7° 13'.7 S
01	69° 45'.9	173° 59'.9	41'.5	274° 40'.9	22'.2	38° 31'.4	08'.4	226° 35'.0	13'.8
02	84° 48'.4	188° 59'.0	41'.9	289° 42'.2	21'.8	53° 34'.1	08'.3	241° 37'.2	13'.9
03	99° 50'.9	203° 58'.1	42'.3	304° 43'.5	21'.4	68° 36'.9	08'.2	256° 39'.4	14'.0
W 04	114° 53'.3	218° 57'.2	42'.7	319° 44'.8	21'.0	83° 39'.6	08'.1	271° 41'.6	14'.1
e 05	129° 55'.8	233° 56'.3	43'.1	334° 46'.1	20'.6	98° 42'.4	08'.0	286° 43'.8	14'.2
d 06	144° 58'.2	248° 55'.4	43'.5	349° 47'.3	20'.2	113° 45'.1	07'.9	301° 46'.0	14'.3
n 07	160° 00'.7	263° 54'.5	43'.9	4° 48'.6	19'.8	128° 47'.9	07'.8	316° 48'.2	14'.4
e 08	175° 03'.2	278° 53'.6	44'.3	19° 49'.9	19'.4	143° 50'.6	07'.7	331° 50'.4	14'.5
s 09	190° 05'.6	293° 52'.7	44'.7	34° 51'.2	19'.0	158° 53'.4	07'.6	346° 52'.6	14'.6
d 10	205° 08'.1	308° 51'.8	45'.1	49° 52'.5	18'.7	173° 56'.1	07'.5	1° 54'.8	14'.7
a 11	220° 10'.6	323° 50'.9	45'.5	64° 53'.7	18'.3	188° 58'.9	07'.4	16° 57'.0	14'.8
y 12	235° 13'.0	338° 50'.0	23° 45'.9 S	79° 55'.0	12° 17'.9 N	204° 01'.6	11° 07'.3 N	31° 59'.2	7° 14'.9 S
13	250° 15'.5	353° 49'.1	46'.3	94° 56'.3	17'.5	219° 04'.4	07'.3	47° 01'.4	15'.0
14	265° 18'.0	8° 48'.2	46'.7	109° 57'.6	17'.1	234° 07'.1	07'.2	62° 03'.6	15'.1
15	280° 20'.4	23° 47'.3	47'.1	124° 58'.9	16'.7	249° 09'.9	07'.1	77° 05'.8	15'.2
16	295° 22'.9	38° 46'.4	47'.4	140° 00'.2	16'.3	264° 12'.6	07'.0	92° 08'.0	15'.3
17	310° 25'.4	53° 45'.5	47'.8	155° 01'.4	15'.9	279° 15'.4	06'.9	107° 10'.2	15'.4
18	325° 27'.8	68° 44'.6	48'.2	170° 02'.7	15'.5	294° 18'.1	06'.8	122° 12'.4	15'.5
19	340° 30'.3	83° 43'.7	48'.6	185° 04'.0	15'.1	309° 20'.9	06'.7	137° 14'.6	15'.6
20	355° 32'.7	98° 42'.8	49'.0	200° 05'.3	14'.7	324° 23'.6	06'.6	152° 16'.8	15'.7
21	10° 35'.2	113° 41'.9	49'.4	215° 06'.6	14'.3	339° 26'.4	06'.5	167° 19'.0	15'.8
22	25° 37'.7	128° 41'.0	49'.7	230° 07'.9	13'.9	354° 29'.1	06'.4	182° 21'.2	15'.9
23	40° 40'.1	143° 40'.1	50'.1	245° 09'.2	13'.5	9° 31'.9	06'.3	197° 23'.4	16'.0
17 00	55° 42'.6	158° 39'.2	23° 50'.5 S	260° 10'.5	12° 13'.1 N	24° 34'.6	11° 06'.2 N	212° 25'.7	7° 16'.1 S
01	70° 45'.1	173° 38'.3	50'.9	275° 11'.7	12'.7	39° 37'.4	06'.1	227° 27'.9	16'.2
02	85° 47'.5	188° 37'.4	51'.2	290° 13'.0	12'.3	54° 40'.1	06'.1	242° 30'.1	16'.3
03	100° 50'.0	203° 36'.4	51'.6	305° 14'.3	11'.9	69° 42'.9	06'.0	257° 32'.3	16'.4
T 04	115° 52'.5	218° 35'.5	52'.0	320° 15'.6	11'.5	84° 45'.6	05'.9	272° 34'.5	16'.5
h 05	130° 54'.9	233° 34'.6	52'.3	335° 16'.9	11'.1	99° 48'.3	05'.8	287° 36'.7	16'.6
u 06	145° 57'.4	248° 33'.7	52'.7	350° 18'.2	10'.7	114° 51'.1	05'.7	302° 38'.9	16'.7
r 07	160° 59'.9	263° 32'.8	53'.1	5° 19'.5	10'.3	129° 53'.8	05'.6	317° 41'.1	16'.8
s 08	176° 02'.3	278° 31'.9	53'.4	20° 20'.8	09'.9	144° 56'.6	05'.5	332° 43'.3	16'.9
d 09	191° 04'.8	293° 31'.0	53'.8	35° 22'.1	09'.6	159° 59'.3	05'.4	347° 45'.5	16'.9
a 10	206° 07'.2	308° 30'.1	54'.2	50° 23'.3	09'.2	175° 02'.1	05'.3	2° 47'.7	17'.0
y 11	221° 09'.7	323° 29'.2	54'.5	65° 24'.6	08'.8	190° 04'.8	05'.2	17° 49'.9	17'.1
12	236° 12'.2	338° 28'.3	23° 54'.9 S	80° 25'.9	12° 08'.4 N	205° 07'.6	11° 05'.1 N	32° 52'.1	7° 17'.2 S
13	251° 14'.6	353° 27'.4	55'.3	95° 27'.2	08'.0	220° 10'.3	05'.0	47° 54'.3	17'.3
14	266° 17'.1	8° 26'.5	55'.6	110° 28'.5	07'.6	235° 13'.0	05'.0	62° 56'.5	17'.4
15	281° 19'.6	23° 25'.5	56'.0	125° 29'.8	07'.2	250° 15'.8	04'.9	77° 58'.7	17'.5
16	296° 22'.0	38° 24'.6	56'.3	140° 31'.1	06'.8	265° 18'.5	04'.8	93° 00'.9	17'.6
17	311° 24'.5	53° 23'.7	56'.7	155° 32'.4	06'.4	280° 21'.3	04'.7	108° 03'.1	17'.7
18	326° 27'.0	68° 22'.8	57'.0	170° 33'.7	06'.0	295° 24'.0	04'.6	123° 05'.3	17'.8
19	341° 29'.4	83° 21'.9	57'.4	185° 35'.0	05'.6	310° 26'.8	04'.5	138° 07'.5	17'.9
20	356° 31'.9	98° 21'.0	57'.7	200° 36'.3	05'.2	325° 29'.5	04'.4	153° 09'.7	18'.0
21	11° 34'.3	113° 20'.1	58'.1	215° 37'.6	04'.8	340° 32'.3	04'.3	168° 11'.9	18'.1
22	26° 36'.8	128° 19'.2	58'.4	230° 38'.9	04'.4	355° 35'.0	04'.2	183° 14'.1	18'.2
23	41° 39'.3	143° 18'.2	58'.8	245° 40'.2	04'.0	10° 37'.7	04'.1	198° 16'.3	18'.3
	M.P. 20:18	v -0'.9	d 0'.4	v 1'.3	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.7	40° 15'.4 S
Achernar	335° 27'.0	57° 10'.6 S
Acrux	173° 11'.1	63° 09'.7 S
Adhara	255° 13'.2	28° 59'.2 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 22'.1	55° 53'.5 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 45'.1	46° 54'.3 S
Alnilam	275° 47'.2	1° 11'.7 S
Alphard	217° 57'.2	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.6 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.3	59° 32'.7 S
Bellatrix	278° 32'.9	6° 21'.6 N
Betelgeuse	271° 02'.2	7° 24'.5 N
Canopus	263° 56'.2	52° 42'.0 S
Capella	280° 35'.7	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.8 N
Denebola	182° 35'.0	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.3	61° 40'.9 N
Elnath	278° 13'.7	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.6	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.2	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.3 N
Markab	13° 39'.3	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.6 S
Miaplacidus	221° 39'.8	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.9 S
Polaris	317° 52'.7	89° 19'.0 N
Pollux	243° 28'.9	27° 59'.7 N
Procyon	245° 00'.7	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.7	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.2 S
Rigil Kent	139° 53'.9	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.5	16° 43'.9 S
Spica	158° 32'.7	11° 13'.3 S
Suhail	222° 53'.2	43° 28'.7 S
Vega	80° 40'.0	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	104° 17'.4	13:25
Mars	204° 56'.2	06:41
Jupiter	328° 45'.2	22:22
Saturn	156° 49'.4	09:52

SUN

GHA	Dec
183° 53'.3	18° 20'.0 S
198° 53'.2	20'.6
213° 53'.1	21'.3
228° 53'.0	21'.9
243° 52'.9	22'.6
258° 52'.8	23'.2
273° 52'.7	23'.8
288° 52'.6	24'.5
303° 52'.4	25'.1
318° 52'.3	25'.8
333° 52'.2	26'.4
348° 52'.1	27'.0
3° 52'.0	18° 27'.7 S
18° 51'.9	28'.3
33° 51'.8	29'.0
48° 51'.7	29'.6
63° 51'.6	30'.2
78° 51'.5	30'.9
93° 51'.4	31'.5
108° 51'.3	32'.1
123° 51'.2	32'.8
138° 51'.1	33'.4
153° 51'.0	34'.0
168° 50'.9	34'.7
183° 50'.8	18° 35'.3 S
198° 50'.7	35'.9
213° 50'.6	36'.6
228° 50'.4	37'.2
243° 50'.3	37'.8
258° 50'.2	38'.5
273° 50'.1	39'.1
288° 50'.0	39'.7
303° 49'.9	40'.3
318° 49'.8	41'.0
333° 49'.7	41'.6
348° 49'.6	42'.2
3° 49'.5	18° 42'.9 S
18° 49'.3	43'.5
33° 49'.2	44'.1
48° 49'.1	44'.7
63° 49'.0	45'.3
78° 48'.9	46'.0
93° 48'.8	46'.6
108° 48'.7	47'.2
123° 48'.5	47'.8
138° 48'.4	48'.5
153° 48'.3	49'.1
168° 48'.2	49'.7
183° 48'.1	18° 50'.3 S
198° 48'.0	50'.9
213° 47'.8	51'.5
228° 47'.7	52'.2
243° 47'.6	52'.8
258° 47'.5	53'.4
273° 47'.4	54'.0
288° 47'.3	54'.6
303° 47'.1	55'.2
318° 47'.0	55'.9
333° 46'.9	56'.5
348° 46'.8	57'.1
3° 46'.7	18° 57'.7 S
18° 46'.5	58'.3
33° 46'.4	58'.9
48° 46'.3	59'.5
63° 46'.2	19° 00'.1 S
78° 46'.0	00'.7
93° 45'.9	01'.3
108° 45'.8	02'.0
123° 45'.7	02'.6
138° 45'.6	03'.2
153° 45'.4	03'.8
168° 45'.3	04'.4
SD 16'.2	d 0'.6

MOON

GHA	v	Dec	d	HP
314° 28'.6	10'.2	20° 59'.2 N	4'.6	55'.7
328° 57'.8	10'.3	54'.6	4'.8	
343° 27'.1	10'.3	49'.8	4'.9	
357° 56'.4	10'.2	44'.9	5'.0	55'.8
12° 25'.6	10'.3	39'.9	5'.1	
26° 54'.9	10'.3	34'.8	5'.3	
41° 24'.2	10'.3	29'.5	5'.3	
55° 53'.5	10'.4	24'.2	5'.4	55'.9
70° 22'.9	10'.3	18'.8	5'.6	
84° 52'.2	10'.4	13'.2	5'.6	
99° 21'.6	10'.4	07'.6	5'.8	
113° 51'.0	10'.4	01'.8	5'.9	
128° 20'.4	10'.4	19° 55'.9 N	5'.9	56'.0
142° 49'.8	10'.4	50'.0	6'.1	
157° 19'.2	10'.5	43'.9	6'.2	
171° 48'.7	10'.4	37'.7	6'.3	
186° 18'.1	10'.5	31'.4	6'.4	56'.1
200° 47'.6	10'.5	25'.0	6'.5	
215° 17'.1	10'.6	18'.5	6'.6	
229° 46'.7	10'.5	11'.9	6'.7	
244° 16'.2	10'.6	05'.2	6'.8	56'.2
258° 45'.8	10'.5	18° 58'.4 N	6'.9	
273° 15'.3	10'.6	51'.5	7'.1	
287° 44'.9	10'.7	44'.4	7'.1	
302° 14'.6	10'.6	18° 37'.3 N	7'.2	56'.3
316° 44'.2	10'.7	30'.1	7'.3	
331° 13'.9	10'.6	22'.8	7'.4	
345° 43'.5	10'.7	15'.4	7'.5	
0° 13'.2	10'.8	07'.9	7'.7	56'.4
14° 43'.0	10'.7	00'.2	7'.7	
29° 12'.7	10'.7	17° 52'.5 N	7'.8	
43° 42'.4	10'.8	44'.7	7'.9	
58° 12'.2	10'.8	36'.8	8'.0	56'.5
72° 42'.0	10'.8	28'.8	8'.1	
87° 11'.8	10'.9	20'.7	8'.2	
101° 41'.7	10'.8	12'.5	8'.3	
116° 11'.5	10'.9	17° 04'.2 N	8'.4	56'.6
130° 41'.4	10'.9	16° 55'.8 N	8'.4	
145° 11'.3	10'.9	47'.4	8'.6	
159° 41'.2	11'.0	38'.8	8'.7	
174° 11'.2	11'.0	30'.1	8'.7	56'.7
188° 41'.2	10'.9	21'.4	8'.9	
203° 11'.1	11'.0	12'.5	8'.9	
217° 41'.1	11'.1	03'.6	9'.0	56'.8
232° 11'.2	11'.0	15° 54'.6 N	9'.1	
246° 41'.2	11'.0	45'.5	9'.2	
261° 11'.2	11'.1	36'.3	9'.3	
275° 41'.3	11'.1	27'.0	9'.4	56'.9
290° 11'.4	11'.1	15° 17'.6 N	9'.5	56'.9
304° 41'.5	11'.2	08'.1	9'.5	
319° 11'.7	11'.1	14° 58'.6 N	9'.6	
333° 41'.8	11'.2	49'.0	9'.8	57'.0
348° 12'.0	11'.2	39'.2	9'.8	
2° 42'.2	11'.2	29'.4	9'.8	
17° 12'.4	11'.2	19'.6	10'.0	57'.1
31° 42'.6	11'.2	09'.6	10'.1	
46° 12'.8	11'.3	13° 59'.5 N	10'.1	
60° 43'.1	11'.2	49'.4	10'.2	
75° 13'.3	11'.3	39'.2	10'.3	57'.2
89° 43'.6	11'.3	28'.9	10'.3	
104° 13'.9	11'.3	13° 18'.6 N	10'.5	57'.2
118° 44'.2	11'.3	08'.1	10'.5	57'.3
133° 14'.5	11'.4	12° 57'.6 N	10'.6	
147° 44'.9	11'.3	47'.0	10'.7	
162° 15'.2	11'.4	36'.3	10'.7	57'.4
176° 45'.6	11'.4	25'.6	10'.8	
191° 16'.0	11'.3	14'.8	10'.9	
205° 46'.3	11'.4	03'.9	11'.0	
220° 16'.7	11'.4	11° 52'.9 N	11'.0	57'.5
234° 47'.1	11'.5	41'.9	11'.2	
249° 17'.6	11'.4	30'.7	11'.1	
263° 48'.0	11'.4	19'.6	11'.3	57'.6
SD 15'.2		15'.4	15'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 15	Moonrise 16	Moonrise 17
N 72°	07:02	08:37	11:17	-	18:19	20:43
N 70°	06:51	08:14	09:54	16:37	19:03	21:04
68°	06:43	07:56	09:16	17:39	19:32	21:21
66°	06:35	07:41	08:49	18:14	19:53	21:34
64°	06:29	07:29	08:29	18:39	20:10	21:44
62°	06:23	07:19	08:13	18:59	20:24	21:54
60°	06:18	07:10	07:59	19:14	20:36	22:01
N 58°	06:14	07:02	07:48	19:28	20:46	22:08
56°	06:09	06:55	07:38	19:39	20:55	22:14
54°	06:06	06:49	07:29	19:50	21:03	22:20
52°	06:02	06:43	07:21	19:59	21:10	22:25
50°	05:59	06:38	07:14	20:07	21:16	22:29
45°	05:51	06:27	06:58	20:24	21:30	22:38
N 40°	05:44	06:17	06:46	20:38	21:41	22:46
35°	05:37	06:08	06:35	20:49	21:50	22:53
30°	05:31	06:00	06:25	21:00	21:59	22:59
20°	05:19	05:46	06:09	21:17	22:13	23:09
N 10°	05:07	05:33	05:55	21:33	22:25	23:18
0°	04:54	05:19	05:41	21:47	22:37	23:26
S 10°	04:39	05:05	05:27	22:01	22:49	23:34
20°	04:21	04:49	05:13	22:17	23:01	23:43
30°	03:58	04:29	04:56	22:34	23:15	23:53
35°	03:44	04:18	04:46	22:44	23:23	23:59
40°	03:26	04:04	04:34	22:56	23:32	24:06
45°	03:03	03:46	04:21	23:09	23:43	24:13
S 50°	02:33	03:25	04:04	23:26	23:56	24:22
52°	02:17	03:14	03:56	23:34	-	00:02
54°	01:57	03:02	03:47	23:42	-	00:09
56°	01:32	02:48	03:37	23:52	-	00:16
58°	00:56	02:31	03:26	-	00:03	00:24
S 60°	-	02:11	03:13	-	00:15	00:34
S 62°	-	01:44	02:57	00:08	00:30	00:45

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 15	Moonset 16	Moonset 17
N 72°	12:12	14:51	16:26	-	14:46	14:05
N 70°	13:35	15:14	16:37	14:41	14:01	13:42
68°	14:13	15:32	16:46	13:38	13:31	13:24
66°	14:39	15:47	16:53	13:03	13:08	13:10
64°	14:59	15:59	17:00	12:38	12:50	12:58
62°	15:16	16:10	17:05	12:18	12:35	12:48
60°	15:29	16:18	17:10	12:01	12:23	12:39
N 58°	15:41	16:26	17:15	11:47	12:12	12:31
56°	15:51	16:33	17:19	11:35	12:03	12:25
54°	16:00	16:40	17:23	11:25	11:54	12:18
52°	16:08	16:46	17:27	11:15	11:47	12:13
50°	16:15	16:51	17:30	11:07	11:40	12:08
45°	16:31	17:02	17:38	10:49	11:25	11:57
N 40°	16:43	17:12	17:45	10:34	11:13	11:48
35°	16:54	17:21	17:52	10:22	11:03	11:40
30°	17:04	17:29	17:58	10:11	10:54	11:33
20°	17:20	17:43	18:10	09:52	10:38	11:21
N 10°	17:35	17:57	18:22	09:36	10:24	11:11
0°	17:48	18:10	18:35	09:21	10:11	11:01
S 10°	18:02	18:24	18:51	09:05	09:58	10:51
20°	18:17	18:41	19:09	08:49	09:44	10:40
30°	18:34	19:00	19:32	08:30	09:28	10:27
35°	18:44	19:12	19:46	08:19	09:18	10:20
40°	18:56	19:27	20:04	08:06	09:08	10:12
45°	19:10	19:44	20:27	07:50	08:55	10:02
S 50°	19:26	20:06	20:58	07:32	08:39	09:50
52°	19:34	20:17	21:15	07:23	08:32	09:45
54°	19:43	20:29	21:34	07:13	08:24	09:39
56°	19:53	20:43	22:00	07:02	08:15	09:32
58°	20:05	21:00	22:40	06:49	08:04	09:25
S 60°	20:18	21:21	-	06:33	07:52	09:16
S 62°	20:34	21:49	-	06:15	07:38	09:06

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
15	15 33	15 28	11:45	03:09	15:34	20d 81%
16	15 23	15 18	11:45	03:59	16:24	21d 72%
17	15 13	15 07	11:45	04:49	17:13	22d 62%

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2011 November 18, 19, 20 (Fri, Sat, Sun)

GMT	ARIES	VENUS -3.9		MARS +0.9		JUPITER -2.9		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
18 00	56° 41'.7	158° 17'.3	23° 59'.1 S	260° 41'.5	12° 03'.6 N	25° 40'.5	11° 04'.1 N	213° 18'.5	7° 18'.4 S
01	71° 44'.2	173° 16'.4	59'.5	275° 42'.8	03'.2	40° 43'.2	04'.0	228° 20'.7	18'.5
02	86° 46'.7	188° 15'.5	59'.8	290° 44'.1	02'.9	55° 46'.0	03'.9	243° 22'.9	18'.6
03	101° 49'.1	203° 14'.6	24° 00'.2 S	305° 45'.4	02'.5	70° 48'.7	03'.8	258° 25'.1	18'.7
04	116° 51'.6	218° 13'.7	00'.5	320° 46'.7	02'.1	85° 51'.4	03'.7	273° 27'.3	18'.8
05	131° 54'.1	233° 12'.8	00'.8	335° 48'.0	01'.7	100° 54'.2	03'.6	288° 29'.5	18'.9
06	146° 56'.5	248° 11'.9	01'.2	350° 49'.3	01'.3	115° 56'.9	03'.5	303° 31'.7	19'.0
07	161° 59'.0	263° 10'.9	01'.5	5° 50'.6	00'.9	130° 59'.7	03'.4	318° 33'.9	19'.1
08	177° 01'.5	278° 10'.0	01'.9	20° 51'.9	00'.5	146° 02'.4	03'.3	333° 36'.1	19'.2
09	192° 03'.9	293° 09'.1	02'.2	35° 53'.2	00'.1	161° 05'.2	03'.2	348° 38'.3	19'.3
10	207° 06'.4	308° 08'.2	02'.5	50° 54'.5	11° 59'.7 N	176° 07'.9	03'.2	3° 40'.5	19'.4
11	222° 08'.8	323° 07'.3	02'.9	65° 55'.8	59'.3	191° 10'.6	03'.1	18° 42'.7	19'.5
12	237° 11'.3	338° 06'.4	24° 03'.2 S	80° 57'.1	11° 58'.9 N	206° 13'.4	11° 03'.0 N	33° 44'.9	7° 19'.6 S
13	252° 13'.8	353° 05'.4	03'.5	95° 58'.4	58'.5	221° 16'.1	02'.9	48° 47'.1	19'.6
14	267° 16'.2	8° 04'.5	03'.9	110° 59'.7	58'.1	236° 18'.9	02'.8	63° 49'.4	19'.7
15	282° 18'.7	23° 03'.6	04'.2	126° 01'.0	57'.7	251° 21'.6	02'.7	78° 51'.6	19'.8
16	297° 21'.2	38° 02'.7	04'.5	141° 02'.3	57'.3	266° 24'.3	02'.6	93° 53'.8	19'.9
17	312° 23'.6	53° 01'.8	04'.8	156° 03'.6	57'.0	281° 27'.1	02'.5	108° 56'.0	20'.0
18	327° 26'.1	68° 00'.8	05'.2	171° 04'.9	56'.6	296° 29'.8	02'.4	123° 58'.2	20'.1
19	342° 28'.6	82° 59'.9	05'.5	186° 06'.2	56'.2	311° 32'.5	02'.4	139° 00'.4	20'.2
20	357° 31'.0	97° 59'.0	05'.8	201° 07'.5	55'.8	326° 35'.3	02'.3	154° 02'.6	20'.3
21	12° 33'.5	112° 58'.1	06'.1	216° 08'.8	55'.4	341° 38'.0	02'.2	169° 04'.8	20'.4
22	27° 36'.0	127° 57'.2	06'.4	231° 10'.1	55'.0	356° 40'.8	02'.1	184° 07'.0	20'.5
23	42° 38'.4	142° 56'.3	06'.8	246° 11'.4	54'.6	11° 43'.5	02'.0	199° 09'.2	20'.6
19 00	57° 40'.9	157° 55'.3	24° 07'.1 S	261° 12'.7	11° 54'.2 N	26° 46'.2	11° 01'.9 N	214° 11'.4	7° 20'.7 S
01	72° 43'.3	172° 54'.4	07'.4	276° 14'.0	53'.8	41° 49'.0	01'.8	229° 13'.6	20'.8
02	87° 45'.8	187° 53'.5	07'.7	291° 15'.3	53'.4	56° 51'.7	01'.7	244° 15'.8	20'.9
03	102° 48'.3	202° 52'.6	08'.0	306° 16'.6	53'.0	71° 54'.5	01'.6	259° 18'.0	21'.0
04	117° 50'.7	217° 51'.7	08'.3	321° 17'.9	52'.6	86° 57'.2	01'.6	274° 20'.2	21'.1
05	132° 53'.2	232° 50'.7	08'.6	336° 19'.2	52'.3	101° 59'.9	01'.5	289° 22'.4	21'.2
06	147° 55'.7	247° 49'.8	08'.9	351° 20'.5	51'.9	117° 02'.7	01'.4	304° 24'.6	21'.3
07	162° 58'.1	262° 48'.9	09'.3	6° 21'.8	51'.5	132° 05'.4	01'.3	319° 26'.8	21'.4
08	178° 00'.6	277° 48'.0	09'.6	21° 23'.2	51'.1	147° 08'.1	01'.2	334° 29'.0	21'.5
09	193° 03'.1	292° 47'.0	09'.9	36° 24'.5	50'.7	162° 10'.9	01'.1	349° 31'.2	21'.6
10	208° 05'.5	307° 46'.1	10'.2	51° 25'.8	50'.3	177° 13'.6	01'.0	4° 33'.4	21'.7
11	223° 08'.0	322° 45'.2	10'.5	66° 27'.1	49'.9	192° 16'.3	00'.9	19° 35'.6	21'.8
12	238° 10'.4	337° 44'.3	24° 10'.8 S	81° 28'.4	11° 49'.5 N	207° 19'.1	11° 00'.9 N	34° 37'.9	7° 21'.8 S
13	253° 12'.9	352° 43'.4	11'.1	96° 29'.7	49'.1	222° 21'.8	00'.8	49° 40'.1	21'.9
14	268° 15'.4	7° 42'.4	11'.4	111° 31'.0	48'.7	237° 24'.5	00'.7	64° 42'.3	22'.0
15	283° 17'.8	22° 41'.5	11'.7	126° 32'.3	48'.3	252° 27'.3	00'.6	79° 44'.5	22'.1
16	298° 20'.3	37° 40'.6	12'.0	141° 33'.6	47'.9	267° 30'.0	00'.5	94° 46'.7	22'.2
17	313° 22'.8	52° 39'.7	12'.3	156° 35'.0	47'.6	282° 32'.7	00'.4	109° 48'.9	22'.3
18	328° 25'.2	67° 38'.7	12'.6	171° 36'.3	47'.2	297° 35'.5	00'.3	124° 51'.1	22'.4
19	343° 27'.7	82° 37'.8	12'.9	186° 37'.6	46'.8	312° 38'.2	00'.3	139° 53'.3	22'.5
20	358° 30'.2	97° 36'.9	13'.1	201° 38'.9	46'.4	327° 40'.9	00'.2	154° 55'.5	22'.6
21	13° 32'.6	112° 36'.0	13'.4	216° 40'.2	46'.0	342° 43'.7	00'.1	169° 57'.7	22'.7
22	28° 35'.1	127° 35'.0	13'.7	231° 41'.5	45'.6	357° 46'.4	00'.0	184° 59'.9	22'.8
23	43° 37'.6	142° 34'.1	14'.0	246° 42'.8	45'.2	12° 49'.1	10° 59'.9 N	200° 02'.1	22'.9
20 00	58° 40'.0	157° 33'.2	24° 14'.3 S	261° 44'.2	11° 44'.8 N	27° 51'.9	10° 59'.8 N	215° 04'.3	7° 23'.0 S
01	73° 42'.5	172° 32'.3	14'.6	276° 45'.5	44'.4	42° 54'.6	59'.7	230° 06'.5	23'.1
02	88° 44'.9	187° 31'.3	14'.9	291° 46'.8	44'.0	57° 57'.3	59'.6	245° 08'.7	23'.2
03	103° 47'.4	202° 30'.4	15'.1	306° 48'.1	43'.7	73° 00'.1	59'.6	260° 10'.9	23'.3
04	118° 49'.9	217° 29'.5	15'.4	321° 49'.4	43'.3	88° 02'.8	59'.5	275° 13'.1	23'.4
05	133° 52'.3	232° 28'.5	15'.7	336° 50'.7	42'.9	103° 05'.5	59'.4	290° 15'.3	23'.5
06	148° 54'.8	247° 27'.6	16'.0	351° 52'.1	42'.5	118° 08'.3	59'.3	305° 17'.6	23'.6
07	163° 57'.3	262° 26'.7	16'.3	6° 53'.4	42'.1	133° 11'.0	59'.2	320° 19'.8	23'.6
08	178° 59'.7	277° 25'.8	16'.5	21° 54'.7	41'.7	148° 13'.7	59'.1	335° 22'.0	23'.7
09	194° 02'.2	292° 24'.8	16'.8	36° 56'.0	41'.3	163° 16'.5	59'.0	350° 24'.2	23'.8
10	209° 04'.7	307° 23'.9	17'.1	51° 57'.3	40'.9	178° 19'.2	59'.0	5° 26'.4	23'.9
11	224° 07'.1	322° 23'.0	17'.4	66° 58'.6	40'.5	193° 21'.9	58'.9	20° 28'.6	24'.0
12	239° 09'.6	337° 22'.1	24° 17'.6 S	82° 00'.0	11° 40'.2 N	208° 24'.7	10° 58'.8 N	35° 30'.8	7° 24'.1 S
13	254° 12'.0	352° 21'.1	17'.9	97° 01'.3	39'.8	223° 27'.4	58'.7	50° 33'.0	24'.2
14	269° 14'.5	7° 20'.2	18'.2	112° 02'.6	39'.4	238° 30'.1	58'.6	65° 35'.2	24'.3
15	284° 17'.0	22° 19'.3	18'.4	127° 03'.9	39'.0	253° 32'.8	58'.5	80° 37'.4	24'.4
16	299° 19'.4	37° 18'.3	18'.7	142° 05'.2	38'.6	268° 35'.6	58'.4	95° 39'.6	24'.5
17	314° 21'.9	52° 17'.4	19'.0	157° 06'.6	38'.2	283° 38'.3	58'.4	110° 41'.8	24'.6
18	329° 24'.4	67° 16'.5	19'.2	172° 07'.9	37'.8	298° 41'.0	58'.3	125° 44'.0	24'.7
19	344° 26'.8	82° 15'.5	19'.5	187° 09'.2	37'.4	313° 43'.8	58'.2	140° 46'.2	24'.8
20	359° 29'.3	97° 14'.6	19'.8	202° 10'.5	37'.0	328° 46'.5	58'.1	155° 48'.4	24'.9
21	14° 31'.8	112° 13'.7	20'.0	217° 11'.9	36'.7	343° 49'.2	58'.0	170° 50'.7	25'.0
22	29° 34'.2	127° 12'.8	20'.3	232° 13'.2	36'.3	358° 51'.9	57'.9	185° 52'.9	25'.1
23	44° 36'.7	142° 11'.8	20'.5	247° 14'.5	35'.9	13° 54'.7	57'.9	200° 55'.1	25'.2
	M.P. 20:06	v -0'.9	d 0'.3	v 1'.3	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.7	40° 15'.4 S
Achernar	335° 27'.1	57° 10'.6 S
Acrux	173° 11'.1	63° 09'.7 S
Adhara	255° 13'.1	28° 59'.2 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 22'.0	55° 53'.5 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 45'.1	46° 54'.3 S
Alnilam	275° 47'.2	1° 11'.7 S
Alphard	217° 57'.2	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.2	59° 32'.7 S
Bellatrix	278° 32'.9	6° 21'.6 N
Betelgeuse	271° 02'.2	7° 24'.5 N
Canopus	263° 56'.2	52° 42'.0 S
Capella	280° 35'.7	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.8 N
Denebola	182° 35'.0	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.2	61° 40'.8 N
Elnath	278° 13'.7	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.2	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.6	57° 10'.6 S
Gienah	175° 53'.7	17° 36'.4 S
Hadar	148° 50'.1	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.3 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.6 S
Miaplacidus	221° 39'.8	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.9 S
Polaris	317° 52'.8	89° 19'.1 N
Pollux	243° 28'.9	27° 59'.6 N
Procyon	245° 00'.7	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.7	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.3 S
Rigil Kent	139° 53'.9	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.4	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.4	16° 43'.9 S
Spica	158° 32'.7	11° 13'.3 S
Suhail	222° 53'.2	43° 28'.7 S
Vega	80° 40'.1	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	100° 14'.5	13:29
Mars	203° 31'.8	06:35
Jupiter	329° 05'.4	22:09
Saturn	156° 30'.5	09:42

SUN

GHA	Dec
183° 45'.2	19° 05'.0 S
198° 45'.1	05'.6
213° 44'.9	06'.2
228° 44'.8	06'.8
243° 44'.7	07'.4
258° 44'.5	08'.0
273° 44'.4	08'.6
288° 44'.3	09'.2
303° 44'.2	09'.8
318° 44'.0	10'.4
333° 43'.9	11'.0
348° 43'.8	11'.6
3° 43'.6	19° 12'.2 S
18° 43'.5	12'.8
33° 43'.4	13'.4
48° 43'.3	14'.0
63° 43'.1	14'.6
78° 43'.0	15'.2
93° 42'.9	15'.8
108° 42'.7	16'.4
123° 42'.6	16'.9
138° 42'.5	17'.5
153° 42'.3	18'.1
168° 42'.2	18'.7
183° 42'.1	19° 19'.3 S
198° 41'.9	19'.9
213° 41'.8	20'.5
228° 41'.7	21'.1
243° 41'.5	21'.7
258° 41'.4	22'.3
273° 41'.2	22'.8
288° 41'.1	23'.4
303° 41'.0	24'.0
318° 40'.8	24'.6
333° 40'.7	25'.2
348° 40'.6	25'.8
3° 40'.4	19° 26'.3 S
18° 40'.3	26'.9
33° 40'.1	27'.5
48° 40'.0	28'.1
63° 39'.9	28'.7
78° 39'.7	29'.3
93° 39'.6	29'.8
108° 39'.4	30'.4
123° 39'.3	31'.0
138° 39'.2	31'.6
153° 39'.0	32'.1
168° 38'.9	32'.7
183° 38'.7	19° 33'.3 S
198° 38'.6	33'.9
213° 38'.4	34'.4
228° 38'.3	35'.0
243° 38'.2	35'.6
258° 38'.0	36'.2
273° 37'.9	36'.7
288° 37'.7	37'.3
303° 37'.6	37'.9
318° 37'.4	38'.4
333° 37'.3	39'.0
348° 37'.1	39'.6
3° 37'.0	19° 40'.2 S
18° 36'.8	40'.7
33° 36'.7	41'.3
48° 36'.5	41'.9
63° 36'.4	42'.4
78° 36'.2	43'.0
93° 36'.1	43'.6
108° 35'.9	44'.1
123° 35'.8	44'.7
138° 35'.6	45'.2
153° 35'.5	45'.8
168° 35'.3	46'.4

SD 16'.2 d 0'.6

MOON

GHA	v	Dec	d	HP
278° 18'.4	11'.5	11° 08'.3 N	11'.3	57'.6
292° 48'.9	11'.4	10° 57'.0 N	11'.4	
307° 19'.3	11'.5	45'.6	11'.4	57'.7
321° 49'.8	11'.4	34'.2	11'.5	
336° 20'.2	11'.5	22'.7	11'.6	
350° 50'.7	11'.5	11'.1	11'.7	
5° 21'.2	11'.4	9° 59'.4 N	11'.7	57'.8
19° 51'.6	11'.5	47'.7	11'.8	
34° 22'.1	11'.5	35'.9	11'.8	
48° 52'.6	11'.5	24'.1	11'.9	57'.9
63° 23'.1	11'.5	12'.2	11'.9	
77° 53'.6	11'.5	00'.3	12'.0	
92° 24'.1	11'.5	8° 48'.3 N	12'.1	58'.0
106° 54'.6	11'.4	36'.2	12'.1	
121° 25'.0	11'.5	24'.1	12'.2	
135° 55'.5	11'.5	11'.9	12'.3	58'.1
150° 26'.0	11'.5	7° 59'.6 N	12'.3	
164° 56'.5	11'.5	47'.3	12'.3	
179° 27'.0	11'.4	35'.0	12'.4	58'.2
193° 57'.4	11'.5	22'.6	12'.5	
208° 27'.9	11'.5	10'.1	12'.5	
222° 58'.4	11'.4	6° 57'.6 N	12'.5	58'.3
237° 28'.8	11'.5	45'.1	12'.6	
251° 59'.3	11'.4	32'.5	12'.7	
266° 29'.7	11'.4	6° 19'.8 N	12'.6	58'.4
281° 00'.1	11'.5	07'.2	12'.8	
295° 30'.6	11'.4	5° 54'.4 N	12'.8	
310° 01'.0	11'.4	41'.6	12'.8	
324° 31'.4	11'.3	28'.8	12'.9	58'.5
339° 01'.7	11'.4	15'.9	12'.9	
353° 32'.1	11'.4	03'.0	12'.9	
8° 02'.5	11'.3	4° 50'.1 N	13'.0	58'.6
22° 32'.8	11'.3	37'.1	13'.1	
37° 03'.1	11'.3	24'.0	13'.0	
51° 33'.4	11'.3	11'.0	13'.1	58'.7
66° 03'.7	11'.3	3° 57'.9 N	13'.2	
80° 34'.0	11'.2	3° 44'.7 N	13'.2	58'.7
95° 04'.2	11'.3	31'.5	13'.2	58'.8
109° 34'.5	11'.2	18'.3	13'.2	
124° 04'.7	11'.2	05'.1	13'.3	
138° 34'.9	11'.1	2° 51'.8 N	13'.3	58'.9
153° 05'.0	11'.2	38'.5	13'.3	
167° 35'.2	11'.1	25'.2	13'.4	
182° 05'.3	11'.1	11'.8	13'.4	59'.0
196° 35'.4	11'.0	1° 58'.4 N	13'.4	
211° 05'.4	11'.0	45'.0	13'.4	
225° 35'.4	11'.0	31'.6	13'.5	59'.1
240° 05'.4	11'.0	18'.1	13'.4	
254° 35'.4	11'.0	1° 04'.7 N	13'.5	59'.1
269° 05'.4	10'.9	0° 51'.2 N	13'.6	
283° 35'.3	10'.8	37'.6	13'.5	59'.2
298° 05'.1	10'.9	24'.1	13'.5	
312° 35'.0	10'.8	10'.6	13'.6	
327° 04'.8	10'.8	0° 03'.0 S	13'.6	59'.3
341° 34'.6	10'.7	16'.6	13'.6	
356° 04'.3	10'.7	30'.2	13'.6	
10° 34'.0	10'.6	43'.8	13'.6	59'.4
25° 03'.6	10'.7	57'.4	13'.7	
39° 33'.3	10'.5	1° 11'.1 S	13'.6	
54° 02'.8	10'.6	24'.7	13'.6	59'.5
68° 32'.4	10'.5	1° 38'.3 S	13'.7	59'.5
83° 01'.9	10'.4	52'.0	13'.6	
97° 31'.3	10'.4	2° 05'.6 S	13'.7	
112° 00'.7	10'.4	19'.3	13'.7	59'.6
126° 30'.1	10'.3	33'.0	13'.6	
140° 59'.4	10'.2	46'.6	13'.7	
155° 28'.6	10'.2	3° 00'.3 S	13'.6	59'.7
169° 57'.8	10'.2	13'.9	13'.7	
184° 27'.0	10'.1	27'.6	13'.6	
198° 56'.1	10'.1	41'.2	13'.7	
213° 25'.2	10'.0	54'.9	13'.6	59'.8
227° 54'.2	10'.0	4° 08'.5 S	13'.6	

SD 15'.8 16'.0 16'.2

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 18	Moonrise 19	Moonrise 20
N 72°	07:12	08:51	-	22:51	-	00:55
N 70°	07:01	08:26	10:15	23:00	-	00:56
68°	06:51	08:06	09:30	23:08	-	00:57
66°	06:43	07:50	09:01	23:15	-	00:57
64°	06:36	07:37	08:39	23:20	-	00:58
62°	06:30	07:26	08:21	23:25	-	00:58
60°	06:24	07:17	08:07	23:29	-	00:59
N 58°	06:19	07:08	07:54	23:33	-	00:59
56°	06:15	07:01	07:44	23:36	-	01:00
54°	06:10	06:54	07:34	23:39	-	01:00
52°	06:06	06:48	07:26	23:41	-	01:00
50°	06:03	06:42	07:18	23:44	-	01:01
45°	05:54	06:30	07:02	23:49	-	01:01
N 40°	05:47	06:20	06:49	23:53	-	01:02
35°	05:40	06:11	06:38	23:57	-	01:02
30°	05:33	06:02	06:28	24:00	-	01:02
20°	05:21	05:48	06:11	-	00:06	01:03
N 10°	05:08	05:34	05:56	-	00:10	01:04
0°	04:54	05:20	05:42	-	00:15	01:04
S 10°	04:39	05:05	05:27	-	00:20	01:05
20°	04:20	04:48	05:12	-	00:25	01:06
30°	03:56	04:28	04:54	-	00:30	01:06
35°	03:41	04:16	04:44	-	00:33	01:07
40°	03:23	04:01	04:32	00:06	00:37	01:07
45°	02:59	03:43	04:18	00:13	00:41	01:08
S 50°	02:27	03:20	04:00	00:22	00:46	01:09
52°	02:10	03:09	03:52	00:26	00:48	01:09
54°	01:49	02:56	03:43	00:31	00:51	01:09
56°	01:21	02:41	03:32	00:36	00:54	01:10
58°	00:34	02:23	03:20	00:42	00:57	01:10
S 60°	-	02:01	03:06	00:48	01:00	01:11
S 62°	-	01:31	02:50	00:55	01:04	01:11

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 18	Moonset 19	Moonset 20
N 72°	-	14:38	16:17	13:41	13:21	13:03
N 70°	13:15	15:04	16:29	13:29	13:17	13:05
68°	14:00	15:24	16:39	13:19	13:13	13:08
66°	14:29	15:40	16:47	13:10	13:10	13:10
64°	14:51	15:53	16:54	13:03	13:07	13:11
62°	15:09	16:04	17:00	12:57	13:05	13:13
60°	15:23	16:13	17:06	12:52	13:03	13:14
N 58°	15:35	16:22	17:11	12:47	13:01	13:15
56°	15:46	16:29	17:15	12:43	13:00	13:16
54°	15:56	16:36	17:20	12:39	12:58	13:17
52°	16:04	16:42	17:24	12:36	12:57	13:18
50°	16:12	16:48	17:27	12:33	12:56	13:18
45°	16:28	17:00	17:36	12:26	12:53	13:20
N 40°	16:41	17:10	17:43	12:20	12:51	13:21
35°	16:52	17:20	17:50	12:15	12:49	13:22
30°	17:02	17:28	17:57	12:11	12:47	13:23
20°	17:20	17:43	18:10	12:03	12:44	13:25
N 10°	17:35	17:57	18:23	11:56	12:41	13:27
0°	17:49	18:11	18:36	11:49	12:38	13:28
S 10°	18:03	18:26	18:52	11:43	12:36	13:30
20°	18:19	18:43	19:11	11:36	12:33	13:31
30°	18:37	19:03	19:35	11:28	12:30	13:33
35°	18:47	19:16	19:50	11:23	12:28	13:34
40°	18:59	19:30	20:09	11:18	12:26	13:35
45°	19:14	19:48	20:33	11:12	12:23	13:36
S 50°	19:31	20:11	21:05	11:04	12:20	13:38
52°	19:40	20:23	21:23	11:01	12:19	13:38
54°	19:49	20:36	21:44	10:57	12:17	13:39
56°	20:00	20:51	22:13	10:53	12:15	13:40
58°	20:12	21:09	23:05	10:48	12:13	13:41
S 60°	20:26	21:32	-	10:43	12:11	13:42
S 62°	20:43	22:04	-	10:36	12:09	13:43

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
18	15 01	14 55	11:45	05:38	18:02	23d 52%
19	14 49	14 42	11:45	06:27	18:51	24d 41%
20	14 35	14 28	11:46	07:16	19:42	25d 30%

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2011 November 21, 22, 23 (Mon, Tue, Wed)

GMT	ARIES	VENUS -3.9		MARS +0.9		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
21 Monday 00	59° 39'.2	157° 10'.9	24° 20'.8 S	262° 15'.8	11° 35'.5 N	28° 57'.4	10° 57'.8 N	215° 57'.3	7° 25'.2 S
01	74° 41'.6	172° 10'.0	21'.0	277° 17'.2	35'.1	44° 00'.1	57'.7	230° 59'.5	25'.3
02	89° 44'.1	187° 09'.0	21'.3	292° 18'.5	34'.7	59° 02'.8	57'.6	246° 01'.7	25'.4
03	104° 46'.5	202° 08'.1	21'.6	307° 19'.8	34'.3	74° 05'.6	57'.5	261° 03'.9	25'.5
04	119° 49'.0	217° 07'.2	21'.8	322° 21'.1	33'.9	89° 08'.3	57'.4	276° 06'.1	25'.6
05	134° 51'.5	232° 06'.2	22'.1	337° 22'.5	33'.6	104° 11'.0	57'.3	291° 08'.3	25'.7
06	149° 53'.9	247° 05'.3	22'.3	352° 23'.8	33'.2	119° 13'.8	57'.3	306° 10'.5	25'.8
07	164° 56'.4	262° 04'.4	22'.5	7° 25'.1	32'.8	134° 16'.5	57'.2	321° 12'.7	25'.9
08	179° 58'.9	277° 03'.4	22'.8	22° 26'.4	32'.4	149° 19'.2	57'.1	336° 14'.9	26'.0
09	195° 01'.3	292° 02'.5	23'.0	37° 27'.8	32'.0	164° 21'.9	57'.0	351° 17'.1	26'.1
10	210° 03'.8	307° 01'.6	23'.3	52° 29'.1	31'.6	179° 24'.7	56'.9	6° 19'.4	26'.2
11	225° 06'.3	322° 00'.6	23'.5	67° 30'.4	31'.2	194° 27'.4	56'.8	21° 21'.6	26'.3
12	240° 08'.7	336° 59'.7	24° 23'.8 S	82° 31'.8	11° 30'.8 N	209° 30'.1	10° 56'.8 N	36° 23'.8	7° 26'.4 S
13	255° 11'.2	351° 58'.8	24'.0	97° 33'.1	30'.5	224° 32'.8	56'.7	51° 26'.0	26'.5
14	270° 13'.7	6° 57'.8	24'.2	112° 34'.4	30'.1	239° 35'.6	56'.6	66° 28'.2	26'.6
15	285° 16'.1	21° 56'.9	24'.5	127° 35'.8	29'.7	254° 38'.3	56'.5	81° 30'.4	26'.7
16	300° 18'.6	36° 56'.0	24'.7	142° 37'.1	29'.3	269° 41'.0	56'.4	96° 32'.6	26'.7
17	315° 21'.0	51° 55'.0	24'.9	157° 38'.4	28'.9	284° 43'.7	56'.3	111° 34'.8	26'.8
18	330° 23'.5	66° 54'.1	25'.2	172° 39'.7	28'.5	299° 46'.4	56'.3	126° 37'.0	26'.9
19	345° 26'.0	81° 53'.2	25'.4	187° 41'.1	28'.1	314° 49'.2	56'.2	141° 39'.2	27'.0
20	0° 28'.4	96° 52'.2	25'.6	202° 42'.4	27'.8	329° 51'.9	56'.1	156° 41'.4	27'.1
21	15° 30'.9	111° 51'.3	25'.9	217° 43'.7	27'.4	344° 54'.6	56'.0	171° 43'.6	27'.2
22	30° 33'.4	126° 50'.3	26'.1	232° 45'.1	27'.0	359° 57'.3	55'.9	186° 45'.9	27'.3
23	45° 35'.8	141° 49'.4	26'.3	247° 46'.4	26'.6	15° 00'.1	55'.9	201° 48'.1	27'.4
22 Tuesday 00	60° 38'.3	156° 48'.5	24° 26'.6 S	262° 47'.7	11° 26'.2 N	30° 02'.8	10° 55'.8 N	216° 50'.3	7° 27'.5 S
01	75° 40'.8	171° 47'.5	26'.8	277° 49'.1	25'.8	45° 05'.5	55'.7	231° 52'.5	27'.6
02	90° 43'.2	186° 46'.6	27'.0	292° 50'.4	25'.4	60° 08'.2	55'.6	246° 54'.7	27'.7
03	105° 45'.7	201° 45'.7	27'.2	307° 51'.7	25'.1	75° 10'.9	55'.5	261° 56'.9	27'.8
04	120° 48'.1	216° 44'.7	27'.4	322° 53'.1	24'.7	90° 13'.7	55'.4	276° 59'.1	27'.9
05	135° 50'.6	231° 43'.8	27'.7	337° 54'.4	24'.3	105° 16'.4	55'.4	292° 01'.3	28'.0
06	150° 53'.1	246° 42'.8	27'.9	352° 55'.8	23'.9	120° 19'.1	55'.3	307° 03'.5	28'.0
07	165° 55'.5	261° 41'.9	28'.1	7° 57'.1	23'.5	135° 21'.8	55'.2	322° 05'.7	28'.1
08	180° 58'.0	276° 41'.0	28'.3	22° 58'.4	23'.1	150° 24'.6	55'.1	337° 08'.0	28'.2
09	196° 00'.5	291° 40'.0	28'.5	37° 59'.8	22'.8	165° 27'.3	55'.0	352° 10'.2	28'.3
10	211° 02'.9	306° 39'.1	28'.7	53° 01'.1	22'.4	180° 30'.0	54'.9	7° 12'.4	28'.4
11	226° 05'.4	321° 38'.2	28'.9	68° 02'.4	22'.0	195° 32'.7	54'.9	22° 14'.6	28'.5
12	241° 07'.9	336° 37'.2	24° 29'.2 S	83° 03'.8	11° 21'.6 N	210° 35'.4	10° 54'.8 N	37° 16'.8	7° 28'.6 S
13	256° 10'.3	351° 36'.3	29'.4	98° 05'.1	21'.2	225° 38'.1	54'.7	52° 19'.0	28'.7
14	271° 12'.8	6° 35'.3	29'.6	113° 06'.5	20'.8	240° 40'.9	54'.6	67° 21'.2	28'.8
15	286° 15'.3	21° 34'.4	29'.8	128° 07'.8	20'.4	255° 43'.6	54'.5	82° 23'.4	28'.9
16	301° 17'.7	36° 33'.5	30'.0	143° 09'.1	20'.1	270° 46'.3	54'.5	97° 25'.6	29'.0
17	316° 20'.2	51° 32'.5	30'.2	158° 10'.5	19'.7	285° 49'.0	54'.4	112° 27'.8	29'.1
18	331° 22'.6	66° 31'.6	30'.4	173° 11'.8	19'.3	300° 51'.7	54'.3	127° 30'.1	29'.2
19	346° 25'.1	81° 30'.6	30'.6	188° 13'.2	18'.9	315° 54'.5	54'.2	142° 32'.3	29'.2
20	1° 27'.6	96° 29'.7	30'.8	203° 14'.5	18'.5	330° 57'.2	54'.1	157° 34'.5	29'.3
21	16° 30'.0	111° 28'.8	31'.0	218° 15'.9	18'.1	345° 59'.9	54'.1	172° 36'.7	29'.4
22	31° 32'.5	126° 27'.8	31'.2	233° 17'.2	17'.8	1° 02'.6	54'.0	187° 38'.9	29'.5
23	46° 35'.0	141° 26'.9	31'.4	248° 18'.5	17'.4	16° 05'.3	53'.9	202° 41'.1	29'.6
23 Wednesday 00	61° 37'.4	156° 25'.9	24° 31'.6 S	263° 19'.9	11° 17'.0 N	31° 08'.0	10° 53'.8 N	217° 43'.3	7° 29'.7 S
01	76° 39'.9	171° 25'.0	31'.8	278° 21'.2	16'.6	46° 10'.8	53'.7	232° 45'.5	29'.8
02	91° 42'.4	186° 24'.1	32'.0	293° 22'.6	16'.2	61° 13'.5	53'.7	247° 47'.7	29'.9
03	106° 44'.8	201° 23'.1	32'.2	308° 23'.9	15'.8	76° 16'.2	53'.6	262° 49'.9	30'.0
04	121° 47'.3	216° 22'.2	32'.3	323° 25'.3	15'.5	91° 18'.9	53'.5	277° 52'.2	30'.1
05	136° 49'.8	231° 21'.2	32'.5	338° 26'.6	15'.1	106° 21'.6	53'.4	292° 54'.4	30'.2
06	151° 52'.2	246° 20'.3	32'.7	353° 28'.0	14'.7	121° 24'.3	53'.3	307° 56'.6	30'.3
07	166° 54'.7	261° 19'.4	32'.9	8° 29'.3	14'.3	136° 27'.0	53'.3	322° 58'.8	30'.4
08	181° 57'.1	276° 18'.4	33'.1	23° 30'.7	13'.9	151° 29'.8	53'.2	338° 01'.0	30'.4
09	196° 59'.6	291° 17'.5	33'.3	38° 32'.0	13'.5	166° 32'.5	53'.1	353° 03'.2	30'.5
10	212° 02'.1	306° 16'.5	33'.5	53° 33'.4	13'.2	181° 35'.2	53'.0	8° 05'.4	30'.6
11	227° 04'.5	321° 15'.6	33'.6	68° 34'.7	12'.8	196° 37'.9	52'.9	23° 07'.6	30'.7
12	242° 07'.0	336° 14'.6	24° 33'.8 S	83° 36'.0	11° 12'.4 N	211° 40'.6	10° 52'.9 N	38° 09'.9	7° 30'.8 S
13	257° 09'.5	351° 13'.7	34'.0	98° 37'.4	12'.0	226° 43'.3	52'.8	53° 12'.1	30'.9
14	272° 11'.9	6° 12'.8	34'.2	113° 38'.7	11'.6	241° 46'.0	52'.7	68° 14'.3	31'.0
15	287° 14'.4	21° 11'.8	34'.3	128° 40'.1	11'.3	256° 48'.8	52'.6	83° 16'.5	31'.1
16	302° 16'.9	36° 10'.9	34'.5	143° 41'.4	10'.9	271° 51'.5	52'.5	98° 18'.7	31'.2
17	317° 19'.3	51° 09'.9	34'.7	158° 42'.8	10'.5	286° 54'.2	52'.5	113° 20'.9	31'.3
18	332° 21'.8	66° 09'.0	34'.9	173° 44'.2	10'.1	301° 56'.9	52'.4	128° 23'.1	31'.4
19	347° 24'.2	81° 08'.0	35'.0	188° 45'.5	09'.7	316° 59'.6	52'.3	143° 25'.3	31'.5
20	2° 26'.7	96° 07'.1	35'.2	203° 46'.9	09'.4	332° 02'.3	52'.2	158° 27'.5	31'.5
21	17° 29'.2	111° 06'.2	35'.4	218° 48'.2	09'.0	347° 05'.0	52'.2	173° 29'.8	31'.6
22	32° 31'.6	126° 05'.2	35'.5	233° 49'.6	08'.6	2° 07'.7	52'.1	188° 32'.0	31'.7
23	47° 34'.1	141° 04'.3	35'.7	248° 50'.9	08'.2	17° 10'.5	52'.0	203° 34'.2	31'.8
	M.P. 19:54	v -0'.9	d 0'.2	v 1'.3	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.7	40° 15'.4 S
Achernar	335° 27'.1	57° 10'.7 S
Acrux	173° 11'.1	63° 09'.7 S
Adhara	255° 13'.1	28° 59'.2 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 22'.0	55° 53'.5 N
Alkaid	153° 00'.2	49° 15'.1 N
Alnair	27° 45'.1	46° 54'.3 S
Alnilam	275° 47'.2	1° 11'.7 S
Alphard	217° 57'.1	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.1	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.2	59° 32'.7 S
Bellatrix	278° 32'.9	6° 21'.6 N
Betelgeuse	271° 02'.2	7° 24'.5 N
Canopus	263° 56'.2	52° 42'.0 S
Capella	280° 35'.6	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.8 N
Denebola	182° 34'.9	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.2	61° 40'.8 N
Elnath	278° 13'.7	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.6	57° 10'.6 S
Gienah	175° 53'.6	17° 36'.4 S
Hadar	148° 50'.1	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.1	74° 06'.3 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.3	36° 25'.6 S
Miaplacidus	221° 39'.7	69° 45'.7 S
Mirfak	308° 41'.5	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.2	56° 41'.9 S
Polaris	317° 53'.0	89° 19'.1 N
Pollux	243° 28'.9	27° 59'.6 N
Procyon	245° 00'.7	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.3 N
Regulus	207° 44'.7	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.3 S
Rigil Kent	139° 53'.9	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.4	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.2	43° 28'.7 S
Vega	80° 40'.1	38° 48'.0 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	96° 10'.2	13:34
Mars	202° 09'.5	06:28
Jupiter	329° 24'.5	21:56
Saturn	156° 12'.0	09:31

SUN											
GHA	Dec	GHA	v	Dec	d	HP
183° 35'.2	19° 46'.9 S	242° 23'.2	9'.9	4° 22'.1 S	13'.6	59'.8
198° 35'.0	47'.5	256° 52'.1	9'.8	35'.7	13'.6	59'.9
213° 34'.9	48'.0	271° 20'.9	9'.8	49'.3	13'.6	
228° 34'.7	48'.6	285° 49'.7	9'.8	5° 02'.9 S	13'.6	
243° 34'.6	49'.2	300° 18'.5	9'.6	16'.5	13'.5	
258° 34'.4	49'.7	314° 47'.1	9'.7	30'.0	13'.5	60'.0
273° 34'.3	50'.3	329° 15'.8	9'.5	43'.5	13'.6	
288° 34'.1	50'.8	343° 44'.3	9'.5	57'.1	13'.4	
303° 34'.0	51'.4	358° 12'.8	9'.5	6° 10'.5 S	13'.5	
318° 33'.8	51'.9	12° 41'.3	9'.4	24'.0	13'.4	60'.1
333° 33'.7	52'.5	27° 09'.7	9'.3	37'.4	13'.5	
348° 33'.5	53'.1	41° 38'.0	9'.2	50'.9	13'.3	
3° 33'.3	19° 53'.6 S	56° 06'.2	9'.2	7° 04'.2 S	13'.4	60'.1
18° 33'.2	54'.2	70° 34'.4	9'.2	17'.6	13'.3	60'.2
33° 33'.0	54'.7	85° 02'.6	9'.0	30'.9	13'.3	
48° 32'.9	55'.3	99° 30'.6	9'.0	44'.2	13'.3	
63° 32'.7	55'.8	113° 58'.6	9'.0	57'.5	13'.2	
78° 32'.6	56'.4	128° 26'.6	8'.8	8° 10'.7 S	13'.2	60'.3
93° 32'.4	56'.9	142° 54'.4	8'.8	23'.9	13'.1	
108° 32'.2	57'.5	157° 22'.2	8'.7	37'.0	13'.1	
123° 32'.1	58'.0	171° 49'.9	8'.7	50'.1	13'.1	
138° 31'.9	58'.6	186° 17'.6	8'.6	9° 03'.2 S	13'.0	60'.4
153° 31'.8	59'.1	200° 45'.2	8'.5	16'.2	12'.9	
168° 31'.6	59'.7	215° 12'.7	8'.4	29'.1	13'.0	
183° 31'.4	20° 00'.2 S	229° 40'.1	8'.4	9° 42'.1 S	12'.8	60'.4
198° 31'.3	00'.7	244° 07'.5	8'.3	54'.9	12'.9	
213° 31'.1	01'.3	258° 34'.8	8'.2	10° 07'.8 S	12'.7	60'.5
228° 31'.0	01'.8	273° 02'.0	8'.2	20'.5	12'.7	
243° 30'.8	02'.4	287° 29'.2	8'.1	33'.2	12'.7	
258° 30'.6	02'.9	301° 56'.3	8'.0	45'.9	12'.6	
273° 30'.5	03'.5	316° 23'.3	7'.9	58'.5	12'.5	
288° 30'.3	04'.0	330° 50'.2	7'.8	11° 11'.0 S	12'.5	60'.6
303° 30'.1	04'.5	345° 17'.0	7'.8	23'.5	12'.4	
318° 30'.0	05'.1	359° 43'.8	7'.7	35'.9	12'.4	
333° 29'.8	05'.6	14° 10'.5	7'.6	48'.3	12'.3	
348° 29'.7	06'.2	28° 37'.1	7'.6	12° 00'.6 S	12'.2	
3° 29'.5	20° 06'.7 S	43° 03'.7	7'.4	12° 12'.8 S	12'.1	60'.7
18° 29'.3	07'.2	57° 30'.1	7'.4	24'.9	12'.1	
33° 29'.2	07'.8	71° 56'.5	7'.3	37'.0	12'.0	
48° 29'.0	08'.3	86° 22'.8	7'.3	49'.0	11'.9	
63° 28'.8	08'.8	100° 49'.1	7'.1	13° 00'.9 S	11'.8	
78° 28'.7	09'.4	115° 15'.2	7'.1	12'.7	11'.8	
93° 28'.5	09'.9	129° 41'.3	7'.0	24'.5	11'.7	
108° 28'.3	10'.4	144° 07'.3	6'.9	36'.2	11'.6	60'.8
123° 28'.2	11'.0	158° 33'.2	6'.8	47'.8	11'.5	
138° 28'.0	11'.5	172° 59'.0	6'.8	59'.3	11'.5	
153° 27'.8	12'.0	187° 24'.8	6'.7	14° 10'.8 S	11'.3	
168° 27'.7	12'.6	201° 50'.5	6'.6	22'.1	11'.2	
183° 27'.5	20° 13'.1 S	216° 16'.1	6'.5	14° 33'.3 S	11'.2	60'.8
198° 27'.3	13'.6	230° 41'.6	6'.4	44'.5	11'.1	
213° 27'.1	14'.2	245° 07'.0	6'.4	55'.6	11'.0	
228° 27'.0	14'.7	259° 32'.4	6'.3	15° 06'.6 S	10'.8	60'.9
243° 26'.8	15'.2	273° 57'.7	6'.2	17'.4	10'.8	
258° 26'.6	15'.7	288° 22'.9	6'.1	28'.2	10'.7	
273° 26'.5	16'.3	302° 48'.0	6'.1	38'.9	10'.6	
288° 26'.3	16'.8	317° 13'.1	5'.9	49'.5	10'.4	
303° 26'.1	17'.3	331° 38'.0	5'.9	59'.9	10'.4	
318° 26'.0	17'.8	346° 02'.9	5'.8	16° 10'.3 S	10'.3	
333° 25'.8	18'.4	0° 27'.7	5'.8	20'.6	10'.1	
348° 25'.6	18'.9	14° 52'.5	5'.7	30'.7	10'.1	
3° 25'.4	20° 19'.4 S	29° 17'.2	5'.5	16° 40'.8 S	9'.9	60'.9
18° 25'.3	19'.9	43° 41'.7	5'.6	50'.7	9'.8	
33° 25'.1	20'.5	58° 06'.3	5'.4	17° 00'.5 S	9'.7	
48° 24'.9	21'.0	72° 30'.7	5'.4	10'.2	9'.6	
63° 24'.7	21'.5	86° 55'.1	5'.3	19'.8	9'.4	
78° 24'.6	22'.0	101° 19'.4	5'.2	29'.2	9'.4	61'.0
93° 24'.4	22'.5	115° 43'.6	5'.2	38'.6	9'.2	
108° 24'.2	23'.1	130° 07'.8	5'.0	47'.8	9'.1	
123° 24'.0	23'.6	144° 31'.8	5'.1	56'.9	9'.0	
138° 23'.9	24'.1	158° 55'.9	4'.9	18° 05'.9 S	8'.8	
153° 23'.7	24'.6	173° 19'.8	4'.9	14'.7	8'.8	
168° 23'.5	25'.1	187° 43'.7	4'.8	23'.5	8'.5	
SD 16'.2	d 0'.5	SD	16'.4	16'.5	16'.6	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 21	Moonrise 22	Moonrise 23
N 72°	07:22	09:06	-	03:02	05:20	08:07
N 70°	07:10	08:37	10:41	02:54	05:01	07:21
68°	06:59	08:16	09:45	02:48	04:45	06:51
66°	06:50	07:59	09:12	02:43	04:33	06:29
64°	06:42	07:45	08:48	02:38	04:23	06:12
62°	06:36	07:33	08:30	02:35	04:15	05:58
60°	06:30	07:23	08:14	02:31	04:07	05:46
N 58°	06:24	07:14	08:01	02:29	04:01	05:35
56°	06:19	07:06	07:50	02:26	03:55	05:26
54°	06:15	06:59	07:40	02:24	03:50	05:18
52°	06:11	06:53	07:31	02:22	03:46	05:11
50°	06:07	06:47	07:23	02:20	03:41	05:05
45°	05:58	06:34	07:06	02:16	03:33	04:51
N 40°	05:50	06:23	06:53	02:12	03:25	04:40
35°	05:43	06:13	06:41	02:09	03:19	04:31
30°	05:36	06:05	06:30	02:07	03:13	04:22
20°	05:22	05:49	06:13	02:02	03:04	04:08
N 10°	05:09	05:35	05:57	01:59	02:56	03:56
0°	04:55	05:20	05:42	01:55	02:48	03:44
S 10°	04:39	05:05	05:28	01:52	02:41	03:33
20°	04:20	04:48	05:12	01:48	02:32	03:21
30°	03:55	04:27	04:53	01:44	02:23	03:07
35°	03:39	04:14	04:42	01:41	02:18	02:59
40°	03:20	03:59	04:30	01:39	02:12	02:50
45°	02:55	03:40	04:15	01:36	02:06	02:40
S 50°	02:21	03:16	03:57	01:32	01:58	02:27
52°	02:03	03:05	03:48	01:30	01:54	02:21
54°	01:40	02:51	03:38	01:29	01:50	02:15
56°	01:09	02:35	03:27	01:27	01:45	02:08
58°	-	02:16	03:15	01:24	01:40	02:00
S 60°	-	01:51	03:00	01:22	01:35	01:51
S 62°	-	01:17	02:42	01:19	01:28	01:41

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 21	Moonset 22	Moonset 23
N 72°	-	14:25	16:09	12:43	12:17	11:30
N 70°	12:50	14:54	16:22	12:53	12:39	12:17
68°	13:46	15:16	16:32	13:02	12:56	12:48
66°	14:19	15:33	16:41	13:09	13:10	13:11
64°	14:43	15:47	16:49	13:15	13:21	13:30
62°	15:02	15:58	16:56	13:21	13:31	13:45
60°	15:17	16:09	17:02	13:25	13:39	13:58
N 58°	15:30	16:17	17:07	13:29	13:47	14:09
56°	15:42	16:25	17:12	13:33	13:53	14:19
54°	15:52	16:32	17:17	13:37	13:59	14:27
52°	16:01	16:39	17:21	13:40	14:05	14:35
50°	16:08	16:45	17:25	13:42	14:09	14:42
45°	16:25	16:58	17:34	13:48	14:20	14:57
N 40°	16:39	17:09	17:42	13:53	14:29	15:09
35°	16:51	17:18	17:49	13:58	14:36	15:20
30°	17:01	17:27	17:56	14:02	14:43	15:29
20°	17:19	17:43	18:10	14:08	14:55	15:45
N 10°	17:35	17:57	18:23	14:14	15:05	15:59
0°	17:50	18:12	18:37	14:20	15:14	16:12
S 10°	18:05	18:27	18:53	14:25	15:24	16:25
20°	18:21	18:45	19:13	14:31	15:34	16:39
30°	18:39	19:06	19:38	14:38	15:46	16:56
35°	18:50	19:19	19:54	14:42	15:53	17:05
40°	19:03	19:34	20:13	14:47	16:01	17:16
45°	19:18	19:53	20:38	14:52	16:10	17:29
S 50°	19:36	20:17	21:12	14:58	16:21	17:44
52°	19:45	20:29	21:31	15:01	16:26	17:51
54°	19:55	20:42	21:54	15:04	16:32	18:00
56°	20:06	20:59	22:28	15:08	16:38	18:09
58°	20:19	21:18	-	15:12	16:45	18:19
S 60°	20:34	21:43	-	15:16	16:53	18:31
S 62°	20:52	22:19	-	15:21	17:02	18:45

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
21	14 21	14 14	11:46	08:07	20:34	26d 20%
22	14 06	13 58	11:46	09:01	21:29	27d 11%
23	13 50	13 42	11:46	09:58	22:28	28d 5%

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2011 November 24, 25, 26 (Thur, Fri, Sat)

GMT	ARIES	VENUS -3.9		MARS +0.8		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
24 00	62° 36'.6	156° 03'.3	24° 35'.9 S	263° 52'.3	11° 07'.8 N	32° 13'.2	10° 51'.9 N	218° 36'.4	7° 31'.9 S
01	77° 39'.0	171° 02'.4	36'.0	278° 53'.6	07'.4	47° 15'.9	51'.8	233° 38'.6	32'.0
02	92° 41'.5	186° 01'.4	36'.2	293° 55'.0	07'.1	62° 18'.6	51'.8	248° 40'.8	32'.1
03	107° 44'.0	201° 00'.5	36'.3	308° 56'.3	06'.7	77° 21'.3	51'.7	263° 43'.0	32'.2
Thursday 04	122° 46'.4	215° 59'.5	36'.5	323° 57'.7	06'.3	92° 24'.0	51'.6	278° 45'.2	32'.3
05	137° 48'.9	230° 58'.6	36'.7	338° 59'.0	05'.9	107° 26'.7	51'.5	293° 47'.5	32'.4
06	152° 51'.4	245° 57'.7	36'.8	354° 00'.4	05'.5	122° 29'.4	51'.5	308° 49'.7	32'.5
07	167° 53'.8	260° 56'.7	37'.0	9° 01'.8	05'.2	137° 32'.1	51'.4	323° 51'.9	32'.5
08	182° 56'.3	275° 55'.8	37'.1	24° 03'.1	04'.8	152° 34'.8	51'.3	338° 54'.1	32'.6
09	197° 58'.7	290° 54'.8	37'.3	39° 04'.5	04'.4	167° 37'.5	51'.2	353° 56'.3	32'.7
10	213° 01'.2	305° 53'.9	37'.4	54° 05'.8	04'.0	182° 40'.3	51'.1	8° 58'.5	32'.8
11	228° 03'.7	320° 52'.9	37'.6	69° 07'.2	03'.6	197° 43'.0	51'.1	24° 00'.7	32'.9
12	243° 06'.1	335° 52'.0	24° 37'.7 S	84° 08'.5	11° 03'.3 N	212° 45'.7	10° 51'.0 N	39° 03'.0	7° 33'.0 S
13	258° 08'.6	350° 51'.0	37'.9	99° 09'.9	02'.9	227° 48'.4	50'.9	54° 05'.2	33'.1
14	273° 11'.1	5° 50'.1	38'.0	114° 11'.3	02'.5	242° 51'.1	50'.8	69° 07'.4	33'.2
15	288° 13'.5	20° 49'.1	38'.2	129° 12'.6	02'.1	257° 53'.8	50'.8	84° 09'.6	33'.3
16	303° 16'.0	35° 48'.2	38'.3	144° 14'.0	01'.8	272° 56'.5	50'.7	99° 11'.8	33'.4
17	318° 18'.5	50° 47'.3	38'.4	159° 15'.3	01'.4	287° 59'.2	50'.6	114° 14'.0	33'.5
18	333° 20'.9	65° 46'.3	38'.6	174° 16'.7	01'.0	303° 01'.9	50'.5	129° 16'.2	33'.5
19	348° 23'.4	80° 45'.4	38'.7	189° 18'.1	00'.6	318° 04'.6	50'.5	144° 18'.4	33'.6
20	3° 25'.9	95° 44'.4	38'.9	204° 19'.4	00'.2	333° 07'.3	50'.4	159° 20'.7	33'.7
21	18° 28'.3	110° 43'.5	39'.0	219° 20'.8	10° 59'.9 N	348° 10'.0	50'.3	174° 22'.9	33'.8
22	33° 30'.8	125° 42'.5	39'.1	234° 22'.2	59'.5	3° 12'.7	50'.2	189° 25'.1	33'.9
23	48° 33'.2	140° 41'.6	39'.3	249° 23'.5	59'.1	18° 15'.4	50'.1	204° 27'.3	34'.0
25 00	63° 35'.7	155° 40'.6	24° 39'.4 S	264° 24'.9	10° 58'.7 N	33° 18'.1	10° 50'.1 N	219° 29'.5	7° 34'.1 S
01	78° 38'.2	170° 39'.7	39'.5	279° 26'.3	58'.4	48° 20'.8	50'.0	234° 31'.7	34'.2
02	93° 40'.6	185° 38'.7	39'.7	294° 27'.6	58'.0	63° 23'.5	49'.9	249° 33'.9	34'.3
03	108° 43'.1	200° 37'.8	39'.8	309° 29'.0	57'.6	78° 26'.3	49'.8	264° 36'.2	34'.4
Friday 04	123° 45'.6	215° 36'.8	39'.9	324° 30'.3	57'.2	93° 29'.0	49'.8	279° 38'.4	34'.4
05	138° 48'.0	230° 35'.9	40'.0	339° 31'.7	56'.8	108° 31'.7	49'.7	294° 40'.6	34'.5
06	153° 50'.5	245° 34'.9	40'.2	354° 33'.1	56'.5	123° 34'.4	49'.6	309° 42'.8	34'.6
07	168° 53'.0	260° 34'.0	40'.3	9° 34'.4	56'.1	138° 37'.1	49'.5	324° 45'.0	34'.7
08	183° 55'.4	275° 33'.0	40'.4	24° 35'.8	55'.7	153° 39'.8	49'.5	339° 47'.2	34'.8
09	198° 57'.9	290° 32'.1	40'.5	39° 37'.2	55'.3	168° 42'.5	49'.4	354° 49'.4	34'.9
10	214° 00'.4	305° 31'.2	40'.7	54° 38'.6	55'.0	183° 45'.2	49'.3	9° 51'.7	35'.0
11	229° 02'.8	320° 30'.2	40'.8	69° 39'.9	54'.6	198° 47'.9	49'.2	24° 53'.9	35'.1
12	244° 05'.3	335° 29'.3	24° 40'.9 S	84° 41'.3	10° 54'.2 N	213° 50'.6	10° 49'.2 N	39° 56'.1	7° 35'.2 S
13	259° 07'.7	350° 28'.3	41'.0	99° 42'.7	53'.8	228° 53'.3	49'.1	54° 58'.3	35'.3
14	274° 10'.2	5° 27'.4	41'.1	114° 44'.0	53'.5	243° 56'.0	49'.0	70° 00'.5	35'.3
15	289° 12'.7	20° 26'.4	41'.2	129° 45'.4	53'.1	258° 58'.7	48'.9	85° 02'.7	35'.4
16	304° 15'.1	35° 25'.5	41'.3	144° 46'.8	52'.7	274° 01'.4	48'.9	100° 05'.0	35'.5
17	319° 17'.6	50° 24'.5	41'.5	159° 48'.1	52'.3	289° 04'.1	48'.8	115° 07'.2	35'.6
18	334° 20'.1	65° 23'.6	41'.6	174° 49'.5	51'.9	304° 06'.8	48'.7	130° 09'.4	35'.7
19	349° 22'.5	80° 22'.6	41'.7	189° 50'.9	51'.6	319° 09'.5	48'.7	145° 11'.6	35'.8
20	4° 25'.0	95° 21'.7	41'.8	204° 52'.3	51'.2	334° 12'.2	48'.6	160° 13'.8	35'.9
21	19° 27'.5	110° 20'.7	41'.9	219° 53'.6	50'.8	349° 14'.9	48'.5	175° 16'.0	36'.0
22	34° 29'.9	125° 19'.8	42'.0	234° 55'.0	50'.4	4° 17'.6	48'.4	190° 18'.2	36'.1
23	49° 32'.4	140° 18'.8	42'.1	249° 56'.4	50'.1	19° 20'.3	48'.4	205° 20'.5	36'.2
26 00	64° 34'.9	155° 17'.9	24° 42'.2 S	264° 57'.8	10° 49'.7 N	34° 23'.0	10° 48'.3 N	220° 22'.7	7° 36'.2 S
01	79° 37'.3	170° 16'.9	42'.3	279° 59'.1	49'.3	49° 25'.7	48'.2	235° 24'.9	36'.3
02	94° 39'.8	185° 16'.0	42'.4	295° 00'.5	48'.9	64° 28'.4	48'.1	250° 27'.1	36'.4
03	109° 42'.2	200° 15'.0	42'.5	310° 01'.9	48'.6	79° 31'.1	48'.1	265° 29'.3	36'.5
Saturday 04	124° 44'.7	215° 14'.1	42'.6	325° 03'.3	48'.2	94° 33'.8	48'.0	280° 31'.5	36'.6
05	139° 47'.2	230° 13'.1	42'.7	340° 04'.6	47'.8	109° 36'.5	47'.9	295° 33'.8	36'.7
06	154° 49'.6	245° 12'.2	42'.8	355° 06'.0	47'.4	124° 39'.2	47'.8	310° 36'.0	36'.8
07	169° 52'.1	260° 11'.2	42'.9	10° 07'.4	47'.1	139° 41'.9	47'.8	325° 38'.2	36'.9
08	184° 54'.6	275° 10'.3	43'.0	25° 08'.8	46'.7	154° 44'.5	47'.7	340° 40'.4	37'.0
09	199° 57'.0	290° 09'.3	43'.1	40° 10'.1	46'.3	169° 47'.2	47'.6	355° 42'.6	37'.0
10	214° 59'.5	305° 08'.4	43'.1	55° 11'.5	46'.0	184° 49'.9	47'.6	10° 44'.8	37'.1
11	230° 02'.0	320° 07'.4	43'.2	70° 12'.9	45'.6	199° 52'.6	47'.5	25° 47'.1	37'.2
12	245° 04'.4	335° 06'.5	24° 43'.3 S	85° 14'.3	10° 45'.2 N	214° 55'.3	10° 47'.4 N	40° 49'.3	7° 37'.3 S
13	260° 06'.9	350° 05'.5	43'.4	100° 15'.7	44'.8	229° 58'.0	47'.3	55° 51'.5	37'.4
14	275° 09'.4	5° 04'.6	43'.5	115° 17'.0	44'.5	245° 00'.7	47'.3	70° 53'.7	37'.5
15	290° 11'.8	20° 03'.6	43'.6	130° 18'.4	44'.1	260° 03'.4	47'.2	85° 55'.9	37'.6
16	305° 14'.3	35° 02'.7	43'.6	145° 19'.8	43'.7	275° 06'.1	47'.1	100° 58'.1	37'.7
17	320° 16'.7	50° 01'.7	43'.7	160° 21'.2	43'.3	290° 08'.8	47'.0	116° 00'.4	37'.8
18	335° 19'.2	65° 00'.8	43'.8	175° 22'.6	43'.0	305° 11'.5	47'.0	131° 02'.6	37'.8
19	350° 21'.7	79° 59'.8	43'.9	190° 23'.9	42'.6	320° 14'.2	46'.9	146° 04'.8	37'.9
20	5° 24'.1	94° 58'.9	44'.0	205° 25'.3	42'.2	335° 16'.9	46'.8	161° 07'.0	38'.0
21	20° 26'.6	109° 57'.9	44'.0	220° 26'.7	41'.8	350° 19'.6	46'.8	176° 09'.2	38'.1
22	35° 29'.1	124° 57'.0	44'.1	235° 28'.1	41'.5	5° 22'.3	46'.7	191° 11'.5	38'.2
23	50° 31'.5	139° 56'.0	44'.2	250° 29'.5	41'.1	20° 25'.0	46'.6	206° 13'.7	38'.3
	M.P. 19:42	v -0'.9	d 0'.1	v 1'.4	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.7	40° 15'.4 S
Achernar	335° 27'.1	57° 10'.7 S
Acrux	173° 11'.0	63° 09'.7 S
Adhara	255° 13'.1	28° 59'.2 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 22'.0	55° 53'.4 N
Alkaid	153° 00'.1	49° 15'.1 N
Alnair	27° 45'.1	46° 54'.3 S
Alnilam	275° 47'.2	1° 11'.7 S
Alphard	217° 57'.1	8° 42'.6 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.5 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.2	59° 32'.7 S
Bellatrix	278° 32'.9	6° 21'.6 N
Betelgeuse	271° 02'.2	7° 24'.5 N
Canopus	263° 56'.2	52° 42'.0 S
Capella	280° 35'.6	46° 00'.5 N
Deneb	49° 32'.4	45° 19'.8 N
Denebola	182° 34'.9	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.1	61° 40'.8 N
Elnath	278° 13'.7	28° 37'.0 N
Eltanin	90° 47'.1	51° 29'.5 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.5	57° 10'.6 S
Gienah	175° 53'.6	17° 36'.4 S
Hadar	148° 50'.1	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.3 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.7	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.9 S
Polaris	317° 52'.9	89° 19'.1 N
Pollux	243° 28'.8	27° 59'.6 N
Procyon	245° 00'.7	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.7	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.3 S
Rigil Kent	139° 53'.9	60° 52'.9 S
Sabik	102° 14'.2	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.4	16° 43'.9 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.1	43° 28'.7 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	92° 04'.9	13:38
Mars	200° 49'.2	06:22
Jupiter	329° 42'.4	21:43
Saturn	155° 53'.8	09:21

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 23'.3	20° 25'.6 S	202° 07'.5	4'.7	18° 32'.0 S	8'.5	61'.0
198° 23'.2	26'.1	216° 31'.2	4'.7	40'.5	8'.3	
213° 23'.0	26'.7	230° 54'.9	4'.6	48'.8	8'.2	
228° 22'.8	27'.2	245° 18'.5	4'.6	57'.0	8'.1	
243° 22'.6	27'.7	259° 42'.1	4'.5	19° 05'.1 S	7'.9	
258° 22'.4	28'.2	274° 05'.6	4'.4	13'.0	7'.8	
273° 22'.3	28'.7	288° 29'.0	4'.4	20'.8	7'.6	
288° 22'.1	29'.2	302° 52'.4	4'.3	28'.4	7'.5	60'.9
303° 21'.9	29'.7	317° 15'.7	4'.3	35'.9	7'.4	
318° 21'.7	30'.2	331° 39'.0	4'.2	43'.3	7'.2	
333° 21'.5	30'.7	346° 02'.2	4'.2	50'.5	7'.1	
348° 21'.4	31'.3	0° 25'.4	4'.1	57'.6	6'.9	
3° 21'.2	20° 31'.8 S	14° 48'.5	4'.0	20° 04'.5 S	6'.8	60'.9
18° 21'.0	32'.3	29° 11'.5	4'.0	11'.3	6'.6	
33° 20'.8	32'.8	43° 34'.5	4'.0	17'.9	6'.5	
48° 20'.6	33'.3	57° 57'.5	3'.9	24'.4	6'.3	
63° 20'.5	33'.8	72° 20'.4	3'.9	30'.7	6'.2	
78° 20'.3	34'.3	86° 43'.3	3'.8	36'.9	6'.0	
93° 20'.1	34'.8	101° 06'.1	3'.8	42'.9	5'.9	
108° 19'.9	35'.3	115° 28'.9	3'.7	48'.8	5'.7	
123° 19'.7	35'.8	129° 51'.6	3'.8	54'.5	5'.6	
138° 19'.5	36'.3	144° 14'.4	3'.6	21° 00'.1 S	5'.4	60'.8
153° 19'.4	36'.8	158° 37'.0	3'.7	05'.5	5'.2	
168° 19'.2	37'.3	172° 59'.7	3'.6	10'.7	5'.1	
183° 19'.0	20° 37'.8 S	187° 22'.3	3'.6	21° 15'.8 S	5'.0	60'.8
198° 18'.8	38'.3	201° 44'.9	3'.6	20'.8	4'.8	
213° 18'.6	38'.8	216° 07'.5	3'.5	25'.6	4'.6	
228° 18'.4	39'.3	230° 30'.0	3'.5	30'.2	4'.4	
243° 18'.2	39'.8	244° 52'.5	3'.5	34'.6	4'.3	60'.7
258° 18'.1	40'.3	259° 15'.0	3'.5	38'.9	4'.2	
273° 17'.9	40'.8	273° 37'.5	3'.4	43'.1	3'.9	
288° 17'.7	41'.3	287° 59'.9	3'.5	47'.0	3'.8	
303° 17'.5	41'.8	302° 22'.4	3'.4	50'.8	3'.7	
318° 17'.3	42'.3	316° 44'.8	3'.4	54'.5	3'.5	
333° 17'.1	42'.7	331° 07'.2	3'.4	58'.0	3'.3	60'.6
348° 16'.9	43'.2	345° 29'.6	3'.4	22° 01'.3 S	3'.2	
3° 16'.7	20° 43'.7 S	359° 52'.0	3'.4	22° 04'.5 S	2'.9	60'.6
18° 16'.5	44'.2	14° 14'.4	3'.4	07'.4	2'.9	
33° 16'.4	44'.7	28° 36'.8	3'.5	10'.3	2'.6	
48° 16'.2	45'.2	42° 59'.3	3'.4	12'.9	2'.5	
63° 16'.0	45'.7	57° 21'.7	3'.4	15'.4	2'.4	60'.5
78° 15'.8	46'.2	71° 44'.1	3'.4	17'.8	2'.1	
93° 15'.6	46'.7	86° 06'.5	3'.4	19'.9	2'.0	
108° 15'.4	47'.1	100° 28'.9	3'.4	21'.9	1'.9	
123° 15'.2	47'.6	114° 51'.3	3'.5	23'.8	1'.6	60'.4
138° 15'.0	48'.1	129° 13'.8	3'.5	25'.4	1'.5	
153° 14'.8	48'.6	143° 36'.3	3'.4	26'.9	1'.4	
168° 14'.6	49'.1	157° 58'.7	3'.5	28'.3	1'.1	
183° 14'.4	20° 49'.6 S	172° 21'.2	3'.6	22° 29'.4 S	1'.0	60'.4
198° 14'.3	50'.0	186° 43'.8	3'.5	30'.4	0'.9	60'.3
213° 14'.1	50'.5	201° 06'.3	3'.6	31'.3	0'.7	
228° 13'.9	51'.0	215° 28'.9	3'.6	32'.0	0'.5	
243° 13'.7	51'.5	229° 51'.5	3'.6	32'.5	0'.3	
258° 13'.5	52'.0	244° 14'.1	3'.7	32'.8	0'.2	60'.2
273° 13'.3	52'.4	258° 36'.8	3'.7	33'.0	0'.0	
288° 13'.1	52'.9	272° 59'.5	3'.8	33'.0	0'.1	
303° 12'.9	53'.4	287° 22'.3	3'.8	32'.9	0'.3	60'.1
318° 12'.7	53'.9	301° 45'.1	3'.8	32'.6	0'.5	
333° 12'.5	54'.4	316° 07'.9	3'.9	32'.1	0'.6	
348° 12'.3	54'.8	330° 30'.8	3'.9	31'.5	0'.8	
3° 12'.1	20° 55'.3 S	344° 53'.7	3'.9	22° 30'.7 S	0'.9	60'.0
18° 11'.9	55'.8	359° 16'.6	4'.1	29'.8	1'.2	
33° 11'.7	56'.3	13° 39'.7	4'.0	28'.6	1'.2	
48° 11'.5	56'.7	28° 02'.7	4'.1	27'.4	1'.4	59'.9
63° 11'.3	57'.2	42° 25'.8	4'.2	26'.0	1'.6	
78° 11'.1	57'.7	56° 49'.0	4'.3	24'.4	1'.8	
93° 10'.9	58'.1	71° 12'.3	4'.3	22'.6	1'.8	
108° 10'.7	58'.6	85° 35'.6	4'.3	20'.8	2'.1	59'.8
123° 10'.5	59'.1	99° 58'.9	4'.4	18'.7	2'.2	
138° 10'.3	59'.5	114° 22'.3	4'.5	16'.5	2'.3	
153° 10'.1	21° 00'.0 S	128° 45'.8	4'.6	14'.2	2'.5	59'.7
168° 09'.9	00'.5	143° 09'.4	4'.6	11'.7	2'.7	
SD 16'.2	d 0'.5	SD 16'.6		16'.5	16'.4	

MOON						
GHA	v	Dec	d	HP
202° 07'.5	4'.7	18° 32'.0 S	8'.5	61'.0
216° 31'.2	4'.7	40'.5	8'.3	
230° 54'.9	4'.6	48'.8	8'.2	
245° 18'.5	4'.6	57'.0	8'.1	
259° 42'.1	4'.5	19° 05'.1 S	7'.9	
274° 05'.6	4'.4	13'.0	7'.8	
288° 29'.0	4'.4	20'.8	7'.6	
302° 52'.4	4'.3	28'.4	7'.5	60'.9
317° 15'.7	4'.3	35'.9	7'.4	
331° 39'.0	4'.2	43'.3	7'.2	
346° 02'.2	4'.2	50'.5	7'.1	
0° 25'.4	4'.1	57'.6	6'.9	
14° 48'.5	4'.0	20° 04'.5 S	6'.8	60'.9
29° 11'.5	4'.0	11'.3	6'.6	
43° 34'.5	4'.0	17'.9	6'.5	
57° 57'.5	3'.9	24'.4	6'.3	
72° 20'.4	3'.9	30'.7	6'.2	
86° 43'.3	3'.8	36'.9	6'.0	
101° 06'.1	3'.8	42'.9	5'.9	
115° 28'.9	3'.7	48'.8	5'.7	
129° 51'.6	3'.8	54'.5	5'.6	
144° 14'.4	3'.6	21° 00'.1 S	5'.4	60'.8
158° 37'.0	3'.7	05'.5	5'.2	
172° 59'.7	3'.6	10'.7	5'.1	
187° 22'.3	3'.6	21° 15'.8 S	5'.0	60'.8
201° 44'.9	3'.6	20'.8	4'.8	
216° 07'.5	3'.5	25'.6	4'.6	
230° 30'.0	3'.5	30'.2	4'.4	
244° 52'.5	3'.5	34'.6	4'.3	60'.7
259° 15'.0	3'.5	38'.9	4'.2	
273° 37'.5	3'.4	43'.1	3'.9	
287° 59'.9	3'.5	47'.0	3'.8	
302° 22'.4	3'.4	50'.8	3'.7	
316° 44'.8	3'.4	54'.5	3'.5	
331° 07'.2	3'.4	58'.0	3'.3	60'.6
345° 29'.6	3'.4	22° 01'.3 S	3'.2	
359° 52'.0	3'.4	22° 04'.5 S	2'.9	60'.6
14° 14'.4	3'.4	07'.4	2'.9	
28° 36'.8	3'.5	10'.3	2'.6	
42° 59'.3	3'.4	12'.9	2'.5	
57° 21'.7	3'.4	15'.4	2'.4	60'.5
71° 44'.1	3'.4	17'.8	2'.1	
86° 06'.5	3'.4	19'.9	2'.0	
100° 28'.9	3'.4	21'.9	1'.9	
114° 51'.3	3'.5	23'.8	1'.6	60'.4
129° 13'.8	3'.5	25'.4	1'.5	
143° 36'.3	3'.4	26'.9	1'.4	
157° 58'.7	3'.5	28'.3	1'.1	
172° 21'.2	3'.6	22° 29'.4 S	1'.0	60'.4
186° 43'.8	3'.5	30'.4	0'.9	60'.3
201° 06'.3	3'.6	31'.3	0'.7	
215° 28'.9	3'.6	32'.0	0'.5	
229° 51'.5	3'.6	32'.5	0'.3	
244° 14'.1	3'.7	32'.8	0'.2	60'.2
258° 36'.8	3'.7	33'.0	0'.0	
272° 59'.5	3'.8	33'.0	0'.1	
287° 22'.3	3'.8	32'.9	0'.3	60'.1
301° 45'.1	3'.8	32'.6	0'.5	
316° 07'.9	3'.9	32'.1	0'.6	
330° 30'.8	3'.9	31'.5	0'.8	
344° 53'.7	3'.9	22° 30'.7 S	0'.9	60'.0
359° 16'.6	4'.1	29'.8	1'.2	
13° 39'.7	4'.0	28'.6	1'.2	
28° 02'.7	4'.1	27'.4	1'.4	59'.9
42° 25'.8	4'.2	26'.0	1'.6	
56° 49'.0	4'.3	24'.4	1'.8	
71° 12'.3	4'.3	22'.6	1'.8	
85° 35'.6	4'.3	20'.8	2'.1	59'.8
99° 58'.9	4'.4	18'.7	2'.2	
114° 22'.3	4'.5	16'.5	2'.3	
128° 45'.8	4'.6	14'.2	2'.5	59'.7
143° 09'.4	4'.6	11'.7	2'.7	
SD 16'.6		16'.5	16'.4	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26
N 72°	07:32	09:20	-	-	-	-
N 70°	07:18	08:48	11:22	-	-	-
68°	07:07	08:25	10:01	09:09	-	-
66°	06:57	08:07	09:24	08:29	10:21	11:39
64°	06:49	07:52	08:58	08:01	09:41	10:54
62°	06:42	07:40	08:37	07:40	09:13	10:24
60°	06:35	07:29	08:21	07:23	08:51	10:01
N 58°	06:29	07:20	08:07	07:09	08:34	09:43
56°	06:24	07:11	07:55	06:56	08:19	09:28
54°	06:19	07:04	07:45	06:46	08:06	09:14
52°	06:15	06:57	07:36	06:36	07:55	09:03
50°	06:11	06:51	07:28	06:28	07:45	08:53
45°	06:01	06:38	07:10	06:10	07:25	08:31
N 40°	05:53	06:26	06:56	05:55	07:08	08:14
35°	05:45	06:16	06:44	05:43	06:54	07:59
30°	05:38	06:07	06:33	05:32	06:41	07:46
20°	05:24	05:51	06:15	05:14	06:21	07:25
N 10°	05:10	05:36	05:58	04:58	06:02	07:06
0°	04:55	05:21	05:43	04:44	05:46	06:48
S 10°	04:39	05:05	05:28	04:29	05:29	06:31
20°	04:19	04:47	05:11	04:14	05:11	06:12
30°	03:54	04:26	04:52	03:56	04:51	05:51
35°	03:37	04:12	04:41	03:46	04:39	05:38
40°	03:17	03:57	04:28	03:34	04:25	05:23
45°	02:52	03:37	04:13	03:20	04:09	05:06
S 50°	02:16	03:13	03:54	03:03	03:49	04:45
52°	01:57	03:00	03:45	02:56	03:40	04:35
54°	01:32	02:46	03:35

2011 November 27, 28, 29 (Sun, Mon, Tue)

GMT	ARIES	VENUS -3.9		MARS +0.8		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
27 Sunday 00	65° 34'.0	154° 55'.1	24° 44'.2 S	265° 30'.9	10° 40'.7 N	35° 27'.7	10° 46'.6 N	221° 15'.9	7° 38'.4 S
01	80° 36'.5	169° 54'.1	44'.3	280° 32'.3	40'.4	50° 30'.3	46'.5	236° 18'.1	38'.5
02	95° 38'.9	184° 53'.2	44'.4	295° 33'.6	40'.0	65° 33'.0	46'.4	251° 20'.3	38'.6
03	110° 41'.4	199° 52'.2	44'.4	310° 35'.0	39'.6	80° 35'.7	46'.3	266° 22'.5	38'.6
04	125° 43'.8	214° 51'.3	44'.5	325° 36'.4	39'.2	95° 38'.4	46'.3	281° 24'.8	38'.7
05	140° 46'.3	229° 50'.3	44'.6	340° 37'.8	38'.9	110° 41'.1	46'.2	296° 27'.0	38'.8
06	155° 48'.8	244° 49'.4	44'.6	355° 39'.2	38'.5	125° 43'.8	46'.1	311° 29'.2	38'.9
07	170° 51'.2	259° 48'.4	44'.7	10° 40'.6	38'.1	140° 46'.5	46'.1	326° 31'.4	39'.0
08	185° 53'.7	274° 47'.5	44'.8	25° 42'.0	37'.8	155° 49'.2	46'.0	341° 33'.6	39'.1
09	200° 56'.2	289° 46'.5	44'.8	40° 43'.3	37'.4	170° 51'.9	45'.9	356° 35'.9	39'.2
10	215° 58'.6	304° 45'.6	44'.9	55° 44'.7	37'.0	185° 54'.6	45'.8	11° 38'.1	39'.3
11	231° 01'.1	319° 44'.6	44'.9	70° 46'.1	36'.6	200° 57'.2	45'.8	26° 40'.3	39'.3
12	246° 03'.6	334° 43'.7	24° 45'.0 S	85° 47'.5	10° 36'.3 N	215° 59'.9	10° 45'.7 N	41° 42'.5	7° 39'.4 S
13	261° 06'.0	349° 42'.7	45'.0	100° 48'.9	35'.9	231° 02'.6	45'.6	56° 44'.7	39'.5
14	276° 08'.5	4° 41'.8	45'.1	115° 50'.3	35'.5	246° 05'.3	45'.6	71° 47'.0	39'.6
15	291° 11'.0	19° 40'.8	45'.1	130° 51'.7	35'.2	261° 08'.0	45'.5	86° 49'.2	39'.7
16	306° 13'.4	34° 39'.9	45'.2	145° 53'.1	34'.8	276° 10'.7	45'.4	101° 51'.4	39'.8
17	321° 15'.9	49° 38'.9	45'.2	160° 54'.5	34'.4	291° 13'.4	45'.4	116° 53'.6	39'.9
18	336° 18'.3	64° 38'.0	45'.3	175° 55'.9	34'.1	306° 16'.1	45'.3	131° 55'.8	40'.0
19	351° 20'.8	79° 37'.0	45'.3	190° 57'.3	33'.7	321° 18'.8	45'.2	146° 58'.0	40'.1
20	6° 23'.3	94° 36'.1	45'.4	205° 58'.7	33'.3	336° 21'.4	45'.2	162° 00'.3	40'.1
21	21° 25'.7	109° 35'.1	45'.4	221° 00'.0	32'.9	351° 24'.1	45'.1	177° 02'.5	40'.2
22	36° 28'.2	124° 34'.2	45'.5	236° 01'.4	32'.6	6° 26'.8	45'.0	192° 04'.7	40'.3
23	51° 30'.7	139° 33'.2	45'.5	251° 02'.8	32'.2	21° 29'.5	44'.9	207° 06'.9	40'.4
28 Monday 00	66° 33'.1	154° 32'.3	24° 45'.5 S	266° 04'.2	10° 31'.8 N	36° 32'.2	10° 44'.9 N	222° 09'.1	7° 40'.5 S
01	81° 35'.6	169° 31'.3	45'.6	281° 05'.6	31'.5	51° 34'.9	44'.8	237° 11'.4	40'.6
02	96° 38'.1	184° 30'.4	45'.6	296° 07'.0	31'.1	66° 37'.6	44'.7	252° 13'.6	40'.7
03	111° 40'.5	199° 29'.4	45'.6	311° 08'.4	30'.7	81° 40'.2	44'.7	267° 15'.8	40'.8
04	126° 43'.0	214° 28'.5	45'.7	326° 09'.8	30'.4	96° 42'.9	44'.6	282° 18'.0	40'.8
05	141° 45'.5	229° 27'.5	45'.7	341° 11'.2	30'.0	111° 45'.6	44'.5	297° 20'.2	40'.9
06	156° 47'.9	244° 26'.5	45'.7	356° 12'.6	29'.6	126° 48'.3	44'.5	312° 22'.5	41'.0
07	171° 50'.4	259° 25'.6	45'.8	11° 14'.0	29'.3	141° 51'.0	44'.4	327° 24'.7	41'.1
08	186° 52'.8	274° 24'.6	45'.8	26° 15'.4	28'.9	156° 53'.7	44'.3	342° 26'.9	41'.2
09	201° 55'.3	289° 23'.7	45'.8	41° 16'.8	28'.5	171° 56'.3	44'.3	357° 29'.1	41'.3
10	216° 57'.8	304° 22'.7	45'.9	56° 18'.2	28'.2	186° 59'.0	44'.2	12° 31'.3	41'.4
11	232° 00'.2	319° 21'.8	45'.9	71° 19'.6	27'.8	202° 01'.7	44'.1	27° 33'.6	41'.5
12	247° 02'.7	334° 20'.8	24° 45'.9 S	86° 21'.0	10° 27'.4 N	217° 04'.4	10° 44'.1 N	42° 35'.8	7° 41'.5 S
13	262° 05'.2	349° 19'.9	45'.9	101° 22'.4	27'.1	232° 07'.1	44'.0	57° 38'.0	41'.6
14	277° 07'.6	4° 18'.9	45'.9	116° 23'.8	26'.7	247° 09'.8	43'.9	72° 40'.2	41'.7
15	292° 10'.1	19° 18'.0	46'.0	131° 25'.2	26'.3	262° 12'.4	43'.9	87° 42'.5	41'.8
16	307° 12'.6	34° 17'.0	46'.0	146° 26'.6	26'.0	277° 15'.1	43'.8	102° 44'.7	41'.9
17	322° 15'.0	49° 16'.1	46'.0	161° 28'.0	25'.6	292° 17'.8	43'.7	117° 46'.9	42'.0
18	337° 17'.5	64° 15'.1	46'.0	176° 29'.4	25'.2	307° 20'.5	43'.7	132° 49'.1	42'.1
19	352° 20'.0	79° 14'.2	46'.0	191° 30'.8	24'.9	322° 23'.2	43'.6	147° 51'.3	42'.1
20	7° 22'.4	94° 13'.2	46'.0	206° 32'.2	24'.5	337° 25'.8	43'.5	162° 53'.6	42'.2
21	22° 24'.9	109° 12'.3	46'.1	221° 33'.6	24'.1	352° 28'.5	43'.5	177° 55'.8	42'.3
22	37° 27'.3	124° 11'.3	46'.1	236° 35'.0	23'.8	7° 31'.2	43'.4	192° 58'.0	42'.4
23	52° 29'.8	139° 10'.4	46'.1	251° 36'.4	23'.4	22° 33'.9	43'.3	208° 00'.2	42'.5
29 Tuesday 00	67° 32'.3	154° 09'.4	24° 46'.1 S	266° 37'.8	10° 23'.0 N	37° 36'.6	10° 43'.3 N	223° 02'.4	7° 42'.6 S
01	82° 34'.7	169° 08'.5	46'.1	281° 39'.3	22'.7	52° 39'.2	43'.2	238° 04'.7	42'.7
02	97° 37'.2	184° 07'.5	46'.1	296° 40'.7	22'.3	67° 41'.9	43'.1	253° 06'.9	42'.8
03	112° 39'.7	199° 06'.6	46'.1	311° 42'.1	21'.9	82° 44'.6	43'.1	268° 09'.1	42'.8
04	127° 42'.1	214° 05'.6	46'.1	326° 43'.5	21'.6	97° 47'.3	43'.0	283° 11'.3	42'.9
05	142° 44'.6	229° 04'.7	46'.1	341° 44'.9	21'.2	112° 49'.9	42'.9	298° 13'.6	43'.0
06	157° 47'.1	244° 03'.7	46'.1	356° 46'.3	20'.8	127° 52'.6	42'.9	313° 15'.8	43'.1
07	172° 49'.5	259° 02'.8	46'.1	11° 47'.7	20'.5	142° 55'.3	42'.8	328° 18'.0	43'.2
08	187° 52'.0	274° 01'.8	46'.1	26° 49'.1	20'.1	157° 58'.0	42'.7	343° 20'.2	43'.3
09	202° 54'.5	289° 00'.9	46'.1	41° 50'.5	19'.7	173° 00'.7	42'.7	358° 22'.4	43'.4
10	217° 56'.9	303° 59'.9	46'.1	56° 51'.9	19'.4	188° 03'.3	42'.6	13° 24'.7	43'.4
11	232° 59'.4	318° 59'.0	46'.1	71° 53'.3	19'.0	203° 06'.0	42'.5	28° 26'.9	43'.5
12	248° 01'.8	333° 58'.0	24° 46'.1 S	86° 54'.8	10° 18'.6 N	218° 08'.7	10° 42'.5 N	43° 29'.1	7° 43'.6 S
13	263° 04'.3	348° 57'.1	46'.1	101° 56'.2	18'.3	233° 11'.4	42'.4	58° 31'.3	43'.7
14	278° 06'.8	3° 56'.1	46'.0	116° 57'.6	17'.9	248° 14'.0	42'.3	73° 33'.6	43'.8
15	293° 09'.2	18° 55'.2	46'.0	131° 59'.0	17'.6	263° 16'.7	42'.3	88° 35'.8	43'.9
16	308° 11'.7	33° 54'.2	46'.0	147° 00'.4	17'.2	278° 19'.4	42'.2	103° 38'.0	44'.0
17	323° 14'.2	48° 53'.3	46'.0	162° 01'.8	16'.8	293° 22'.1	42'.2	118° 40'.2	44'.0
18	338° 16'.6	63° 52'.3	46'.0	177° 03'.2	16'.5	308° 24'.7	42'.1	133° 42'.5	44'.1
19	353° 19'.1	78° 51'.4	46'.0	192° 04'.6	16'.1	323° 27'.4	42'.0	148° 44'.7	44'.2
20	8° 21'.6	93° 50'.4	46'.0	207° 06'.1	15'.7	338° 30'.1	42'.0	163° 46'.9	44'.3
21	23° 24'.0	108° 49'.5	45'.9	222° 07'.5	15'.4	353° 32'.7	41'.9	178° 49'.1	44'.4
22	38° 26'.5	123° 48'.5	45'.9	237° 08'.9	15'.0	8° 35'.4	41'.8	193° 51'.4	44'.5
23	53° 28'.9	138° 47'.6	45'.9	252° 10'.3	14'.6	23° 38'.1	41'.8	208° 53'.6	44'.6
	M.P. 19:31	v -1'.0	d 0'.0	v 1'.4	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.7	40° 15'.4 S
Achernar	335° 27'.1	57° 10'.7 S
Acrux	173° 11'.0	63° 09'.7 S
Adhara	255° 13'.1	28° 59'.3 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 22'.0	55° 53'.4 N
Alkaid	153° 00'.1	49° 15'.0 N
Alnair	27° 45'.1	46° 54'.3 S
Alnilam	275° 47'.2	1° 11'.7 S
Alphard	217° 57'.1	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.5	42° 14'.6 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.1	59° 32'.7 S
Bellatrix	278° 32'.9	6° 21'.6 N
Betelgeuse	271° 02'.2	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.0 S
Capella	280° 35'.6	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.8 N
Denebola	182° 34'.9	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.1	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.4 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.5	57° 10'.6 S
Gienah	175° 53'.6	17° 36'.4 S
Hadar	148° 50'.0	60° 25'.7 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.2 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.6	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.9 S
Polaris	317° 53'.0	89° 19'.1 N
Pollux	243° 28'.8	27° 59'.6 N
Procyon	245° 00'.6	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.6	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.3 S
Rigil Kent	139° 53'.8	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.4	16° 44'.0 S
Spica	158° 32'.7	11° 13'.4 S
Suhail	222° 53'.1	43° 28'.7 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 07'.0	16° 05'.4 S

	SHA	Mer.Pass.
Venus	87° 59'.1	13:43
Mars	199° 31'.1	06:15
Jupiter	329° 59'.1	21:30
Saturn	155° 36'.0	09:10

SUN						
GHA	Dec	GHA	v	Dec	d	HP
183° 09'.7	21° 00'.9 S	157° 33'.0	4'.7	22° 09'.0 S	2'.8	59'.7
198° 09'.5	01'.4	171° 56'.7	4'.7	06'.2	3'.0	59'.6
213° 09'.3	01'.9	186° 20'.4	4'.9	03'.2	3'.1	
228° 09'.1	02'.3	200° 44'.3	4'.9	00'.1	3'.2	
243° 08'.9	02'.8	215° 08'.2	5'.0	21° 56'.9 S	3'.4	59'.5
258° 08'.7	03'.3	229° 32'.2	5'.0	53'.5	3'.5	
273° 08'.5	03'.7	243° 56'.2	5'.2	50'.0	3'.7	
288° 08'.3	04'.2	258° 20'.4	5'.2	46'.3	3'.8	59'.4
303° 08'.1	04'.7	272° 44'.6	5'.3	42'.5	4'.0	
318° 07'.9	05'.1	287° 08'.9	5'.4	38'.5	4'.1	
333° 07'.7	05'.6	301° 33'.3	5'.4	34'.4	4'.3	59'.3
348° 07'.5	06'.0	315° 57'.7	5'.6	30'.1	4'.3	
3° 07'.3	21° 06'.5 S	330° 22'.3	5'.6	21° 25'.8 S	4'.6	59'.3
18° 07'.1	07'.0	344° 46'.9	5'.8	21'.2	4'.6	59'.2
33° 06'.9	07'.4	359° 11'.7	5'.8	16'.6	4'.8	
48° 06'.7	07'.9	13° 36'.5	5'.9	11'.8	4'.9	59'.1
63° 06'.5	08'.3	28° 01'.4	6'.0	06'.9	5'.1	
78° 06'.3	08'.8	42° 26'.4	6'.1	01'.8	5'.1	
93° 06'.1	09'.2	56° 51'.5	6'.2	20° 56'.7 S	5'.4	59'.0
108° 05'.8	09'.7	71° 16'.7	6'.3	51'.3	5'.4	
123° 05'.6	10'.1	85° 42'.0	6'.3	45'.9	5'.6	
138° 05'.4	10'.6	100° 07'.3	6'.5	40'.3	5'.6	58'.9
153° 05'.2	11'.0	114° 32'.8	6'.6	34'.7	5'.8	
168° 05'.0	11'.5	128° 58'.4	6'.6	28'.9	6'.0	58'.8
183° 04'.8	21° 11'.9 S	143° 24'.0	6'.8	20° 22'.9 S	6'.0	58'.8
198° 04'.6	12'.4	157° 49'.8	6'.8	16'.9	6'.2	
213° 04'.4	12'.8	172° 15'.6	7'.0	10'.7	6'.3	58'.7
228° 04'.2	13'.3	186° 41'.6	7'.1	04'.4	6'.4	
243° 04'.0	13'.7	201° 07'.7	7'.1	19° 58'.0 S	6'.5	
258° 03'.8	14'.2	215° 33'.8	7'.3	51'.5	6'.6	58'.6
273° 03'.6	14'.6	230° 00'.1	7'.3	44'.9	6'.8	
288° 03'.3	15'.1	244° 26'.4	7'.5	38'.1	6'.8	58'.5
303° 03'.1	15'.5	258° 52'.9	7'.6	31'.3	7'.0	
318° 02'.9	16'.0	273° 19'.5	7'.6	24'.3	7'.1	
333° 02'.7	16'.4	287° 46'.1	7'.8	17'.2	7'.1	58'.4
348° 02'.5	16'.8	302° 12'.9	7'.9	10'.1	7'.3	
3° 02'.3	21° 17'.3 S	316° 39'.8	7'.9	19° 02'.8 S	7'.4	58'.3
18° 02'.1	17'.7	331° 06'.7	8'.1	18° 55'.4 S	7'.5	
33° 01'.9	18'.2	345° 33'.8	8'.2	47'.9	7'.6	
48° 01'.7	18'.6	0° 01'.0	8'.3	40'.3	7'.6	58'.2
63° 01'.4	19'.0	14° 28'.3	8'.3	32'.7	7'.8	
78° 01'.2	19'.5	28° 55'.6	8'.5	24'.9	7'.9	
93° 01'.0	19'.9	43° 23'.1	8'.6	17'.0	8'.0	58'.1
108° 00'.8	20'.4	57° 50'.7	8'.7	09'.0	8'.0	
123° 00'.6	20'.8	72° 18'.4	8'.8	01'.0	8'.2	58'.0
138° 00'.4	21'.2	86° 46'.2	8'.9	17° 52'.8 S	8'.2	
153° 00'.2	21'.7	101° 14'.1	9'.0	44'.6	8'.4	
167° 59'.9	22'.1	115° 42'.1	9'.1	36'.2	8'.4	57'.9
182° 59'.7	21° 22'.5 S	130° 10'.2	9'.2	17° 27'.8 S	8'.5	57'.9
197° 59'.5	23'.0	144° 38'.4	9'.3	19'.3	8'.6	57'.8
212° 59'.3	23'.4	159° 06'.7	9'.4	10'.7	8'.6	
227° 59'.1	23'.8	173° 35'.1	9'.5	02'.1	8'.8	
242° 58'.9	24'.3	188° 03'.6	9'.6	16° 53'.3 S	8'.8	57'.7
257° 58'.7	24'.7	202° 32'.2	9'.8	44'.5	8'.9	
272° 58'.4	25'.1	217° 01'.0	9'.8	35'.6	9'.0	57'.6
287° 58'.2	25'.5	231° 29'.8	9'.9	26'.6	9'.1	
302° 58'.0	26'.0	245° 58'.7	10'.0	17'.5	9'.2	
317° 57'.8	26'.4	260° 27'.7	10'.1	08'.3	9'.2	57'.5
332° 57'.6	26'.8	274° 56'.8	10'.2	15° 59'.1 S	9'.3	
347° 57'.3	27'.3	289° 26'.0	10'.3	49'.8	9'.3	
2° 57'.1	21° 27'.7 S	303° 55'.3	10'.4	15° 40'.5 S	9'.5	57'.4
17° 56'.9	28'.1	318° 24'.7	10'.5	31'.0	9'.4	
32° 56'.7	28'.5	332° 54'.2	10'.7	21'.6	9'.6	57'.3
47° 56'.5	28'.9	347° 23'.9	10'.7	12'.0	9'.6	
62° 56'.2	29'.4	1° 53'.6	10'.7	02'.4	9'.7	
77° 56'.0	29'.8	16° 23'.3	10'.9	14° 52'.7 S	9'.8	57'.2
92° 55'.8	30'.2	30° 53'.2	11'.0	42'.9	9'.8	
107° 55'.6	30'.6	45° 23'.2	11'.1	33'.1	9'.9	57'.1
122° 55'.4	31'.0	59° 53'.3	11'.2	23'.2	9'.9	
137° 55'.1	31'.5	74° 23'.5	11'.2	13'.3	10'.0	
152° 54'.9	31'.9	88° 53'.7	11'.4	03'.3	10'.1	57'.0
167° 54'.7	32'.3	103° 24'.1	11'.4	13° 53'.2 S	10'.1	
SD 16'.2	d 0'.4	SD	16'.1	15'.9	15'.6	

MOON						
GHA	v	Dec	d	HP
157° 33'.0	4'.7	22° 09'.0 S	2'.8	59'.7
171° 56'.7	4'.7	06'.2	3'.0	59'.6
186° 20'.4	4'.9	03'.2	3'.1	
200° 44'.3	4'.9	00'.1	3'.2	
215° 08'.2	5'.0	21° 56'.9 S	3'.4	59'.5
229° 32'.2	5'.0	53'.5	3'.5	
243° 56'.2	5'.2	50'.0	3'.7	
258° 20'.4	5'.2	46'.3	3'.8	59'.4
272° 44'.6	5'.3	42'.5	4'.0	
287° 08'.9	5'.4	38'.5	4'.1	
301° 33'.3	5'.4	34'.4	4'.3	59'.3
315° 57'.7	5'.6	30'.1	4'.3	
330° 22'.3	5'.6	21° 25'.8 S	4'.6	59'.3
344° 46'.9	5'.8	21'.2	4'.6	59'.2
359° 11'.7	5'.8	16'.6	4'.8	
13° 36'.5	5'.9	11'.8	4'.9	59'.1
28° 01'.4	6'.0	06'.9	5'.1	
42° 26'.4	6'.1	01'.8	5'.1	
56° 51'.5	6'.2	20° 56'.7 S	5'.4	59'.0
71° 16'.7	6'.3	51'.3	5'.4	
85° 42'.0	6'.3	45'.9	5'.6	
100° 07'.3	6'.5	40'.3	5'.6	58'.9
114° 32'.8	6'.6	34'.7	5'.8	
128° 58'.4	6'.6	28'.9	6'.0	58'.8
143° 24'.0	6'.8	20° 22'.9 S	6'.0	58'.8
157° 49'.8	6'.8	16'.9	6'.2	
172° 15'.6	7'.0	10'.7	6'.3	58'.7
186° 41'.6	7'.1	04'.4	6'.4	
201° 07'.7	7'.1	19° 58'.0 S	6'.5	
215° 33'.8	7'.3	51'.5	6'.6	58'.6
230° 00'.1	7'.3	44'.9	6'.8	
244° 26'.4	7'.5	38'.1	6'.8	58'.5
258° 52'.9	7'.6	31'.3	7'.0	
273° 19'.5	7'.6	24'.3	7'.1	
287° 46'.1	7'.8	17'.2	7'.1	58'.4
302° 12'.9	7'.9	10'.1	7'.3	
316° 39'.8	7'.9	19° 02'.8 S	7'.4	58'.3
331° 06'.7	8'.1	18° 55'.4 S	7'.5	
345° 33'.8	8'.2	47'.9	7'.6	
0° 01'.0	8'.3	40'.3	7'.6	58'.2
14° 28'.3	8'.3	32'.7	7'.8	
28° 55'.6	8'.5	24'.9	7'.9	
43° 23'.1	8'.6	17'.0	8'.0	58'.1
57° 50'.7	8'.7	09'.0	8'.0	
72° 18'.4	8'.8	01'.0	8'.2	58'.0
86° 46'.2	8'.9	17° 52'.8 S	8'.2	
101° 14'.1	9'.0	44'.6	8'.4	
115° 42'.1	9'.1	36'.2	8'.4	57'.9
130° 10'.2	9'.2	17° 27'.8 S	8'.5	57'.9
144° 38'.4	9'.3	19'.3	8'.6	57'.8
159° 06'.7	9'.4	10'.7	8'.6	
173° 35'.1	9'.5	02'.1	8'.8	
188° 03'.6	9'.6	16° 53'.3 S	8'.8	57'.7
202° 32'.2	9'.8	44'.5	8'.9	
217° 01'.0	9'.8	35'.6	9'.0	57'.6
231° 29'.8	9'.9	26'.6	9'.1	
245° 58'.7	10'.0	17'.5	9'.2	
260° 27'.7	10'.1	08'.3	9'.2	57'.5
274° 56'.8	10'.2	15° 59'.1 S	9'.3	
289° 26'.0	10'.3	49'.8	9'.3	
303° 55'.3	10'.4	15° 40'.5 S	9'.5	57'.4
318° 24'.7	10'.5	31'.0	9'.4	
332° 54'.2	10'.7	21'.6	9'.6	57'.3
347° 23'.9	10'.7	12'.0	9'.6	
1° 53'.6	10'.7	02'.4	9'.7	
16° 23'.3	10'.9	14° 52'.7 S	9'.8	57'.2
30° 53'.2	11'.0	42'.9	9'.8	
45° 23'.2	11'.1	33'.1	9'.9	57'.1
59° 53'.3	11'.2	23'.2	9'.9	
74° 23'.5	11'.2	13'.3	10'.0	
88° 53'.7	11'.4	03'.3	10'.1	57'.0
103° 24'.1	11'.4	13° 53'.2 S	10'.1	
SD 16'.1	d 0'.4	SD 15'.9	d 0'.4	15'.6

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 29
N 72°	07:41	09:34	-	-	-	13:43
N 70°	07:26	08:59	-	-	13:41	13:08
68°	07:14	08:34	10:17	13:10	12:51	12:42
66°	07:04	08:15	09:35	12:09	12:19	12:22
64°	06:55	07:59	09:07	11:35	11:55	12:06
62°	06:47	07:46	08:45	11:10	11:37	11:53
60°	06:40	07:35	08:28	10:50	11:21	11:42
N 58°	06:34	07:25	08:13	10:33	11:08	11:32
56°	06:29	07:16	08:01	10:19	10:56	11:23
54°	06:24	07:08	07:50	10:07	10:46	11:15
52°	06:19	07:01	07:41	09:57	10:37	11:08
50°	06:14	06:55	07:32	09:47	10:29	11:02
45°	06:05	06:41	07:14	09:27	10:12	10:49
N 40°	05:56	06:29	06:59	09:10	09:58	10:37
35°	05:48	06:19	06:46	08:57	09:46	10:28
30°	05:40	06:10	06:35	08:45	09:35	10:19
20°	05:26	05:53	06:16	08:24	09:17	10:05
N 10°	05:11	05:37	06:00	08:06	09:02	09:52
0°	04:56	05:22	05:44	07:49	08:47	09:40
S 10°	04:39	05:06	05:28	07:32	08:32	09:28
20°	04:19	04:47	05:11	07:15	08:16	09:15
30°	03:53	04:25	04:52	06:54	07:58	09:00

2011 Nov 30, Dec. 1, 2 (Wed, Thur, Fri)

GMT	ARIES	VENUS -3.9		MARS +0.7		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
30 00	68° 31'.4	153° 46'.6	24° 45'.9 S	267° 11'.7	10° 14'.3 N	38° 40'.8	10° 41'.7 N	223° 55'.8	7° 44'.6 S
01	83° 33'.9	168° 45'.7	45'.8	282° 13'.1	13'.9	53° 43'.4	41'.6	238° 58'.0	44'.7
02	98° 36'.3	183° 44'.7	45'.8	297° 14'.6	13'.6	68° 46'.1	41'.6	254° 00'.2	44'.8
03	113° 38'.8	198° 43'.8	45'.8	312° 16'.0	13'.2	83° 48'.8	41'.5	269° 02'.5	44'.9
04	128° 41'.3	213° 42'.8	45'.8	327° 17'.4	12'.8	98° 51'.5	41'.5	284° 04'.7	45'.0
05	143° 43'.7	228° 41'.9	45'.7	342° 18'.8	12'.5	113° 54'.1	41'.4	299° 06'.9	45'.1
06	158° 46'.2	243° 40'.9	45'.7	357° 20'.2	12'.1	128° 56'.8	41'.3	314° 09'.1	45'.2
07	173° 48'.7	258° 40'.0	45'.7	12° 21'.7	11'.8	143° 59'.5	41'.3	329° 11'.4	45'.2
08	188° 51'.1	273° 39'.0	45'.6	27° 23'.1	11'.4	159° 02'.1	41'.2	344° 13'.6	45'.3
09	203° 53'.6	288° 38'.1	45'.6	42° 24'.5	11'.0	174° 04'.8	41'.1	359° 15'.8	45'.4
10	218° 56'.1	303° 37'.1	45'.6	57° 25'.9	10'.7	189° 07'.5	41'.1	14° 18'.0	45'.5
11	233° 58'.5	318° 36'.2	45'.5	72° 27'.3	10'.3	204° 10'.1	41'.0	29° 20'.3	45'.6
12	249° 01'.0	333° 35'.2	24° 45'.5 S	87° 28'.8	10° 09'.9 N	219° 12'.8	10° 40'.9 N	44° 22'.5	7° 45'.7 S
13	264° 03'.4	348° 34'.3	45'.4	102° 30'.2	09'.6	234° 15'.5	40'.9	59° 24'.7	45'.8
14	279° 05'.9	3° 33'.3	45'.4	117° 31'.6	09'.2	249° 18'.1	40'.8	74° 26'.9	45'.8
15	294° 08'.4	18° 32'.4	45'.3	132° 33'.0	08'.9	264° 20'.8	40'.8	89° 29'.2	45'.9
16	309° 10'.8	33° 31'.4	45'.3	147° 34'.5	08'.5	279° 23'.5	40'.7	104° 31'.4	46'.0
17	324° 13'.3	48° 30'.5	45'.3	162° 35'.9	08'.1	294° 26'.1	40'.6	119° 33'.6	46'.1
18	339° 15'.8	63° 29'.5	45'.2	177° 37'.3	07'.8	309° 28'.8	40'.6	134° 35'.8	46'.2
19	354° 18'.2	78° 28'.6	45'.2	192° 38'.7	07'.4	324° 31'.5	40'.5	149° 38'.1	46'.3
20	9° 20'.7	93° 27'.6	45'.1	207° 40'.2	07'.1	339° 34'.1	40'.5	164° 40'.3	46'.3
21	24° 23'.2	108° 26'.7	45'.1	222° 41'.6	06'.7	354° 36'.8	40'.4	179° 42'.5	46'.4
22	39° 25'.6	123° 25'.7	45'.0	237° 43'.0	06'.4	9° 39'.5	40'.3	194° 44'.7	46'.5
23	54° 28'.1	138° 24'.8	45'.0	252° 44'.4	06'.0	24° 42'.1	40'.3	209° 47'.0	46'.6
1 00	69° 30'.6	153° 23'.8	24° 44'.9 S	267° 45'.9	10° 05'.6 N	39° 44'.8	10° 40'.2 N	224° 49'.2	7° 46'.7 S
01	84° 33'.0	168° 22'.9	44'.8	282° 47'.3	05'.3	54° 47'.5	40'.1	239° 51'.4	46'.8
02	99° 35'.5	183° 21'.9	44'.8	297° 48'.7	04'.9	69° 50'.1	40'.1	254° 53'.6	46'.9
03	114° 37'.9	198° 21'.0	44'.7	312° 50'.1	04'.6	84° 52'.8	40'.0	269° 55'.9	46'.9
04	129° 40'.4	213° 20'.0	44'.7	327° 51'.6	04'.2	99° 55'.5	40'.0	284° 58'.1	47'.0
05	144° 42'.9	228° 19'.1	44'.6	342° 53'.0	03'.8	114° 58'.1	39'.9	300° 00'.3	47'.1
06	159° 45'.3	243° 18'.1	44'.5	357° 54'.4	03'.5	130° 00'.8	39'.8	315° 02'.6	47'.2
07	174° 47'.8	258° 17'.2	44'.5	12° 55'.9	03'.1	145° 03'.5	39'.8	330° 04'.8	47'.3
08	189° 50'.3	273° 16'.3	44'.4	27° 57'.3	02'.8	160° 06'.1	39'.7	345° 07'.0	47'.4
09	204° 52'.7	288° 15'.3	44'.3	42° 58'.7	02'.4	175° 08'.8	39'.7	0° 09'.2	47'.4
10	219° 55'.2	303° 14'.4	44'.3	58° 00'.2	02'.1	190° 11'.4	39'.6	15° 11'.5	47'.5
11	234° 57'.7	318° 13'.4	44'.2	73° 01'.6	01'.7	205° 14'.1	39'.5	30° 13'.7	47'.6
12	250° 00'.1	333° 12'.5	24° 44'.1 S	88° 03'.0	10° 01'.3 N	220° 16'.8	10° 39'.5 N	45° 15'.9	7° 47'.7 S
13	265° 02'.6	348° 11'.5	44'.1	103° 04'.5	01'.0	235° 19'.4	39'.4	60° 18'.1	47'.8
14	280° 05'.0	3° 10'.6	44'.0	118° 05'.9	00'.6	250° 22'.1	39'.4	75° 20'.4	47'.9
15	295° 07'.5	18° 09'.6	43'.9	133° 07'.3	00'.3	265° 24'.8	39'.3	90° 22'.6	47'.9
16	310° 10'.0	33° 08'.7	43'.8	148° 08'.8	9° 59'.9 N	280° 27'.4	39'.2	105° 24'.8	48'.0
17	325° 12'.4	48° 07'.7	43'.8	163° 10'.2	59'.6	295° 30'.1	39'.2	120° 27'.1	48'.1
18	340° 14'.9	63° 06'.8	43'.7	178° 11'.6	59'.2	310° 32'.7	39'.1	135° 29'.3	48'.2
19	355° 17'.4	78° 05'.8	43'.6	193° 13'.1	58'.8	325° 35'.4	39'.1	150° 31'.5	48'.3
20	10° 19'.8	93° 04'.9	43'.5	208° 14'.5	58'.5	340° 38'.1	39'.0	165° 33'.7	48'.4
21	25° 22'.3	108° 03'.9	43'.4	223° 15'.9	58'.1	355° 40'.7	39'.0	180° 36'.0	48'.4
22	40° 24'.8	123° 03'.0	43'.4	238° 17'.4	57'.8	10° 43'.4	38'.9	195° 38'.2	48'.5
23	55° 27'.2	138° 02'.1	43'.3	253° 18'.8	57'.4	25° 46'.0	38'.8	210° 40'.4	48'.6
2 00	70° 29'.7	153° 01'.1	24° 43'.2 S	268° 20'.3	9° 57'.1 N	40° 48'.7	10° 38'.8 N	225° 42'.6	7° 48'.7 S
01	85° 32'.2	168° 00'.2	43'.1	283° 21'.7	56'.7	55° 51'.4	38'.7	240° 44'.9	48'.8
02	100° 34'.6	182° 59'.2	43'.0	298° 23'.1	56'.4	70° 54'.0	38'.7	255° 47'.1	48'.9
03	115° 37'.1	197° 58'.3	42'.9	313° 24'.6	56'.0	85° 56'.7	38'.6	270° 49'.3	48'.9
04	130° 39'.5	212° 57'.3	42'.8	328° 26'.0	55'.6	100° 59'.3	38'.5	285° 51'.6	49'.0
05	145° 42'.0	227° 56'.4	42'.7	343° 27'.5	55'.3	116° 02'.0	38'.5	300° 53'.8	49'.1
06	160° 44'.5	242° 55'.4	42'.6	358° 28'.9	54'.9	131° 04'.6	38'.4	315° 56'.0	49'.2
07	175° 46'.9	257° 54'.5	42'.5	13° 30'.3	54'.6	146° 07'.3	38'.4	330° 58'.2	49'.3
08	190° 49'.4	272° 53'.5	42'.4	28° 31'.8	54'.2	161° 09'.9	38'.3	346° 00'.5	49'.4
09	205° 51'.9	287° 52'.6	42'.3	43° 33'.2	53'.9	176° 12'.6	38'.3	1° 02'.7	49'.4
10	220° 54'.3	302° 51'.7	42'.2	58° 34'.7	53'.5	191° 15'.3	38'.2	16° 04'.9	49'.5
11	235° 56'.8	317° 50'.7	42'.1	73° 36'.1	53'.2	206° 17'.9	38'.1	31° 07'.2	49'.6
12	250° 59'.3	332° 49'.8	24° 42'.0 S	88° 37'.6	9° 52'.8 N	221° 20'.6	10° 38'.1 N	46° 09'.4	7° 49'.7 S
13	266° 01'.7	347° 48'.8	41'.9	103° 39'.0	52'.5	236° 23'.2	38'.0	61° 11'.6	49'.8
14	281° 04'.2	2° 47'.9	41'.8	118° 40'.4	52'.1	251° 25'.9	38'.0	76° 13'.8	49'.9
15	296° 06'.7	17° 46'.9	41'.7	133° 41'.9	51'.8	266° 28'.5	37'.9	91° 16'.1	49'.9
16	311° 09'.1	32° 46'.0	41'.6	148° 43'.3	51'.4	281° 31'.2	37'.9	106° 18'.3	50'.0
17	326° 11'.6	47° 45'.0	41'.5	163° 44'.8	51'.0	296° 33'.8	37'.8	121° 20'.5	50'.1
18	341° 14'.0	62° 44'.1	41'.4	178° 46'.2	50'.7	311° 36'.5	37'.7	136° 22'.8	50'.2
19	356° 16'.5	77° 43'.2	41'.3	193° 47'.7	50'.3	326° 39'.1	37'.7	151° 25'.0	50'.3
20	11° 19'.0	92° 42'.2	41'.2	208° 49'.1	50'.0	341° 41'.8	37'.6	166° 27'.2	50'.4
21	26° 21'.4	107° 41'.3	41'.1	223° 50'.6	49'.6	356° 44'.4	37'.6	181° 29'.5	50'.4
22	41° 23'.9	122° 40'.3	40'.9	238° 52'.0	49'.3	11° 47'.1	37'.5	196° 31'.7	50'.5
23	56° 26'.4	137° 39'.4	40'.8	253° 53'.5	48'.9	26° 49'.8	37'.5	211° 33'.9	50'.6
	M.P. 19:19	v -0'.9	d 0'.1	v 1'.4	d 0'.4	v 2'.7	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.7	40° 15'.5 S
Achernar	335° 27'.1	57° 10'.7 S
Acrux	173° 10'.9	63° 09'.7 S
Adhara	255° 13'.1	28° 59'.3 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 21'.9	55° 53'.4 N
Alkaid	153° 00'.1	49° 15'.0 N
Alnair	27° 45'.1	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 57'.1	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.4	69° 02'.9 S
Avior	234° 18'.1	59° 32'.7 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.2	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.1 S
Capella	280° 35'.6	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.7 N
Denebola	182° 34'.9	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.0	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.4 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.1	29° 33'.5 S
Gacrux	172° 02'.4	57° 10'.6 S
Gienah	175° 53'.6	17° 36'.4 S
Hadar	148° 50'.0	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.2 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.3 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.6	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.9 S
Polaris	317° 53'.5	89° 19'.1 N
Pollux	243° 28'.8	27° 59'.6 N
Procyon	245° 00'.6	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.6	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.3 S
Rigil Kent	139° 53'.8	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.4	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.1	43° 28'.7 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	83° 53'.3	13:47
Mars	198° 15'.3	06:08
Jupiter	330° 14'.3	21:17
Saturn	155° 18'.6	08:59

SUN				
GHA	Dec	GHA	v	Dec	d	HP
182° 54'.5	21° 32'.7 S	117° 54'.5	11'.6	13° 43'.1 S	10'.2	57'.0
197° 54'.3	33'.1	132° 25'.1	11'.6	32'.9	10'.2	56'.9
212° 54'.0	33'.5	146° 55'.7	11'.7	22'.7	10'.3	
227° 53'.8	34'.0	161° 26'.4	11'.8	12'.4	10'.3	56'.8
242° 53'.6	34'.4	175° 57'.2	11'.9	02'.1	10'.4	
257° 53'.4	34'.8	190° 28'.1	12'.0	12° 51'.7 S	10'.4	
272° 53'.1	35'.2	204° 59'.1	12'.0	41'.3	10'.5	56'.7
287° 52'.9	35'.6	219° 30'.1	12'.2	30'.8	10'.5	
302° 52'.7	36'.0	234° 01'.3	12'.2	20'.3	10'.5	
317° 52'.5	36'.4	248° 32'.5	12'.3	09'.8	10'.6	56'.6
332° 52'.2	36'.8	263° 03'.8	12'.4	11° 59'.2 S	10'.7	
347° 52'.0	37'.2	277° 35'.2	12'.5	48'.5	10'.7	
2° 51'.8	21° 37'.7 S	292° 06'.7	12'.5	11° 37'.8 S	10'.7	56'.5
17° 51'.6	38'.1	306° 38'.2	12'.7	27'.1	10'.8	
32° 51'.3	38'.5	321° 09'.9	12'.7	16'.3	10'.8	56'.4
47° 51'.1	38'.9	335° 41'.6	12'.8	05'.5	10'.8	
62° 50'.9	39'.3	350° 13'.4	12'.8	10° 54'.7 S	10'.9	
77° 50'.7	39'.7	4° 45'.2	13'.0	43'.8	10'.9	56'.3
92° 50'.4	40'.1	19° 17'.2	13'.0	32'.9	11'.0	
107° 50'.2	40'.5	33° 49'.2	13'.1	21'.9	11'.0	
122° 50'.0	40'.9	48° 21'.3	13'.2	10'.9	11'.0	56'.2
137° 49'.7	41'.3	62° 53'.5	13'.2	9° 59'.9 S	11'.0	
152° 49'.5	41'.7	77° 25'.7	13'.3	48'.9	11'.1	
167° 49'.3	42'.1	91° 58'.0	13'.4	37'.8	11'.1	56'.1
182° 49'.1	21° 42'.5 S	106° 30'.4	13'.4	9° 26'.7 S	11'.2	56'.1
197° 48'.8	42'.9	121° 02'.8	13'.6	15'.5	11'.2	
212° 48'.6	43'.3	135° 35'.4	13'.5	04'.3	11'.2	56'.0
227° 48'.4	43'.7	150° 07'.9	13'.7	8° 53'.1 S	11'.2	
242° 48'.1	44'.1	164° 40'.6	13'.7	41'.9	11'.2	
257° 47'.9	44'.5	179° 13'.3	13'.8	30'.7	11'.3	55'.9
272° 47'.7	44'.9	193° 46'.1	13'.8	19'.4	11'.3	
287° 47'.5	45'.3	208° 18'.9	13'.9	08'.1	11'.3	
302° 47'.2	45'.7	222° 51'.8	14'.0	7° 56'.8 S	11'.4	55'.8
317° 47'.0	46'.1	237° 24'.8	14'.0	45'.4	11'.3	
332° 46'.8	46'.4	251° 57'.8	14'.1	34'.1	11'.4	
347° 46'.5	46'.8	266° 30'.9	14'.2	22'.7	11'.4	
2° 46'.3	21° 47'.2 S	281° 04'.1	14'.2	7° 11'.3 S	11'.4	55'.7
17° 46'.1	47'.6	295° 37'.3	14'.2	6° 59'.9 S	11'.5	
32° 45'.8	48'.0	310° 10'.5	14'.3	48'.4	11'.4	
47° 45'.6	48'.4	324° 43'.8	14'.4	37'.0	11'.5	55'.6
62° 45'.4	48'.8	339° 17'.2	14'.4	25'.5	11'.5	
77° 45'.1	49'.2	353° 50'.6	14'.5	14'.0	11'.5	
92° 44'.9	49'.6	8° 24'.1	14'.5	02'.5	11'.5	55'.5
107° 44'.7	49'.9	22° 57'.6	14'.6	5° 51'.0 S	11'.5	
122° 44'.4	50'.3	37° 31'.2	14'.6	39'.5	11'.5	
137° 44'.2	50'.7	52° 04'.8	14'.7	28'.0	11'.6	
152° 44'.0	51'.1	66° 38'.5	14'.7	16'.4	11'.5	55'.4
167° 43'.7	51'.5	81° 12'.2	14'.7	04'.9	11'.6	
182° 43'.5	21° 51'.9 S	95° 45'.9	14'.9	4° 53'.3 S	11'.6	55'.4
197° 43'.3	52'.2	110° 19'.8	14'.8	41'.7	11'.6	
212° 43'.0	52'.6	124° 53'.6	14'.9	30'.1	11'.5	55'.3
227° 42'.8	53'.0	139° 27'.5	14'.9	18'.6	11'.6	
242° 42'.5	53'.4	154° 01'.4	15'.0	07'.0	11'.7	
257° 42'.3	53'.8	168° 35'.4	15'.0	3° 55'.3 S	11'.6	55'.2
272° 42'.1	54'.1	183° 09'.4	15'.1	43'.7	11'.6	
287° 41'.8	54'.5	197° 43'.5	15'.1	32'.1	11'.6	
302° 41'.6	54'.9	212° 17'.6	15'.1	20'.5	11'.6	
317° 41'.4	55'.3	226° 51'.7	15'.2	08'.9	11'.6	55'.1
332° 41'.1	55'.6	241° 25'.9	15'.2	2° 57'.3 S	11'.7	
347° 40'.9	56'.0	256° 00'.1	15'.2	45'.6	11'.6	
2° 40'.6	21° 56'.4 S	270° 34'.3	15'.3	2° 34'.0 S	11'.6	55'.1
17° 40'.4	56'.8	285° 08'.6	15'.3	22'.4	11'.6	
32° 40'.2	57'.1	299° 42'.9	15'.3	10'.8	11'.7	55'.0
47° 39'.9	57'.5	314° 17'.2	15'.4	1° 59'.1 S	11'.6	
62° 39'.7	57'.9	328° 51'.6	15'.4	47'.5	11'.6	
77° 39'.4	58'.2	343° 26'.0	15'.4	35'.9	11'.6	
92° 39'.2	58'.6	358° 00'.4	15'.5	24'.3	11'.6	54'.9
107° 39'.0	59'.0	12° 34'.9	15'.4	12'.7	11'.6	
122° 38'.7	59'.3	27° 09'.3	15'.5	01'.1	11'.6	
137° 38'.5	59'.7	41° 43'.8	15'.5	0° 49'.5 S	11'.6	
152° 38'.2	22° 00'.1 S	56° 18'.3	15'.6	37'.9	11'.6	
167° 38'.0	00'.4	70° 52'.9	15'.6	26'.3	11'.6	54'.8
SD 16'.2	d 0'.4	SD	15'.4	15'.2	15'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 30	Moonrise 1	Moonrise 2
N 72°	07:50	09:48	-	13:10	12:48	12:30
N 70°	07:34	09:10	-	12:51	12:38	12:27
68°	07:21	08:43	10:34	12:35	12:30	12:24
66°	07:10	08:22	09:46	12:23	12:23	12:22
64°	07:00	08:06	09:15	12:13	12:17	12:20
62°	06:52	07:52	08:52	12:04	12:12	12:18
60°	06:45	07:40	08:34	11:56	12:07	12:16
N 58°	06:39	07:30	08:19	11:49	12:03	12:15
56°	06:33	07:21	08:06	11:43	12:00	12:14
54°	06:28	07:13	07:55	11:38	11:56	12:13
52°	06:23	07:05	07:45	11:33	11:54	12:12
50°	06:18	06:59	07:36	11:29	11:51	12:11
45°	06:08	06:44	07:17	11:19	11:45	12:09
N 40°	05:59	06:32	07:02	11:11	11:40	12:07
35°	05:50	06:21	06:49	11:04	11:36	12:06
30°	05:42	06:12	06:38	10:58	11:32	12:04
20°	05:27	05:55	06:18	10:47	11:26	12:02
N 10°	05:13	05:39	06:01	10:38	11:20	12:00
0°	04:57	05:23	05:45	10:29	11:15	11:58
S 10°	04:40	05:06	05:29	10:20	11:09	11:56
20°	04:19	04:47	05:12	10:11	11:04	11:54
30°	03:52	04:24	04:51	10:00	10:57	11:52
35°	03:35	04:10	04:39	09:54	10:53	11:51
40°	03:14	03:54	04:26	09:47	10:49	11:49
45°	02:46	03:33	04:09	09:38	10:44	11:47
S 50°	02:07	03:07	03:49	09:28	10:38	11:45
52°	01:45	02:53	03:39	09:24	10:35	11:45
54°	01:16	02:38	03:28	09:19	10:32	11:43
56°	00:20	02:19	03:16	09:13	10:29	11:42
58°	-	01:56	03:01	09:06	10:25	11:41
S 60°	-	01:24	02:44	08:59	10:21	11:40
S 62°	-	00:24	02:23	08:51	10:16	11:38

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 30	Moonset 1	Moonset 2
N 72°	-	13:49	15:47	20:33	22:28	24:15
N 70°	-	14:28	16:03	20:50	22:36	24:15
68°	13:03	14:55	16:16	21:04	22:42	24:16
66°	13:52	15:15	16:27	21:15	22:47	24:16
64°	14:22	15:32	16:37	21:24	22:52	24:16
62°	14:45	15:46	16:45	21:32	22:56	24:16
60°	15:03	15:57	16:52	21:38	22:59	24:17
N 58°	15:18	16:08	16:59	21:44	23:02	24:17
56°	15:31	16:17	17:04	21:49	23:04	24:17
54°	15:43	16:25	17:10	21:54	23:07	24:17
52°	15:52	16:32	17:15	21:58	23:09	24:17
50°	16:01	16:39	17:19	22:02	23:11	24:17
45°	16:20	16:53	17:30	22:10	23:15	24:17
N 40°	16:35	17:05	17:39	22:17	23:18	24:18
35°	16:48	17:16	17:47	22:23	23:21	24:18
30°	17:00	17:26	17:55	22:28	23:24	24:18
20°	17:19	17:43	18:10	22:37	23:28	24:18
N 10°	17:36	17:59	18:25	22:44	23:32	24:18
0°	17:53	18:15	18:41	22:51	23:36	24:18
S 10°	18:09	18:32	18:58	22:58	23:39	24:18
20°	18:26	18:51	19:19	23:06	23:43	24:19
30°	18:47	19:14	19:46	23:14	23:47	24:19
35°	18:59	19:28	20:04	23:19	23:50	24:19
40°	19:13	19:45	20:25	23:25	23:53	24:19
45°	19:29	20:05	20:52	23:31	23:56	24:19
S 50°	19:50	20:32	21:32	23:39	24:00	24:19
52°	19:59	20:45	21:54	23:42	-	00:01
54°	20:10	21:01	22:25	23:46	-	00:03
56°	20:23	21:20	23:27	23:50	-	00:05
58°	20:38	21:44	-	23:55	-	00:08
S 60°	20:55	22:17	-	24:00	-	00:10
S 62°	21:17	23:25	-	-	00:06	00:13

	SUN			MOON		
	Eqn. of Time		Mer.	Mer. Pass.		
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
30	11 38	11 28	11:49	16:40	04:17	5d 31%
1	11 17	11 06	11:49	17:25	05:03	6d 41%
2	10 54	10 43	11:49	18:08	05:47	7d 51%

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2011 December 3, 4, 5 (Sat, Sun, Mon)

GMT	ARIES	VENUS -3.9		MARS +0.7		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
3 00	71° 28'.8	152° 38'.4	24° 40'.7 S	268° 54'.9	9° 48'.6 N	41° 52'.4	10° 37'.4 N	226° 36'.1	7° 50'.7 S
01	86° 31'.3	167° 37'.5	40'.6	283° 56'.4	48'.2	56° 55'.1	37'.4	241° 38'.4	50'.8
02	101° 33'.8	182° 36'.6	40'.5	298° 57'.8	47'.9	71° 57'.7	37'.3	256° 40'.6	50'.9
03	116° 36'.2	197° 35'.6	40'.3	313° 59'.3	47'.5	87° 00'.4	37'.2	271° 42'.8	50'.9
Saturday 04	131° 38'.7	212° 34'.7	40'.2	329° 00'.7	47'.2	102° 03'.0	37'.2	286° 45'.1	51'.0
05	146° 41'.1	227° 33'.7	40'.1	344° 02'.2	46'.8	117° 05'.7	37'.1	301° 47'.3	51'.1
06	161° 43'.6	242° 32'.8	40'.0	359° 03'.6	46'.5	132° 08'.3	37'.1	316° 49'.5	51'.2
07	176° 46'.1	257° 31'.8	39'.8	14° 05'.1	46'.1	147° 11'.0	37'.0	331° 51'.8	51'.3
08	191° 48'.5	272° 30'.9	39'.7	29° 06'.5	45'.8	162° 13'.6	37'.0	346° 54'.0	51'.3
09	206° 51'.0	287° 30'.0	39'.6	44° 08'.0	45'.4	177° 16'.2	36'.9	1° 56'.2	51'.4
10	221° 53'.5	302° 29'.0	39'.5	59° 09'.4	45'.1	192° 18'.9	36'.9	16° 58'.5	51'.5
11	236° 55'.9	317° 28'.1	39'.3	74° 10'.9	44'.7	207° 21'.5	36'.8	32° 00'.7	51'.6
12	251° 58'.4	332° 27'.1	24° 39'.2 S	89° 12'.4	9° 44'.4 N	222° 24'.2	10° 36'.7 N	47° 02'.9	7° 51'.7 S
13	267° 00'.9	347° 26'.2	39'.1	104° 13'.8	44'.0	237° 26'.8	36'.7	62° 05'.1	51'.8
14	282° 03'.3	2° 25'.3	38'.9	119° 15'.3	43'.7	252° 29'.5	36'.6	77° 07'.4	51'.8
15	297° 05'.8	17° 24'.3	38'.8	134° 16'.7	43'.3	267° 32'.1	36'.6	92° 09'.6	51'.9
16	312° 08'.3	32° 23'.4	38'.6	149° 18'.2	43'.0	282° 34'.8	36'.5	107° 11'.8	52'.0
17	327° 10'.7	47° 22'.4	38'.5	164° 19'.6	42'.6	297° 37'.4	36'.5	122° 14'.1	52'.1
18	342° 13'.2	62° 21'.5	38'.4	179° 21'.1	42'.3	312° 40'.1	36'.4	137° 16'.3	52'.2
19	357° 15'.6	77° 20'.5	38'.2	194° 22'.6	41'.9	327° 42'.7	36'.4	152° 18'.5	52'.2
20	12° 18'.1	92° 19'.6	38'.1	209° 24'.0	41'.6	342° 45'.4	36'.3	167° 20'.8	52'.3
21	27° 20'.6	107° 18'.7	37'.9	224° 25'.5	41'.2	357° 48'.0	36'.3	182° 23'.0	52'.4
22	42° 23'.0	122° 17'.7	37'.8	239° 26'.9	40'.9	12° 50'.7	36'.2	197° 25'.2	52'.5
23	57° 25'.5	137° 16'.8	37'.6	254° 28'.4	40'.5	27° 53'.3	36'.2	212° 27'.5	52'.6
4 00	72° 28'.0	152° 15'.9	24° 37'.5 S	269° 29'.9	9° 40'.2 N	42° 55'.9	10° 36'.1 N	227° 29'.7	7° 52'.7 S
01	87° 30'.4	167° 14'.9	37'.3	284° 31'.3	39'.8	57° 58'.6	36'.0	242° 31'.9	52'.7
02	102° 32'.9	182° 14'.0	37'.2	299° 32'.8	39'.5	73° 01'.2	36'.0	257° 34'.2	52'.8
03	117° 35'.4	197° 13'.0	37'.0	314° 34'.2	39'.1	88° 03'.9	35'.9	272° 36'.4	52'.9
Sunday 04	132° 37'.8	212° 12'.1	36'.9	329° 35'.7	38'.8	103° 06'.5	35'.9	287° 38'.6	53'.0
05	147° 40'.3	227° 11'.2	36'.7	344° 37'.2	38'.5	118° 09'.2	35'.8	302° 40'.9	53'.1
06	162° 42'.8	242° 10'.2	36'.6	359° 38'.6	38'.1	133° 11'.8	35'.8	317° 43'.1	53'.1
07	177° 45'.2	257° 09'.3	36'.4	14° 40'.1	37'.8	148° 14'.4	35'.7	332° 45'.3	53'.2
08	192° 47'.7	272° 08'.3	36'.2	29° 41'.6	37'.4	163° 17'.1	35'.7	347° 47'.6	53'.3
09	207° 50'.1	287° 07'.4	36'.1	44° 43'.0	37'.1	178° 19'.7	35'.6	2° 49'.8	53'.4
10	222° 52'.6	302° 06'.5	35'.9	59° 44'.5	36'.7	193° 22'.4	35'.6	17° 52'.0	53'.5
11	237° 55'.1	317° 05'.5	35'.8	74° 46'.0	36'.4	208° 25'.0	35'.5	32° 54'.3	53'.5
12	252° 57'.5	332° 04'.6	24° 35'.6 S	89° 47'.4	9° 36'.0 N	223° 27'.6	10° 35'.5 N	47° 56'.5	7° 53'.6 S
13	268° 00'.0	347° 03'.7	35'.4	104° 48'.9	35'.7	238° 30'.3	35'.4	62° 58'.7	53'.7
14	283° 02'.5	2° 02'.7	35'.3	119° 50'.4	35'.3	253° 32'.9	35'.4	78° 01'.0	53'.8
15	298° 04'.9	17° 01'.8	35'.1	134° 51'.8	35'.0	268° 35'.6	35'.3	93° 03'.2	53'.9
16	313° 07'.4	32° 00'.9	34'.9	149° 53'.3	34'.7	283° 38'.2	35'.3	108° 05'.4	53'.9
17	328° 09'.9	46° 59'.9	34'.8	164° 54'.8	34'.3	298° 40'.8	35'.2	123° 07'.7	54'.0
18	343° 12'.3	61° 59'.0	34'.6	179° 56'.2	34'.0	313° 43'.5	35'.2	138° 09'.9	54'.1
19	358° 14'.8	76° 58'.0	34'.4	194° 57'.7	33'.6	328° 46'.1	35'.1	153° 12'.1	54'.2
20	13° 17'.2	91° 57'.1	34'.2	209° 59'.2	33'.3	343° 48'.8	35'.1	168° 14'.4	54'.3
21	28° 19'.7	106° 56'.2	34'.1	225° 00'.6	32'.9	358° 51'.4	35'.0	183° 16'.6	54'.3
22	43° 22'.2	121° 55'.2	33'.9	240° 02'.1	32'.6	13° 54'.0	35'.0	198° 18'.8	54'.4
23	58° 24'.6	136° 54'.3	33'.7	255° 03'.6	32'.2	28° 56'.7	34'.9	213° 21'.1	54'.5
5 00	73° 27'.1	151° 53'.4	24° 33'.5 S	270° 05'.1	9° 31'.9 N	43° 59'.3	10° 34'.9 N	228° 23'.3	7° 54'.6 S
01	88° 29'.6	166° 52'.4	33'.3	285° 06'.5	31'.6	59° 01'.9	34'.8	243° 25'.5	54'.7
02	103° 32'.0	181° 51'.5	33'.2	300° 08'.0	31'.2	74° 04'.6	34'.8	258° 27'.8	54'.8
03	118° 34'.5	196° 50'.6	33'.0	315° 09'.5	30'.9	89° 07'.2	34'.7	273° 30'.0	54'.8
Monday 04	133° 37'.0	211° 49'.6	32'.8	330° 11'.0	30'.5	104° 09'.8	34'.7	288° 32'.2	54'.9
05	148° 39'.4	226° 48'.7	32'.6	345° 12'.4	30'.2	119° 12'.5	34'.6	303° 34'.5	55'.0
06	163° 41'.9	241° 47'.8	32'.4	0° 13'.9	29'.8	134° 15'.1	34'.6	318° 36'.7	55'.1
07	178° 44'.4	256° 46'.8	32'.2	15° 15'.4	29'.5	149° 17'.7	34'.5	333° 39'.0	55'.2
08	193° 46'.8	271° 45'.9	32'.0	30° 16'.9	29'.2	164° 20'.4	34'.5	348° 41'.2	55'.2
09	208° 49'.3	286° 45'.0	31'.8	45° 18'.3	28'.8	179° 23'.0	34'.4	3° 43'.4	55'.3
10	223° 51'.7	301° 44'.0	31'.6	60° 19'.8	28'.5	194° 25'.7	34'.4	18° 45'.7	55'.4
11	238° 54'.2	316° 43'.1	31'.5	75° 21'.3	28'.1	209° 28'.3	34'.3	33° 47'.9	55'.5
12	253° 56'.7	331° 42'.2	24° 31'.3 S	90° 22'.8	9° 27'.8 N	224° 30'.9	10° 34'.3 N	48° 50'.1	7° 55'.5 S
13	268° 59'.1	346° 41'.2	31'.1	105° 24'.3	27'.4	239° 33'.5	34'.2	63° 52'.4	55'.6
14	284° 01'.6	1° 40'.3	30'.9	120° 25'.7	27'.1	254° 36'.2	34'.2	78° 54'.6	55'.7
15	299° 04'.1	16° 39'.4	30'.7	135° 27'.2	26'.8	269° 38'.8	34'.1	93° 56'.8	55'.8
16	314° 06'.5	31° 38'.4	30'.5	150° 28'.7	26'.4	284° 41'.4	34'.1	108° 59'.1	55'.9
17	329° 09'.0	46° 37'.5	30'.3	165° 30'.2	26'.1	299° 44'.1	34'.0	124° 01'.3	55'.9
18	344° 11'.5	61° 36'.6	30'.1	180° 31'.7	25'.7	314° 46'.7	34'.0	139° 03'.5	56'.0
19	359° 13'.9	76° 35'.7	29'.9	195° 33'.1	25'.4	329° 49'.3	33'.9	154° 05'.8	56'.1
20	14° 16'.4	91° 34'.7	29'.6	210° 34'.6	25'.1	344° 52'.0	33'.9	169° 08'.0	56'.2
21	29° 18'.9	106° 33'.8	29'.4	225° 36'.1	24'.7	359° 54'.6	33'.8	184° 10'.3	56'.3
22	44° 21'.3	121° 32'.9	29'.2	240° 37'.6	24'.4	14° 57'.2	33'.8	199° 12'.5	56'.3
23	59° 23'.8	136° 31'.9	29'.0	255° 39'.1	24'.0	29° 59'.9	33'.7	214° 14'.7	56'.4
	M.P. 19:07	v -0'.9	d 0'.2	v 1'.5	d 0'.3	v 2'.6	d 0'.1	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.5 S
Achernar	335° 27'.1	57° 10'.7 S
Acrux	173° 10'.9	63° 09'.7 S
Adhara	255° 13'.1	28° 59'.3 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 21'.9	55° 53'.4 N
Alkaid	153° 00'.1	49° 15'.0 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 57'.0	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.5	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.2 N
Atria	107° 31'.4	69° 02'.8 S
Avior	234° 18'.1	59° 32'.7 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.1 S
Capella	280° 35'.6	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.7 N
Denebola	182° 34'.8	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.0	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.4 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.5 S
Gacrux	172° 02'.4	57° 10'.6 S
Gienah	175° 53'.6	17° 36'.4 S
Hadar	148° 50'.0	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.2 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.5	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.9 S
Polaris	317° 54'.0	89° 19'.1 N
Pollux	243° 28'.8	27° 59'.6 N
Procyon	245° 00'.6	5° 11'.6 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.6	11° 54'.4 N
Rigel	281° 12'.8	8° 11'.3 S
Rigil Kent	139° 53'.8	60° 52'.9 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.7 S
Sirius	258° 34'.4	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.1	43° 28'.7 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	79° 47'.9	13:52
Mars	197° 01'.9	06:01
Jupiter	330° 28'.0	21:05
Saturn	155° 01'.7	08:49

SUN				
GHA	Dec	GHA	v	Dec	d	HP
182° 37'.8	22° 00'.8 S	85° 27'.5	15'.5	0° 14'.7 S	11'.6	54'.8
197° 37'.5	01'.2	100° 02'.0	15'.6	03'.1	11'.6	
212° 37'.3	01'.5	114° 36'.6	15'.7	0° 08'.5 N	11'.5	
227° 37'.0	01'.9	129° 11'.3	15'.6	20'.0	11'.6	
242° 36'.8	02'.2	143° 45'.9	15'.7	31'.6	11'.5	54'.7
257° 36'.5	02'.6	158° 20'.6	15'.6	43'.1	11'.6	
272° 36'.3	03'.0	172° 55'.2	15'.7	54'.7	11'.5	
287° 36'.1	03'.3	187° 29'.9	15'.7	1° 06'.2 N	11'.5	
302° 35'.8	03'.7	202° 04'.6	15'.8	17'.7	11'.5	
317° 35'.6	04'.0	216° 39'.4	15'.7	29'.2	11'.5	54'.6
332° 35'.3	04'.4	231° 14'.1	15'.7	40'.7	11'.4	
347° 35'.1	04'.8	245° 48'.8	15'.8	52'.1	11'.5	
2° 34'.8	22° 05'.1 S	260° 23'.6	15'.8	2° 03'.6 N	11'.4	54'.6
17° 34'.6	05'.5	274° 58'.4	15'.7	15'.0	11'.5	
32° 34'.3	05'.8	289° 33'.1	15'.8	26'.5	11'.4	
47° 34'.1	06'.2	304° 07'.9	15'.8	37'.9	11'.4	54'.5
62° 33'.9	06'.5	318° 42'.7	15'.8	49'.3	11'.3	
77° 33'.6	06'.9	333° 17'.5	15'.8	3° 00'.6 N	11'.4	
92° 33'.4	07'.2	347° 52'.3	15'.8	12'.0	11'.3	
107° 33'.1	07'.6	2° 27'.1	15'.8	23'.3	11'.4	
122° 32'.9	07'.9	17° 01'.9	15'.8	34'.7	11'.3	
137° 32'.6	08'.3	31° 36'.7	15'.8	46'.0	11'.3	54'.4
152° 32'.4	08'.6	46° 11'.5	15'.8	57'.3	11'.2	
167° 32'.1	09'.0	60° 46'.3	15'.8	4° 08'.5 N	11'.3	
182° 31'.9	22° 09'.3 S	75° 21'.1	15'.8	4° 19'.8 N	11'.2	54'.4
197° 31'.6	09'.7	89° 55'.9	15'.8	31'.0	11'.2	
212° 31'.4	10'.0	104° 30'.7	15'.8	42'.2	11'.1	
227° 31'.1	10'.3	119° 05'.5	15'.8	53'.3	11'.2	
242° 30'.9	10'.7	133° 40'.3	15'.8	5° 04'.5 N	11'.1	
257° 30'.6	11'.0	148° 15'.1	15'.8	15'.6	11'.1	54'.3
272° 30'.4	11'.4	162° 49'.9	15'.7	26'.7	11'.1	
287° 30'.1	11'.7	177° 24'.6	15'.8	37'.8	11'.1	
302° 29'.9	12'.1	191° 59'.4	15'.8	48'.9	11'.0	
317° 29'.6	12'.4	206° 34'.2	15'.7	59'.9	11'.0	
332° 29'.4	12'.7	221° 08'.9	15'.8	6° 10'.9 N	11'.0	
347° 29'.1	13'.1	235° 43'.7	15'.7	21'.9	10'.9	
2° 28'.9	22° 13'.4 S	250° 18'.4	15'.7	6° 32'.8 N	10'.9	54'.3
17° 28'.6	13'.8	264° 53'.1	15'.7	43'.7	10'.9	
32° 28'.4	14'.1	279° 27'.8	15'.7	54'.6	10'.9	54'.2
47° 28'.1	14'.4	294° 02'.5	15'.7	7° 05'.5 N	10'.8	
62° 27'.9	14'.8	308° 37'.2	15'.6	16'.3	10'.8	
77° 27'.6	15'.1	323° 11'.8	15'.7	27'.1	10'.7	
92° 27'.4	15'.4	337° 46'.5	15'.6	37'.8	10'.8	
107° 27'.1	15'.8	352° 21'.1	15'.6	48'.6	10'.7	
122° 26'.9	16'.1	6° 55'.7	15'.6	59'.3	10'.6	
137° 26'.6	16'.4	21° 30'.3	15'.6	8° 09'.9 N	10'.7	
152° 26'.4	16'.7	36° 04'.9	15'.5	20'.6	10'.6	
167° 26'.1	17'.1	50° 39'.4	15'.6	31'.2	10'.5	
182° 25'.9	22° 17'.4 S	65° 14'.0	15'.5	8° 41'.7 N	10'.5	54'.2
197° 25'.6	17'.7	79° 48'.5	15'.5	52'.2	10'.5	
212° 25'.3	18'.1	94° 23'.0	15'.4	9° 02'.7 N	10'.5	
227° 25'.1	18'.4	108° 57'.4	15'.5	13'.2	10'.4	54'.1
242° 24'.8	18'.7	123° 31'.9	15'.4	23'.6	10'.4	
257° 24'.6	19'.0	138° 06'.3	15'.4	34'.0	10'.3	
272° 24'.3	19'.4	152° 40'.7	15'.3	44'.3	10'.3	
287° 24'.1	19'.7	167° 15'.0	15'.4	54'.6	10'.3	
302° 23'.8	20'.0	181° 49'.4	15'.3	10° 04'.9 N	10'.2	
317° 23'.6	20'.3	196° 23'.7	15'.2	15'.1	10'.2	
332° 23'.3	20'.6	210° 57'.9	15'.3	25'.3	10'.1	
347° 23'.0	21'.0	225° 32'.2	15'.2	35'.4	10'.1	
2° 22'.8	22° 21'.3 S	240° 06'.4	15'.2	10° 45'.5 N	10'.1	54'.1
17° 22'.5	21'.6	254° 40'.6	15'.2	55'.6	10'.0	
32° 22'.3	21'.9	269° 14'.8	15'.1	11° 05'.6 N	9'.9	
47° 22'.0	22'.2	283° 48'.9	15'.1	15'.5	9'.9	
62° 21'.8	22'.6	298° 23'.0	15'.1	25'.4	9'.9	
77° 21'.5	22'.9	312° 57'.1	15'.0	35'.3	9'.8	
92° 21'.2	23'.2	327° 31'.1	15'.0	45'.1	9'.8	
107° 21'.0	23'.5	342° 05'.1	14'.9	54'.9	9'.8	
122° 20'.7	23'.8	356° 39'.0	15'.0	12° 04'.7 N	9'.6	
137° 20'.5	24'.1	11° 13'.0	14'.9	14'.3	9'.7	
152° 20'.2	24'.4	25° 46'.9	14'.8	24'.0	9'.6	
167° 20'.0	24'.8	40° 20'.7	14'.8	33'.6	9'.5	
SD 16'.2	d 0'.3	SD	14'.9	14'.8	14'.7	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 3	Moonrise 4	Moonrise 5
N 72°	07:58	10:02	-	12:14	11:57	11:38
N 70°	07:41	09:19	-	12:17	12:06	11:55
68°	07:27	08:51	10:53	12:19	12:14	12:08
66°	07:15	08:29	09:56	12:21	12:20	12:20
64°	07:06	08:12	09:23	12:22	12:25	12:29
62°	06:57	07:57	08:59	12:24	12:30	12:37
60°	06:50	07:45	08:40	12:25	12:34	12:44
N 58°	06:43	07:34	08:24	12:26	12:37	12:50
56°	06:37	07:25	08:11	12:27	12:41	12:55
54°	06:31	07:17	07:59	12:28	12:44	13:00
52°	06:26	07:09	07:49	12:29	12:46	13:05
50°	06:21	07:02	07:40	12:30	12:49	13:09
45°	06:11	06:47	07:21	12:31	12:54	13:18
N 40°	06:01	06:35	07:05	12:33	12:58	13:25
35°	05:53	06:24	06:52	12:34	13:02	13:31
30°	05:45	06:14	06:40	12:35	13:05	13:37
20°	05:29	05:56	06:20	12:37	13:11	13:47
N 10°	05:14	05:40	06:03	12:38	13:16	13:55
0°	04:58	05:24	05:46	12:40	13:21	14:03
S 10°	04:40	05:07	05:30	12:42	13:26	14:12
20°	04:19	04:48	05:12	12:43	13:32	14:20
30°	03:51	04:24	04:51	12:45	13:38	14:31
35°	03:34	04:10	04:39	12:46	13:41	14:36
40°	03:12	03:53	04:25	12:48	13:45	14:43
45°	02:44	03:32	04:08	12:49	13:50	14:51
S 50°	02:04	03:04	03:47	12:51	13:56	15:00
52°	01:40	02:51	03:37	12:52	13:58	15:05
54°	01:08	02:35	03:26	12:53	14:01	15:09
56°	-	02:15	03:13	12:54	14:04	15:15
58°	-	01:50	02:58	12:55	14:08	15:21
S 60°	-	01:15	02:40	12:56	14:12	15:28
S 62°	-	-	02:17	12:58	14:17	15:35

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 3	Moonset 4	Moonset 5
N 72°	-	13:37	15:42	00:15	01:59	03:46
N 70°	-	14:20	15:59	00:15	01:53	03:31
68°	12:47	14:49	16:13	00:16	01:47	03:19
66°	13:44	15:11	16:24	00:16	01:43	03:09
64°	14:17	15:28	16:34	00:16	01:39	03:01
62°	14:41	15:42	16:42	00:16	01:35	02:54
60°	15:00	15:55	16:50	00:17	01:33	02:48
N 58°	15:15	16:05	16:57	00:17	01:30	02:43
56°	15:29	16:15	17:03	00:17	01:28	02:38
54°	15:40	16:23	17:08	00:17	01:26	02:34
52°	15:51	16:31	17:14	00:17	01:24	02:30
50°	16:00	16:37	17:18	00:17	01:22	02:27
45°	16:19	16:52	17:29	00:17	01:19	02:19
N 40°	16:35	17:05	17:39	00:18	01:16	02:13
35°	16:48	17:16	17:47	00:18	01:13	02:08
30°	17:00	17:26	17:55	00:18	01:11	02:03
20°	17:20	17:44	18:11	00:18	01:07	01:55
N 10°	17:37	18:00	18:26	00:18	01:03	01:48
0°	17:54	18:16	18:42	00:18	01:00	01:42
S 10°	18:10	18:33	19:00	00:18	00:57	01:35
20°	18:28	18:53	19:22	00:19	00:53	01:28
30°	18:49	19:16	19:49	00:19	00:49	01:20
35°	19:01	19:31	20:07	00:19	00:47	01:16
40°	19:16	19:48	20:28	00:19	00:44	01:10
45°	19:32	20:09	20:57	00:19	00:41	01:04
S 50°	19:54	20:37	21:38	00:19	00:38	00:57
52°	20:04	20:50	22:01	00:19	00:36	00:54
54°	20:15	21:07	22:35	00:19	00:34	00:50
56°	20:28	21:26	-	00:19	00:32	00:46
58°	20:43	21:52	-	00:19	00:30	00:42
S 60°	21:01	22:28	-	00:19	00:28	00:37
S 62°	21:24	-	-	00:19	00:25	00:32

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
3	10 32	10 20	11:50	18:50	06:29	8d 61%
4	10 08	9 56	11:50	19:31	07:11	9d 70%
5	9 44	9 32	11:50	20:14	07:52	10d 78%

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2011 December 6, 7, 8 (Tue, Wed, Thur)

GMT	ARIES	VENUS -3.9		MARS +0.7		JUPITER -2.8		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
6 00	74° 26'.2	151° 31'.0	24° 28'.8 S	270° 40'.6	9° 23'.7 N	45° 02'.5	10° 33'.7 N	229° 17'.0	7° 56'.5 S
01	89° 28'.7	166° 30'.1	28'.6	285° 42'.0	23'.4	60° 05'.1	33'.6	244° 19'.2	56'.6
02	104° 31'.2	181° 29'.1	28'.4	300° 43'.5	23'.0	75° 07'.7	33'.6	259° 21'.4	56'.7
03	119° 33'.6	196° 28'.2	28'.2	315° 45'.0	22'.7	90° 10'.4	33'.5	274° 23'.7	56'.7
T 04	134° 36'.1	211° 27'.3	27'.9	330° 46'.5	22'.3	105° 13'.0	33'.5	289° 25'.9	56'.8
u 05	149° 38'.6	226° 26'.4	27'.7	345° 48'.0	22'.0	120° 15'.6	33'.5	304° 28'.2	56'.9
e 06	164° 41'.0	241° 25'.4	27'.5	0° 49'.5	21'.7	135° 18'.3	33'.4	319° 30'.4	57'.0
s 07	179° 43'.5	256° 24'.5	27'.3	15° 51'.0	21'.3	150° 20'.9	33'.4	334° 32'.6	57'.1
d 08	194° 46'.0	271° 23'.6	27'.1	30° 52'.4	21'.0	165° 23'.5	33'.3	349° 34'.9	57'.1
a 09	209° 48'.4	286° 22'.6	26'.8	45° 53'.9	20'.6	180° 26'.1	33'.3	4° 37'.1	57'.2
y 10	224° 50'.9	301° 21'.7	26'.6	60° 55'.4	20'.3	195° 28'.8	33'.2	19° 39'.3	57'.3
11	239° 53'.3	316° 20'.8	26'.4	75° 56'.9	20'.0	210° 31'.4	33'.2	34° 41'.6	57'.4
12	254° 55'.8	331° 19'.9	24° 26'.2 S	90° 58'.4	9° 19'.6 N	225° 34'.0	10° 33'.1 N	49° 43'.8	7° 57'.4 S
13	269° 58'.3	346° 18'.9	25'.9	105° 59'.9	19'.3	240° 36'.6	33'.1	64° 46'.1	57'.5
14	285° 00'.7	1° 18'.0	25'.7	121° 01'.4	19'.0	255° 39'.3	33'.0	79° 48'.3	57'.6
15	300° 03'.2	16° 17'.1	25'.5	136° 02'.9	18'.6	270° 41'.9	33'.0	94° 50'.5	57'.7
16	315° 05'.7	31° 16'.2	25'.3	151° 04'.4	18'.3	285° 44'.5	32'.9	109° 52'.8	57'.8
17	330° 08'.1	46° 15'.2	25'.0	166° 05'.9	17'.9	300° 47'.1	32'.9	124° 55'.0	57'.8
18	345° 10'.6	61° 14'.3	24'.8	181° 07'.4	17'.6	315° 49'.8	32'.9	139° 57'.2	57'.9
19	0° 13'.1	76° 13'.4	24'.5	196° 08'.8	17'.3	330° 52'.4	32'.8	154° 59'.5	58'.0
20	15° 15'.5	91° 12'.5	24'.3	211° 10'.3	16'.9	345° 55'.0	32'.8	170° 01'.7	58'.1
21	30° 18'.0	106° 11'.5	24'.1	226° 11'.8	16'.6	0° 57'.6	32'.7	185° 04'.0	58'.2
22	45° 20'.5	121° 10'.6	23'.8	241° 13'.3	16'.3	16° 00'.2	32'.7	200° 06'.2	58'.2
23	60° 22'.9	136° 09'.7	23'.6	256° 14'.8	15'.9	31° 02'.9	32'.6	215° 08'.4	58'.3
7 00	75° 25'.4	151° 08'.8	24° 23'.4 S	271° 16'.3	9° 15'.6 N	46° 05'.5	10° 32'.6 N	230° 10'.7	7° 58'.4 S
01	90° 27'.8	166° 07'.8	23'.1	286° 17'.8	15'.3	61° 08'.1	32'.5	245° 12'.9	58'.5
02	105° 30'.3	181° 06'.9	22'.9	301° 19'.3	14'.9	76° 10'.7	32'.5	260° 15'.2	58'.5
03	120° 32'.8	196° 06'.0	22'.6	316° 20'.8	14'.6	91° 13'.4	32'.5	275° 17'.4	58'.6
W 04	135° 35'.2	211° 05'.1	22'.4	331° 22'.3	14'.3	106° 16'.0	32'.4	290° 19'.6	58'.7
e 05	150° 37'.7	226° 04'.2	22'.1	346° 23'.8	13'.9	121° 18'.6	32'.4	305° 21'.9	58'.8
d 06	165° 40'.2	241° 03'.2	21'.9	1° 25'.3	13'.6	136° 21'.2	32'.3	320° 24'.1	58'.9
n 07	180° 42'.6	256° 02'.3	21'.6	16° 26'.8	13'.3	151° 23'.8	32'.3	335° 26'.4	58'.9
e 08	195° 45'.1	271° 01'.4	21'.4	31° 28'.3	12'.9	166° 26'.5	32'.2	350° 28'.6	59'.0
s 09	210° 47'.6	286° 00'.5	21'.1	46° 29'.8	12'.6	181° 29'.1	32'.2	5° 30'.8	59'.1
d 10	225° 50'.0	300° 59'.5	20'.9	61° 31'.3	12'.3	196° 31'.7	32'.1	20° 33'.1	59'.2
a 11	240° 52'.5	315° 58'.6	20'.6	76° 32'.8	11'.9	211° 34'.3	32'.1	35° 35'.3	59'.2
y 12	255° 55'.0	330° 57'.7	24° 20'.3 S	91° 34'.3	9° 11'.6 N	226° 36'.9	10° 32'.1 N	50° 37'.6	7° 59'.3 S
13	270° 57'.4	345° 56'.8	20'.1	106° 35'.8	11'.3	241° 39'.5	32'.0	65° 39'.8	59'.4
14	285° 59'.9	0° 55'.9	19'.8	121° 37'.3	10'.9	256° 42'.2	32'.0	80° 42'.0	59'.5
15	301° 02'.3	15° 54'.9	19'.6	136° 38'.8	10'.6	271° 44'.8	31'.9	95° 44'.3	59'.6
16	316° 04'.8	30° 54'.0	19'.3	151° 40'.3	10'.3	286° 47'.4	31'.9	110° 46'.5	59'.6
17	331° 07'.3	45° 53'.1	19'.0	166° 41'.8	09'.9	301° 50'.0	31'.8	125° 48'.8	59'.7
18	346° 09'.7	60° 52'.2	18'.8	181° 43'.3	09'.6	316° 52'.6	31'.8	140° 51'.0	59'.8
19	1° 12'.2	75° 51'.3	18'.5	196° 44'.8	09'.3	331° 55'.2	31'.8	155° 53'.2	59'.9
20	16° 14'.7	90° 50'.4	18'.2	211° 46'.3	08'.9	346° 57'.9	31'.7	170° 55'.5	59'.9
21	31° 17'.1	105° 49'.4	18'.0	226° 47'.8	08'.6	2° 00'.5	31'.7	185° 57'.7	8° 00'.0 S
22	46° 19'.6	120° 48'.5	17'.7	241° 49'.4	08'.3	17° 03'.1	31'.6	201° 00'.0	00'.1
23	61° 22'.1	135° 47'.6	17'.4	256° 50'.9	07'.9	32° 05'.7	31'.6	216° 02'.2	00'.2
8 00	76° 24'.5	150° 46'.7	24° 17'.2 S	271° 52'.4	9° 07'.6 N	47° 08'.3	10° 31'.5 N	231° 04'.5	8° 00'.3 S
01	91° 27'.0	165° 45'.8	16'.9	286° 53'.9	07'.3	62° 10'.9	31'.5	246° 06'.7	00'.3
02	106° 29'.4	180° 44'.8	16'.6	301° 55'.4	06'.9	77° 13'.5	31'.5	261° 08'.9	00'.4
03	121° 31'.9	195° 43'.9	16'.3	316° 56'.9	06'.6	92° 16'.2	31'.4	276° 11'.2	00'.5
T 04	136° 34'.4	210° 43'.0	16'.1	331° 58'.4	06'.3	107° 18'.8	31'.4	291° 13'.4	00'.6
h 05	151° 36'.8	225° 42'.1	15'.8	346° 59'.9	06'.0	122° 21'.4	31'.3	306° 15'.7	00'.6
u 06	166° 39'.3	240° 41'.2	15'.5	2° 01'.4	05'.6	137° 24'.0	31'.3	321° 17'.9	00'.7
r 07	181° 41'.8	255° 40'.3	15'.2	17° 02'.9	05'.3	152° 26'.6	31'.3	336° 20'.2	00'.8
s 08	196° 44'.2	270° 39'.4	14'.9	32° 04'.5	05'.0	167° 29'.2	31'.2	351° 22'.4	00'.9
d 09	211° 46'.7	285° 38'.4	14'.6	47° 06'.0	04'.6	182° 31'.8	31'.2	6° 24'.6	00'.9
a 10	226° 49'.2	300° 37'.5	14'.4	62° 07'.5	04'.3	197° 34'.4	31'.1	21° 26'.9	01'.0
y 11	241° 51'.6	315° 36'.6	14'.1	77° 09'.0	04'.0	212° 37'.1	31'.1	36° 29'.1	01'.1
12	256° 54'.1	330° 35'.7	24° 13'.8 S	92° 10'.5	9° 03'.6 N	227° 39'.7	10° 31'.1 N	51° 31'.4	8° 01'.2 S
13	271° 56'.6	345° 34'.8	13'.5	107° 12'.0	03'.3	242° 42'.3	31'.0	66° 33'.6	01'.2
14	286° 59'.0	0° 33'.9	13'.2	122° 13'.5	03'.0	257° 44'.9	31'.0	81° 35'.8	01'.3
15	302° 01'.5	15° 33'.0	12'.9	137° 15'.1	02'.7	272° 47'.5	30'.9	96° 38'.1	01'.4
16	317° 03'.9	30° 32'.0	12'.6	152° 16'.6	02'.3	287° 50'.1	30'.9	111° 40'.3	01'.5
17	332° 06'.4	45° 31'.1	12'.3	167° 18'.1	02'.0	302° 52'.7	30'.9	126° 42'.6	01'.6
18	347° 08'.9	60° 30'.2	12'.0	182° 19'.6	01'.7	317° 55'.3	30'.8	141° 44'.8	01'.6
19	2° 11'.3	75° 29'.3	11'.7	197° 21'.1	01'.3	332° 57'.9	30'.8	156° 47'.1	01'.7
20	17° 13'.8	90° 28'.4	11'.4	212° 22'.6	01'.0	348° 00'.5	30'.7	171° 49'.3	01'.8
21	32° 16'.3	105° 27'.5	11'.1	227° 24'.2	00'.7	3° 03'.1	30'.7	186° 51'.6	01'.9
22	47° 18'.7	120° 26'.6	10'.8	242° 25'.7	00'.4	18° 05'.7	30'.7	201° 53'.8	01'.9
23	62° 21'.2	135° 25'.7	10'.5	257° 27'.2	00'.0	33° 08'.4	30'.6	216° 56'.0	02'.0
	M.P. 18:55	v -0'.9	d 0'.3	v 1'.5	d 0'.3	v 2'.6	d 0'.0	v 2'.2	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.5 S
Achernar	335° 27'.2	57° 10'.7 S
Acrux	173° 10'.8	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.3 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 21'.9	55° 53'.4 N
Alkaid	153° 00'.1	49° 15'.0 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 57'.0	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.5 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.1 N
Atria	107° 31'.4	69° 02'.8 S
Avior	234° 18'.0	59° 32'.7 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.1 S
Capella	280° 35'.6	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.7 N
Denebola	182° 34'.8	14° 30'.2 N
Diphda	348° 56'.8	17° 55'.2 S
Dubhe	193° 53'.0	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.4 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.4	57° 10'.6 S
Gienah	175° 53'.5	17° 36'.5 S
Hadar	148° 50'.0	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.7 S
Kochab	137° 21'.0	74° 06'.2 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.2	36° 25'.6 S
Miaplacidus	221° 39'.5	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.9 S
Polaris	317° 54'.4	89° 19'.2 N
Pollux	243° 28'.8	27° 59'.6 N
Procyon	245° 00'.6	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.6	11° 54'.4 N
Rigel	281° 12'.7	8° 11'.3 S
Rigil Kent	139° 53'.8	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.0	43° 28'.7 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	75° 43'.4	13:56
Mars	195° 50'.9	05:54
Jupiter	330° 40'.1	20:52
Saturn	154° 45'.3	08:38

SUN

GHA	Dec
182° 19'.7	22° 25'.1 S
197° 19'.4	25'.4
212° 19'.2	25'.7
227° 18'.9	26'.0
242° 18'.7	26'.3
257° 18'.4	26'.6
272° 18'.1	26'.9
287° 17'.9	27'.2
302° 17'.6	27'.5
317° 17'.4	27'.8
332° 17'.1	28'.1
347° 16'.8	28'.4
2° 16'.6	22° 28'.7 S
17° 16'.3	29'.0
32° 16'.0	29'.3
47° 15'.8	29'.6
62° 15'.5	29'.9
77° 15'.3	30'.2
92° 15'.0	30'.5
107° 14'.7	30'.8
122° 14'.5	31'.1
137° 14'.2	31'.4
152° 13'.9	31'.7
167° 13'.7	32'.0
182° 13'.4	22° 32'.3 S
197° 13'.1	32'.6
212° 12'.9	32'.9
227° 12'.6	33'.2
242° 12'.3	33'.4
257° 12'.1	33'.7
272° 11'.8	34'.0
287° 11'.5	34'.3
302° 11'.3	34'.6
317° 11'.0	34'.9
332° 10'.7	35'.2
347° 10'.5	35'.4
2° 10'.2	22° 35'.7 S
17° 09'.9	36'.0
32° 09'.7	36'.3
47° 09'.4	36'.6
62° 09'.1	36'.9
77° 08'.9	37'.1
92° 08'.6	37'.4
107° 08'.3	37'.7
122° 08'.1	38'.0
137° 07'.8	38'.2
152° 07'.5	38'.5
167° 07'.3	38'.8
182° 07'.0	22° 39'.1 S
197° 06'.7	39'.3
212° 06'.4	39'.6
227° 06'.2	39'.9
242° 05'.9	40'.2
257° 05'.6	40'.4
272° 05'.4	40'.7
287° 05'.1	41'.0
302° 04'.8	41'.2
317° 04'.5	41'.5
332° 04'.3	41'.8
347° 04'.0	42'.0
2° 03'.7	22° 42'.3 S
17° 03'.5	42'.6
32° 03'.2	42'.8
47° 02'.9	43'.1
62° 02'.6	43'.3
77° 02'.4	43'.6
92° 02'.1	43'.9
107° 01'.8	44'.1
122° 01'.5	44'.4
137° 01'.3	44'.6
152° 01'.0	44'.9
167° 00'.7	45'.1
SD 16'.2	d 0'.3

MOON

GHA	v	Dec	d	HP
54° 54'.5	14'.8	12° 43'.1 N	9'.5	54'.1
69° 28'.3	14'.7	52'.6	9'.4	
84° 02'.0	14'.7	13° 02'.0 N	9'.4	
98° 35'.7	14'.7	11'.4	9'.3	
113° 09'.4	14'.6	20'.7	9'.3	
127° 43'.0	14'.6	30'.0	9'.2	
142° 16'.6	14'.5	39'.2	9'.2	
156° 50'.1	14'.5	48'.4	9'.1	
171° 23'.6	14'.5	57'.5	9'.1	
185° 57'.1	14'.4	14° 06'.6 N	9'.0	
200° 30'.5	14'.3	15'.6	8'.9	
215° 03'.8	14'.3	24'.5	8'.9	
229° 37'.1	14'.3	14° 33'.4 N	8'.8	54'.1
244° 10'.4	14'.2	42'.2	8'.8	
258° 43'.6	14'.2	51'.0	8'.7	
273° 16'.8	14'.2	59'.7	8'.6	
287° 50'.0	14'.1	15° 08'.3 N	8'.6	
302° 23'.1	14'.0	16'.9	8'.6	
316° 56'.1	14'.0	25'.5	8'.4	
331° 29'.1	14'.0	33'.9	8'.4	
346° 02'.1	13'.9	42'.3	8'.4	
0° 35'.0	13'.8	50'.7	8'.2	
15° 07'.8	13'.8	58'.9	8'.2	
29° 40'.6	13'.8	16° 07'.1 N	8'.2	
44° 13'.4	13'.7	16° 15'.3 N	8'.0	54'.1
58° 46'.1	13'.6	23'.3	8'.0	54'.2
73° 18'.7	13'.7	31'.3	8'.0	
87° 51'.4	13'.5	39'.3	7'.8	
102° 23'.9	13'.5	47'.1	7'.8	
116° 56'.4	13'.5	54'.9	7'.8	
131° 28'.9	13'.4	17° 02'.7 N	7'.6	
146° 01'.3	13'.3	10'.3	7'.6	
160° 33'.6	13'.3	17'.9	7'.5	
175° 05'.9	13'.3	25'.4	7'.5	
189° 38'.2	13'.2	32'.9	7'.3	
204° 10'.4	13'.1	40'.2	7'.3	
218° 42'.5	13'.1	17° 47'.5 N	7'.2	54'.2
233° 14'.6	13'.1	54'.7	7'.2	
247° 46'.7	13'.0	18° 01'.9 N	7'.0	
262° 18'.7	12'.9	08'.9	7'.0	
276° 50'.6	12'.9	15'.9	6'.9	54'.3
291° 22'.5	12'.8	22'.8	6'.8	
305° 54'.3	12'.8	29'.6	6'.8	
320° 26'.1	12'.7	36'.4	6'.7	
334° 57'.8	12'.7	43'.1	6'.5	
349° 29'.5	12'.6	49'.6	6'.6	
4° 01'.1	12'.6	56'.2	6'.4	
18° 32'.7	12'.5	19° 02'.6 N	6'.3	
33° 04'.2	12'.5	19° 08'.9 N	6'.3	54'.3
47° 35'.7	12'.4	15'.2	6'.1	
62° 07'.1	12'.4	21'.3	6'.1	
76° 38'.5	12'.3	27'.4	6'.0	54'.4
91° 09'.8	12'.2	33'.4	5'.9	
105° 41'.0	12'.2	39'.3	5'.9	
120° 12'.2	12'.2	45'.2	5'.7	
134° 43'.4	12'.1	50'.9	5'.7	
149° 14'.5	12'.0	56'.6	5'.5	
163° 45'.5	12'.0	20° 02'.1 N	5'.5	
178° 16'.5	11'.9	07'.6	5'.4	
192° 47'.4	11'.9	13'.0	5'.3	
207° 18'.3	11'.8	20° 18'.3 N	5'.2	54'.5
221° 49'.1	11'.8	23'.5	5'.1	
236° 19'.9	11'.8	28'.6	5'.0	
250° 50'.7	11'.7	33'.6	4'.9	
265° 21'.4	11'.6	38'.5	4'.8	
279° 52'.0	11'.6	43'.3	4'.8	
294° 22'.6	11'.5	48'.1	4'.6	
308° 53'.1	11'.5	52'.7	4'.5	
323° 23'.6	11'.4	57'.2	4'.5	54'.6
337° 54'.0	11'.4	21° 01'.7 N	4'.3	
352° 24'.4	11'.4	06'.0	4'.2	
6° 54'.8	11'.3	10'.2	4'.2	
SD 14'.7		14'.8	14'.8	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 6	Moonrise 7	Moonrise 8
N 72°	08:05	10:16	-	11:12	10:18	-
N 70°	07:47	09:28	-	11:41	11:21	-
68°	07:33	08:58	11:15	12:03	11:57	11:48
66°	07:21	08:35	10:06	12:20	12:22	12:28
64°	07:10	08:17	09:30	12:34	12:42	12:55
62°	07:02	08:02	09:05	12:46	12:58	13:17
60°	06:54	07:50	08:45	12:56	13:12	13:34
N 58°	06:47	07:39	08:29	13:05	13:24	13:49
56°	06:41	07:29	08:15	13:13	13:34	14:01
54°	06:35	07:20	08:03	13:20	13:43	14:12
52°	06:29	07:13	07:53	13:26	13:51	14:22
50°	06:25	07:06	07:44	13:32	13:58	14:30
45°	06:14	06:50	07:24	13:44	14:14	14:49
N 40°	06:04	06:38	07:08	13:54	14:27	15:04
35°	05:55	06:26	06:54	14:03	14:38	15:17
30°	05:47	06:16	06:42	14:11	14:47	15:28
20°	05:31	05:58	06:22	14:24	15:04	15:47
N 10°	05:15	05:42	06:04	14:36	15:18	16:04
0°	04:59	05:25	05:48	14:47	15:32	16:20
S 10°	04:41	05:08	05:31	14:58	15:46	16:35
20°	04:19	04:48	05:13	15:10	16:01	16:52
30°	03:51	04:24	04:51	15:24	16:18	17:12
35°	03:33	04:10	04:39	15:32	16:28	17:23
40°	03:11	03:52	04:25	15:41	16:39	17:37
45°	02:42	03:31	04:07	15:52	16:52	17:52
S 50°	02:00	03:03	03:46	16:05	17:09	18:11
52°	01:36	02:48	03:36	16:11	17:17	18:20
54°	01:01	02:32	03:24	16:18	17:25	18:31
56°	-	02:12	03:11	16:25	17:35	18:42
58°	-	01:46	02:55	16:34	17:46	18:56
S 60°	-	01:07	02:37	16:43	17:59	19:11
S 62°	-	-	02:13	16:55	18:14	19:31

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 6	Moonset 7	Moonset 8
N 72°	-	13:27	15:37	05:41	08:08	-
N 70°	-	14:14	15:55	05:14	07:07	-
68°	12:27	14:44	16:10	04:53	06:32	08:18
66°	13:37	15:07	16:22	04:37	06:07	07:38
64°	14:12	15:25	16:32	04:24	05:48	07:11
62°	14:37	15:40	16:41	04:13	05:33	06:51
60°	14:57	15:53	16:48	04:04	05:19	06:34
N 58°	15:13	16:04	16:55	03:56	05:08	06:19
56°	15:27	16:13	17:02	03:49	04:59	06:07
54°	15:39	16:22	17:08	03:42	04:50	05:57
52°	15:49	16:30	17:13	03:36	04:42	05:47
50°	15:59	16:37	17:18	03:31	04:36	05:39
45°	16:18	16:52	17:29	03:20	04:21	05:21
N 40°	16:35	17:05	17:39	03:11	04:09	05:07
35°	16:48	17:16	17:48	03:03	03:59	04:54
30°	17:00	17:26	17:56	02:56	03:50	04:44
20°	17:20	17:44	18:12	02:44	03:34	04:26
N 10°	17:38	18:01	18:27	02:34	03:21	04:10
0°	17:55	18:17	18:44	02:24	03:08	03:55
S 10°	18:12	18:35	19:02	02:15	02:56	03:40
20°	18:30	18:55	19:24	02:04	02:43	03:24
30°	18:51	19:19	19:52	01:53	02:28	03:06
35°	19:04	19:33	20:10	01:46	02:19	02:56
40°	19:18	19:51	20:32	01:38	02:09	02:44
45°	19:36	20:12	21:01	01:29	01:57	02:29
S 50°	19:57	20:41	21:43	01:19	01:43	02:12
52°	20:07	20:55	22:08	01:14	01:36	02:04
54°	20:19	21:12	22:44	01:08	01:29	01:55
56°	20:33	21:32	-	01:02	01:21	01:45
58°	20:48	21:59	-	00:55	01:12	01:33
S 60°	21:07	22:38	-	00:48	01:02	01:20
S 62°	21:31	-	-	00:39	00:50	01:04

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
6	9 19	9 07	11:51	20:58	08:35	11d 85%
7	8 54	8 41	11:51	21:43	09:20	12d 91%
8	8 28	8 15	11:52	22:31	10:07	13d 96%

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2011 December 9, 10, 11 (Fri, Sat, Sunday)

GMT	ARIES	VENUS -3.9		MARS +0.6		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
9 00	77° 23'.7	150° 24'.8	24° 10'.2 S	272° 28'.7	8° 59'.7 N	48° 11'.0	10° 30'.6 N	231° 58'.3	8° 02'.1 S
01	92° 26'.1	165° 23'.9	09'.9	287° 30'.2	59'.4	63° 13'.6	30'.5	247° 00'.5	02'.2
02	107° 28'.6	180° 22'.9	09'.6	302° 31'.8	59'.1	78° 16'.2	30'.5	262° 02'.8	02'.2
03	122° 31'.1	195° 22'.0	09'.3	317° 33'.3	58'.7	93° 18'.8	30'.5	277° 05'.0	02'.3
04	137° 33'.5	210° 21'.1	09'.0	332° 34'.8	58'.4	108° 21'.4	30'.4	292° 07'.3	02'.4
05	152° 36'.0	225° 20'.2	08'.7	347° 36'.3	58'.1	123° 24'.0	30'.4	307° 09'.5	02'.5
06	167° 38'.4	240° 19'.3	08'.4	2° 37'.8	57'.8	138° 26'.6	30'.3	322° 11'.8	02'.5
07	182° 40'.9	255° 18'.4	08'.1	17° 39'.4	57'.4	153° 29'.2	30'.3	337° 14'.0	02'.6
08	197° 43'.4	270° 17'.5	07'.8	32° 40'.9	57'.1	168° 31'.8	30'.3	352° 16'.2	02'.7
09	212° 45'.8	285° 16'.6	07'.4	47° 42'.4	56'.8	183° 34'.4	30'.2	7° 18'.5	02'.8
10	227° 48'.3	300° 15'.7	07'.1	62° 43'.9	56'.5	198° 37'.0	30'.2	22° 20'.7	02'.8
11	242° 50'.8	315° 14'.8	06'.8	77° 45'.5	56'.1	213° 39'.6	30'.2	37° 23'.0	02'.9
12	257° 53'.2	330° 13'.9	24° 06'.5 S	92° 47'.0	8° 55'.8 N	228° 42'.2	10° 30'.1 N	52° 25'.2	8° 03'.0 S
13	272° 55'.7	345° 13'.0	06'.2	107° 48'.5	55'.5	243° 44'.8	30'.1	67° 27'.5	03'.1
14	287° 58'.2	0° 12'.1	05'.9	122° 50'.1	55'.2	258° 47'.4	30'.0	82° 29'.7	03'.1
15	303° 00'.6	15° 11'.2	05'.5	137° 51'.6	54'.8	273° 50'.0	30'.0	97° 32'.0	03'.2
16	318° 03'.1	30° 10'.2	05'.2	152° 53'.1	54'.5	288° 52'.6	30'.0	112° 34'.2	03'.3
17	333° 05'.6	45° 09'.3	04'.9	167° 54'.6	54'.2	303° 55'.2	29'.9	127° 36'.5	03'.4
18	348° 08'.0	60° 08'.4	04'.6	182° 56'.2	53'.9	318° 57'.8	29'.9	142° 38'.7	03'.4
19	3° 10'.5	75° 07'.5	04'.2	197° 57'.7	53'.5	334° 00'.4	29'.9	157° 40'.9	03'.5
20	18° 12'.9	90° 06'.6	03'.9	212° 59'.2	53'.2	349° 03'.0	29'.8	172° 43'.2	03'.6
21	33° 15'.4	105° 05'.7	03'.6	228° 00'.8	52'.9	4° 05'.6	29'.8	187° 45'.4	03'.7
22	48° 17'.9	120° 04'.8	03'.2	243° 02'.3	52'.6	19° 08'.2	29'.8	202° 47'.7	03'.7
23	63° 20'.3	135° 03'.9	02'.9	258° 03'.8	52'.3	34° 10'.8	29'.7	217° 49'.9	03'.8
10 00	78° 22'.8	150° 03'.0	24° 02'.6 S	273° 05'.4	8° 51'.9 N	49° 13'.4	10° 29'.7 N	232° 52'.2	8° 03'.9 S
01	93° 25'.3	165° 02'.1	02'.2	288° 06'.9	51'.6	64° 16'.0	29'.6	247° 54'.4	04'.0
02	108° 27'.7	180° 01'.2	01'.9	303° 08'.4	51'.3	79° 18'.6	29'.6	262° 56'.7	04'.0
03	123° 30'.2	195° 00'.3	01'.6	318° 10'.0	51'.0	94° 21'.2	29'.6	277° 58'.9	04'.1
04	138° 32'.7	209° 59'.4	01'.2	333° 11'.5	50'.7	109° 23'.8	29'.5	293° 01'.2	04'.2
05	153° 35'.1	224° 58'.5	00'.9	348° 13'.0	50'.3	124° 26'.4	29'.5	308° 03'.4	04'.3
06	168° 37'.6	239° 57'.6	00'.6	3° 14'.6	50'.0	139° 29'.0	29'.5	323° 05'.7	04'.3
07	183° 40'.1	254° 56'.7	00'.2	18° 16'.1	49'.7	154° 31'.6	29'.4	338° 07'.9	04'.4
08	198° 42'.5	269° 55'.8	23° 59'.9 S	33° 17'.6	49'.4	169° 34'.2	29'.4	353° 10'.2	04'.5
09	213° 45'.0	284° 54'.9	59'.5	48° 19'.2	49'.1	184° 36'.8	29'.4	8° 12'.4	04'.6
10	228° 47'.4	299° 54'.0	59'.2	63° 20'.7	48'.7	199° 39'.4	29'.3	23° 14'.6	04'.6
11	243° 49'.9	314° 53'.1	58'.8	78° 22'.2	48'.4	214° 42'.0	29'.3	38° 16'.9	04'.7
12	258° 52'.4	329° 52'.2	23° 58'.5 S	93° 23'.8	8° 48'.1 N	229° 44'.6	10° 29'.3 N	53° 19'.1	8° 04'.8 S
13	273° 54'.8	344° 51'.3	58'.1	108° 25'.3	47'.8	244° 47'.2	29'.2	68° 21'.4	04'.9
14	288° 57'.3	359° 50'.4	57'.8	123° 26'.9	47'.5	259° 49'.8	29'.2	83° 23'.6	04'.9
15	303° 59'.8	14° 49'.5	57'.4	138° 28'.4	47'.1	274° 52'.4	29'.2	98° 25'.9	05'.0
16	319° 02'.2	29° 48'.6	57'.1	153° 29'.9	46'.8	289° 54'.9	29'.1	113° 28'.1	05'.1
17	334° 04'.7	44° 47'.7	56'.7	168° 31'.5	46'.5	304° 57'.5	29'.1	128° 30'.4	05'.2
18	349° 07'.2	59° 46'.8	56'.4	183° 33'.0	46'.2	320° 00'.1	29'.0	143° 32'.6	05'.2
19	4° 09'.6	74° 45'.9	56'.0	198° 34'.6	45'.9	335° 02'.7	29'.0	158° 34'.9	05'.3
20	19° 12'.1	89° 45'.0	55'.6	213° 36'.1	45'.5	350° 05'.3	29'.0	173° 37'.1	05'.4
21	34° 14'.5	104° 44'.2	55'.3	228° 37'.7	45'.2	5° 07'.9	28'.9	188° 39'.4	05'.5
22	49° 17'.0	119° 43'.3	54'.9	243° 39'.2	44'.9	20° 10'.5	28'.9	203° 41'.6	05'.5
23	64° 19'.5	134° 42'.4	54'.6	258° 40'.7	44'.6	35° 13'.1	28'.9	218° 43'.9	05'.6
11 00	79° 21'.9	149° 41'.5	23° 54'.2 S	273° 42'.3	8° 44'.3 N	50° 15'.7	10° 28'.8 N	233° 46'.1	8° 05'.7 S
01	94° 24'.4	164° 40'.6	53'.8	288° 43'.8	44'.0	65° 18'.3	28'.8	248° 48'.4	05'.7
02	109° 26'.9	179° 39'.7	53'.5	303° 45'.4	43'.6	80° 20'.9	28'.8	263° 50'.6	05'.8
03	124° 29'.3	194° 38'.8	53'.1	318° 46'.9	43'.3	95° 23'.5	28'.7	278° 52'.9	05'.9
04	139° 31'.8	209° 37'.9	52'.7	333° 48'.5	43'.0	110° 26'.0	28'.7	293° 55'.1	06'.0
05	154° 34'.3	224° 37'.0	52'.4	348° 50'.0	42'.7	125° 28'.6	28'.7	308° 57'.4	06'.0
06	169° 36'.7	239° 36'.1	52'.0	3° 51'.6	42'.4	140° 31'.2	28'.7	323° 59'.6	06'.1
07	184° 39'.2	254° 35'.2	51'.6	18° 53'.1	42'.1	155° 33'.8	28'.6	339° 01'.9	06'.2
08	199° 41'.7	269° 34'.3	51'.3	33° 54'.7	41'.7	170° 36'.4	28'.6	354° 04'.1	06'.3
09	214° 44'.1	284° 33'.4	50'.9	48° 56'.2	41'.4	185° 39'.0	28'.6	9° 06'.4	06'.3
10	229° 46'.6	299° 32'.6	50'.5	63° 57'.8	41'.1	200° 41'.6	28'.5	24° 08'.6	06'.4
11	244° 49'.0	314° 31'.7	50'.1	78° 59'.3	40'.8	215° 44'.2	28'.5	39° 10'.9	06'.5
12	259° 51'.5	329° 30'.8	23° 49'.7 S	94° 00'.9	8° 40'.5 N	230° 46'.8	10° 28'.5 N	54° 13'.1	8° 06'.6 S
13	274° 54'.0	344° 29'.9	49'.4	109° 02'.4	40'.2	245° 49'.3	28'.4	69° 15'.4	06'.6
14	289° 56'.4	359° 29'.0	49'.0	124° 04'.0	39'.9	260° 51'.9	28'.4	84° 17'.6	06'.7
15	304° 58'.9	14° 28'.1	48'.6	139° 05'.5	39'.5	275° 54'.5	28'.4	99° 19'.9	06'.8
16	320° 01'.4	29° 27'.2	48'.2	154° 07'.1	39'.2	290° 57'.1	28'.3	114° 22'.1	06'.8
17	335° 03'.8	44° 26'.3	47'.8	169° 08'.6	38'.9	305° 59'.7	28'.3	129° 24'.4	06'.9
18	350° 06'.3	59° 25'.4	47'.4	184° 10'.2	38'.6	321° 02'.3	28'.3	144° 26'.6	07'.0
19	5° 08'.8	74° 24'.6	47'.1	199° 11'.8	38'.3	336° 04'.8	28'.2	159° 28'.9	07'.1
20	20° 11'.2	89° 23'.7	46'.7	214° 13'.3	38'.0	351° 07'.4	28'.2	174° 31'.1	07'.1
21	35° 13'.7	104° 22'.8	46'.3	229° 14'.9	37'.7	6° 10'.0	28'.2	189° 33'.4	07'.2
22	50° 16'.2	119° 21'.9	45'.9	244° 16'.4	37'.4	21° 12'.6	28'.1	204° 35'.6	07'.3
23	65° 18'.6	134° 21'.0	45'.5	259° 18'.0	37'.0	36° 15'.2	28'.1	219° 37'.9	07'.4
	M.P. 18:43	v -0'.9	d 0'.3	v 1'.5	d 0'.3	v 2'.6	d 0'.0	v 2'.2	d 0'.1

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.5 S
Achernar	335° 27'.2	57° 10'.7 S
Acrux	173° 10'.8	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.3 S
Aldebaran	290° 50'.3	16° 32'.0 N
Alioth	166° 21'.8	55° 53'.4 N
Alkaid	153° 00'.0	49° 15'.0 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 57'.0	8° 42'.7 S
Alphecca	126° 12'.3	26° 40'.4 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 28'.0	26° 27'.4 S
Arcturus	145° 57'.0	19° 07'.1 N
Atria	107° 31'.3	69° 02'.8 S
Avior	234° 18'.0	59° 32'.8 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.1 S
Capella	280° 35'.5	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.7 N
Denebola	182° 34'.8	14° 30'.1 N
Diphda	348° 56'.8	17° 55'.3 S
Dubhe	193° 52'.9	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.4 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.5	17° 36'.5 S
Hadar	148° 49'.9	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.9	74° 06'.2 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.4	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.8 S
Polaris	317° 54'.8	89° 19'.2 N
Pollux	243° 28'.7	27° 59'.6 N
Procyon	245° 00'.6	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.6	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.3 S
Rigil Kent	139° 53'.7	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.5	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.0 S
Spica	158° 32'.6	11° 13'.4 S
Suhail	222° 53'.0	43° 28'.8 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	71° 40'.2	14:01
Mars	194° 42'.6	05:47
Jupiter	330° 50'.6	20:40
Saturn	154° 29'.4	08:27

SUN				
GHA	Dec			
182° 00'.4	22° 45'.4 S			
197° 00'.2	45'.7			
211° 59'.9	45'.9			
226° 59'.6	46'.2			
241° 59'.3	46'.4			
256° 59'.1	46'.7			
271° 58'.8	46'.9			
286° 58'.5	47'.2			
301° 58'.2	47'.4			
316° 58'.0	47'.7			
331° 57'.7	47'.9			
346° 57'.4	48'.2			
1° 57'.1	22° 48'.4 S			
16° 56'.9	48'.7			
31° 56'.6	48'.9			
46° 56'.3	49'.1			
61° 56'.0	49'.4			
76° 55'.7	49'.6			
91° 55'.5	49'.9			
106° 55'.2	50'.1			
121° 54'.9	50'.3			
136° 54'.6	50'.6			
151° 54'.4	50'.8			
166° 54'.1	51'.1			
181° 53'.8	22° 51'.3 S			
196° 53'.5	51'.5			
211° 53'.2	51'.8			
226° 53'.0	52'.0			
241° 52'.7	52'.2			
256° 52'.4	52'.5			
271° 52'.1	52'.7			
286° 51'.8	52'.9			
301° 51'.6	53'.2			
316° 51'.3	53'.4			
331° 51'.0	53'.6			
346° 50'.7	53'.8			
1° 50'.4	22° 54'.1 S			
16° 50'.1	54'.3			
31° 49'.9	54'.5			
46° 49'.6	54'.8			
61° 49'.3	55'.0			
76° 49'.0	55'.2			
91° 48'.7	55'.4			
106° 48'.5	55'.6			
121° 48'.2	55'.9			
136° 47'.9	56'.1			
151° 47'.6	56'.3			
166° 47'.3	56'.5			
181° 47'.0	22° 56'.7 S			
196° 46'.8	57'.0			
211° 46'.5	57'.2			
226° 46'.2	57'.4			
241° 45'.9	57'.6			
256° 45'.6	57'.8			
271° 45'.3	58'.0			
286° 45'.0	58'.2			
301° 44'.8	58'.5			
316° 44'.5	58'.7			
331° 44'.2	58'.9			
346° 43'.9	59'.1			
1° 43'.6	22° 59'.3 S			
16° 43'.3	59'.5			
31° 43'.0	59'.7			
46° 42'.8	59'.9			
61° 42'.5	23° 00'.1 S			
76° 42'.2	00'.3			
91° 41'.9	00'.5			
106° 41'.6	00'.7			
121° 41'.3	00'.9			
136° 41'.0	01'.1			
151° 40'.8	01'.3			
166° 40'.5	01'.5			
SD 16'.2	d 0'.2			

MOON				
GHA	v	Dec	d	HP
21° 25'.1	11'.2	21° 14'.4 N	4'.0	54'.6
35° 55'.3	11'.2	18'.4	4'.0	
50° 25'.5	11'.1	22'.4	3'.8	
64° 55'.6	11'.2	26'.2	3'.8	
79° 25'.8	11'.0	30'.0	3'.6	54'.7
93° 55'.8	11'.0	33'.6	3'.5	
108° 25'.8	11'.0	37'.1	3'.5	
122° 55'.8	10'.9	40'.6	3'.3	
137° 25'.7	10'.9	43'.9	3'.2	
151° 55'.6	10'.9	47'.1	3'.2	
166° 25'.5	10'.8	50'.3	3'.0	
180° 55'.3	10'.7	53'.3	2'.9	54'.8
195° 25'.0	10'.7	21° 56'.2 N	2'.8	54'.8
209° 54'.7	10'.7	59'.0	2'.7	
224° 24'.4	10'.7	22° 01'.7 N	2'.6	
238° 54'.1	10'.6	04'.3	2'.5	
253° 23'.7	10'.5	06'.8	2'.3	
267° 53'.2	10'.6	09'.1	2'.3	
282° 22'.8	10'.4	11'.4	2'.2	54'.9
296° 52'.2	10'.5	13'.6	2'.0	
311° 21'.7	10'.4	15'.6	1'.9	
325° 51'.1	10'.4	17'.5	1'.9	
340° 20'.5	10'.4	19'.4	1'.7	
354° 49'.9	10'.3	21'.1	1'.6	
9° 19'.2	10'.3	22° 22'.7 N	1'.5	55'.0
23° 48'.5	10'.2	24'.2	1'.4	
38° 17'.7	10'.2	25'.6	1'.2	
52° 46'.9	10'.2	26'.8	1'.2	
67° 16'.1	10'.2	28'.0	1'.0	
81° 45'.3	10'.1	29'.0	1'.0	
96° 14'.4	10'.1	30'.0	0'.8	55'.1
110° 43'.5	10'.1	30'.8	0'.7	
125° 12'.6	10'.1	31'.5	0'.6	
139° 41'.7	10'.0	32'.1	0'.4	
154° 10'.7	10'.0	32'.5	0'.4	
168° 39'.7	10'.0	32'.9	0'.2	
183° 08'.7	10'.0	22° 33'.1 N	0'.2	55'.2
197° 37'.7	9'.9	33'.3	0'.0	
212° 06'.6	9'.9	33'.3	0'.1	
226° 35'.5	9'.9	33'.2	0'.3	
241° 04'.4	9'.9	32'.9	0'.3	
255° 33'.3	9'.9	32'.6	0'.5	
270° 02'.2	9'.8	32'.1	0'.5	55'.3
284° 31'.0	9'.9	31'.6	0'.7	
298° 59'.9	9'.8	30'.9	0'.8	
313° 28'.7	9'.8	30'.1	0'.9	
327° 57'.5	9'.8	29'.2	1'.1	
342° 26'.3	9'.8	28'.1	1'.1	
356° 55'.1	9'.7	22° 27'.0 N	1'.3	55'.4
11° 23'.8	9'.8	25'.7	1'.4	
25° 52'.6	9'.7	24'.3	1'.5	
40° 21'.3	9'.8	22'.8	1'.6	
54° 50'.1	9'.7	21'.2	1'.8	
69° 18'.8	9'.7	19'.4	1'.8	
83° 47'.5	9'.7	17'.6	2'.0	55'.5
98° 16'.2	9'.8	15'.6	2'.1	
112° 45'.0	9'.7	13'.5	2'.2	
127° 13'.7	9'.7	11'.3	2'.3	
141° 42'.4	9'.7	09'.0	2'.5	
156° 11'.1	9'.7	06'.5	2'.5	55'.6
170° 39'.8	9'.7	22° 04'.0 N	2'.7	55'.6
185° 08'.5	9'.7	01'.3	2'.8	
199° 37'.2	9'.7	21° 58'.5 N	2'.9	
214° 05'.9	9'.7	55'.6	3'.1	
228° 34'.6	9'.7	52'.5	3'.1	55'.7
243° 03'.3	9'.7	49'.4	3'.3	
257° 32'.0	9'.8	46'.1	3'.4	
272° 00'.8	9'.7	42'.7	3'.4	
286° 29'.5	9'.7	39'.3	3'.7	
300° 58'.2	9'.7	35'.6	3'.7	
315° 26'.9	9'.8	31'.9	3'.8	55'.8
329° 55'.7	9'.7	28'.1	4'.0	
SD 14'.9		15'.0	15'.1	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 9	Moonrise 10	Moonrise 11
N 72°	08:11	10:28	-	-	-	-
N 70°	07:53	09:36	-	-	-	-
68°	07:38	09:04	-	11:29	-	13:01
66°	07:25	08:41	10:14	12:42	13:18	14:26
64°	07:15	08:22	09:37	13:19	14:00	15:03
62°	07:06	08:07	09:11	13:45	14:29	15:30
60°	06:57	07:54	08:50	14:06	14:51	15:50
N 58°	06:50	07:42	08:33	14:23	15:08	16:07
56°	06:44	07:33	08:19	14:37	15:23	16:22
54°	06:38	07:24	08:07	14:49	15:36	16:34
52°	06:33	07:16	07:56	15:00	15:48	16:45
50°	06:27	07:09	07:47	15:10	15:58	16:54
45°	06:16	06:53	07:27	15:30	16:19	17:15
N 40°	06:06	06:40	07:10	15:47	16:36	17:31
35°	05:57	06:29	06:57	16:01	16:50	17:45
30°	05:49	06:18	06:45	16:13	17:03	17:57
20°	05:33	06:00	06:24	16:34	17:24	18:18
N 10°	05:17	05:43	06:06	16:52	17:43	18:35
0°	05:00	05:26	05:49	17:09	18:00	18:52
S 10°	04:42	05:09	05:32	17:26	18:18	19:09
20°	04:20	04:49	05:13	17:45	18:36	19:27
30°	03:51	04:25	04:52	18:06	18:58	19:47
35°	03:33	04:10	04:39	18:18	19:10	19:59
40°	03:11	03:52	04:24	18:32	19:25	20:13
45°	02:41	03:30	04:07	18:49	19:42	20:29
S 50°	01:58	03:01	03:45	19:10	20:03	20:49
52°	01:33	02:47	03:35	19:20	20:13	20:59
54°	00:54	02:30	03:23	19:31	20:25	21:09
56°	-	02:09	03:09	19:44	20:38	21:21
58°	-	01:42	02:53	19:59	20:53	21:35
S 60°	-	01:00	02:34	20:17	21:11	21:52
S 62°	-	-	02:09	20:39	21:33	22:12

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 9	Moonset 10	Moonset 11
N 72°	-	13:17	15:34	-	-	-
N 70°	-	14:09	15:52	-	-	-
68°	-	14:41	16:07	10:19	-	12:21
66°	13:30	15:04	16:20	09:06	10:16	10:56
64°	14:08	15:23	16:30	08:29	09:34	10:18
62°	14:34	15:38	16:39	08:03	09:05	09:51
60°	14:55	15:51	16:47	07:43	08:43	09:30
N 58°	15:12	16:03	16:55	07:26	08:25	09:13
56°	15:26	16:12	17:01	07:12	08:10	08:59
54°	15:38	16:21	17:07	07:00	07:57	08:46
52°	15:49	16:29	17:13	06:49	07:46	08:35
50°	15:58	16:36	17:18	06:40	07:36	08:26
45°	16:18	16:52	17:29	06:20	07:15	08:05
N 40°	16:35	17:05	17:39	06:04	06:58	07:48
35°	16:48	17:16	17:48	05:50	06:43	07:34
30°	17:01	17:27	17:57	05:38	06:31	07:22
20°	17:21	17:45	18:13	05:18	06:10	07:01
N 10°	17:39	18:02	18:28	05:00	05:51	06:42
0°	17:56	18:19	18:45	04:43	05:34	06:25
S 10°	18:14	18:37	19:04	04:27	05:16	06:08
20°	18:32	18:57	19:26	04:09	04:58	05:50
30°	18:54	19:21	19:54	03:49	04:36	05:28
35°	19:06	19:36	20:12	03:37	04:24	05:16
40°	19:21	19:54	20:35	03:23	04:09	05:02
45°	19:39	20:16	21:05	03:07	03:52	04:44
S 50°	20:00	20:44	21:48	02:48	03:31	04:23
52°	20:11	20:59	22:14	02:38	03:21	04:13
54°	20:23	21:16	22:54	02:28	03:10	04:02
56°	20:37	21:37	-	02:16	02:57	03:49
58°	20:53	22:05	-	02:02	02:42	03:34
S 60°	21:12	22:48	-	01:46	02:24	03:16
S 62°	21:37	-	-	01:27	02:02	02:54

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
9	8 02	7 49	11:52	23:21	10:56	14d 99%
10	7 36	7 22	11:53	24:13	11:47	15d Full
11	7 09	6 55	11:53	00:13	12:39	16d 99%

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2011 December 12, 13, 14 (Mon, Tue, Wed)

GMT	ARIES	VENUS -4.0		MARS +0.6		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
12 Monday 00	80° 21'.1	149° 20'.1	23° 45'.1 S	274° 19'.5	8° 36'.7 N	51° 17'.8	10° 28'.1 N	234° 40'.1	8° 07'.4 S
01	95° 23'.5	164° 19'.2	44'.7	289° 21'.1	36'.4	66° 20'.4	28'.1	249° 42'.4	07'.5
02	110° 26'.0	179° 18'.4	44'.3	304° 22'.7	36'.1	81° 22'.9	28'.0	264° 44'.6	07'.6
03	125° 28'.5	194° 17'.5	43'.9	319° 24'.2	35'.8	96° 25'.5	28'.0	279° 46'.9	07'.6
04	140° 30'.9	209° 16'.6	43'.5	334° 25'.8	35'.5	111° 28'.1	28'.0	294° 49'.1	07'.7
05	155° 33'.4	224° 15'.7	43'.1	349° 27'.3	35'.2	126° 30'.7	27'.9	309° 51'.4	07'.8
06	170° 35'.9	239° 14'.8	42'.7	4° 28'.9	34'.9	141° 33'.3	27'.9	324° 53'.6	07'.9
07	185° 38'.3	254° 13'.9	42'.3	19° 30'.5	34'.6	156° 35'.8	27'.9	339° 55'.9	07'.9
08	200° 40'.8	269° 13'.1	41'.9	34° 32'.0	34'.2	171° 38'.4	27'.9	354° 58'.1	08'.0
09	215° 43'.3	284° 12'.2	41'.5	49° 33'.6	33'.9	186° 41'.0	27'.8	10° 00'.4	08'.1
10	230° 45'.7	299° 11'.3	41'.1	64° 35'.1	33'.6	201° 43'.6	27'.8	25° 02'.7	08'.2
11	245° 48'.2	314° 10'.4	40'.7	79° 36'.7	33'.3	216° 46'.2	27'.8	40° 04'.9	08'.2
12	260° 50'.7	329° 09'.5	23° 40'.3 S	94° 38'.3	8° 33'.0 N	231° 48'.7	10° 27'.7 N	55° 07'.2	8° 08'.3 S
13	275° 53'.1	344° 08'.7	39'.9	109° 39'.8	32'.7	246° 51'.3	27'.7	70° 09'.4	08'.4
14	290° 55'.6	359° 07'.8	39'.5	124° 41'.4	32'.4	261° 53'.9	27'.7	85° 11'.7	08'.4
15	305° 58'.0	14° 06'.9	39'.1	139° 43'.0	32'.1	276° 56'.5	27'.7	100° 13'.9	08'.5
16	321° 00'.5	29° 06'.0	38'.7	154° 44'.5	31'.8	291° 59'.1	27'.6	115° 16'.2	08'.6
17	336° 03'.0	44° 05'.1	38'.2	169° 46'.1	31'.5	307° 01'.6	27'.6	130° 18'.4	08'.7
18	351° 05'.4	59° 04'.3	37'.8	184° 47'.7	31'.2	322° 04'.2	27'.6	145° 20'.7	08'.7
19	6° 07'.9	74° 03'.4	37'.4	199° 49'.2	30'.8	337° 06'.8	27'.5	160° 22'.9	08'.8
20	21° 10'.4	89° 02'.5	37'.0	214° 50'.8	30'.5	352° 09'.4	27'.5	175° 25'.2	08'.9
21	36° 12'.8	104° 01'.6	36'.6	229° 52'.4	30'.2	7° 11'.9	27'.5	190° 27'.4	08'.9
22	51° 15'.3	119° 00'.8	36'.2	244° 54'.0	29'.9	22° 14'.5	27'.5	205° 29'.7	09'.0
23	66° 17'.8	133° 59'.9	35'.7	259° 55'.5	29'.6	37° 17'.1	27'.4	220° 31'.9	09'.1
13 Tuesday 00	81° 20'.2	148° 59'.0	23° 35'.3 S	274° 57'.1	8° 29'.3 N	52° 19'.7	10° 27'.4 N	235° 34'.2	8° 09'.2 S
01	96° 22'.7	163° 58'.1	34'.9	289° 58'.7	29'.0	67° 22'.2	27'.4	250° 36'.5	09'.2
02	111° 25'.2	178° 57'.3	34'.5	305° 00'.2	28'.7	82° 24'.8	27'.3	265° 38'.7	09'.3
03	126° 27'.6	193° 56'.4	34'.0	320° 01'.8	28'.4	97° 27'.4	27'.3	280° 41'.0	09'.4
04	141° 30'.1	208° 55'.5	33'.6	335° 03'.4	28'.1	112° 30'.0	27'.3	295° 43'.2	09'.4
05	156° 32'.5	223° 54'.6	33'.2	350° 05'.0	27'.8	127° 32'.5	27'.3	310° 45'.5	09'.5
06	171° 35'.0	238° 53'.8	32'.7	5° 06'.5	27'.5	142° 35'.1	27'.2	325° 47'.7	09'.6
07	186° 37'.5	253° 52'.9	32'.3	20° 08'.1	27'.2	157° 37'.7	27'.2	340° 50'.0	09'.7
08	201° 39'.9	268° 52'.0	31'.9	35° 09'.7	26'.9	172° 40'.2	27'.2	355° 52'.2	09'.7
09	216° 42'.4	283° 51'.2	31'.5	50° 11'.3	26'.6	187° 42'.8	27'.2	10° 54'.5	09'.8
10	231° 44'.9	298° 50'.3	31'.0	65° 12'.8	26'.3	202° 45'.4	27'.1	25° 56'.7	09'.9
11	246° 47'.3	313° 49'.4	30'.6	80° 14'.4	26'.0	217° 48'.0	27'.1	40° 59'.0	09'.9
12	261° 49'.8	328° 48'.5	23° 30'.1 S	95° 16'.0	8° 25'.7 N	232° 50'.5	10° 27'.1 N	56° 01'.3	8° 10'.0 S
13	276° 52'.3	343° 47'.7	29'.7	110° 17'.6	25'.3	247° 53'.1	27'.1	71° 03'.5	10'.1
14	291° 54'.7	358° 46'.8	29'.3	125° 19'.1	25'.0	262° 55'.7	27'.0	86° 05'.8	10'.1
15	306° 57'.2	13° 45'.9	28'.8	140° 20'.7	24'.7	277° 58'.2	27'.0	101° 08'.0	10'.2
16	321° 59'.6	28° 45'.1	28'.4	155° 22'.3	24'.4	293° 00'.8	27'.0	116° 10'.3	10'.3
17	337° 02'.1	43° 44'.2	27'.9	170° 23'.9	24'.1	308° 03'.4	27'.0	131° 12'.5	10'.4
18	352° 04'.6	58° 43'.3	27'.5	185° 25'.5	23'.8	323° 06'.0	26'.9	146° 14'.8	10'.4
19	7° 07'.0	73° 42'.5	27'.0	200° 27'.1	23'.5	338° 08'.5	26'.9	161° 17'.0	10'.5
20	22° 09'.5	88° 41'.6	26'.6	215° 28'.6	23'.2	353° 11'.1	26'.9	176° 19'.3	10'.6
21	37° 12'.0	103° 40'.7	26'.2	230° 30'.2	22'.9	8° 13'.7	26'.9	191° 21'.6	10'.6
22	52° 14'.4	118° 39'.9	25'.7	245° 31'.8	22'.6	23° 16'.2	26'.8	206° 23'.8	10'.7
23	67° 16'.9	133° 39'.0	25'.3	260° 33'.4	22'.3	38° 18'.8	26'.8	221° 26'.1	10'.8
14 Wednesday 00	82° 19'.4	148° 38'.1	23° 24'.8 S	275° 35'.0	8° 22'.0 N	53° 21'.4	10° 26'.8 N	236° 28'.3	8° 10'.9 S
01	97° 21'.8	163° 37'.3	24'.3	290° 36'.6	21'.7	68° 23'.9	26'.8	251° 30'.6	10'.9
02	112° 24'.3	178° 36'.4	23'.9	305° 38'.1	21'.4	83° 26'.5	26'.7	266° 32'.8	11'.0
03	127° 26'.8	193° 35'.5	23'.4	320° 39'.7	21'.1	98° 29'.1	26'.7	281° 35'.1	11'.1
04	142° 29'.2	208° 34'.7	23'.0	335° 41'.3	20'.8	113° 31'.6	26'.7	296° 37'.4	11'.1
05	157° 31'.7	223° 33'.8	22'.5	350° 42'.9	20'.5	128° 34'.2	26'.7	311° 39'.6	11'.2
06	172° 34'.1	238° 32'.9	22'.1	5° 44'.5	20'.2	143° 36'.8	26'.6	326° 41'.9	11'.3
07	187° 36'.6	253° 32'.1	21'.6	20° 46'.1	19'.9	158° 39'.3	26'.6	341° 44'.1	11'.3
08	202° 39'.1	268° 31'.2	21'.1	35° 47'.7	19'.6	173° 41'.9	26'.6	356° 46'.4	11'.4
09	217° 41'.5	283° 30'.4	20'.7	50° 49'.3	19'.3	188° 44'.5	26'.6	11° 48'.6	11'.5
10	232° 44'.0	298° 29'.5	20'.2	65° 50'.8	19'.0	203° 47'.0	26'.5	26° 50'.9	11'.5
11	247° 46'.5	313° 28'.6	19'.8	80° 52'.4	18'.7	218° 49'.6	26'.5	41° 53'.2	11'.6
12	262° 48'.9	328° 27'.8	23° 19'.3 S	95° 54'.0	8° 18'.4 N	233° 52'.1	10° 26'.5 N	56° 55'.4	8° 11'.7 S
13	277° 51'.4	343° 26'.9	18'.8	110° 55'.6	18'.1	248° 54'.7	26'.5	71° 57'.7	11'.8
14	292° 53'.9	358° 26'.1	18'.4	125° 57'.2	17'.8	263° 57'.3	26'.5	86° 59'.9	11'.8
15	307° 56'.3	13° 25'.2	17'.9	140° 58'.8	17'.5	278° 59'.8	26'.4	102° 02'.2	11'.9
16	322° 58'.8	28° 24'.3	17'.4	156° 00'.4	17'.2	294° 02'.4	26'.4	117° 04'.5	12'.0
17	338° 01'.3	43° 23'.5	16'.9	171° 02'.0	16'.9	309° 05'.0	26'.4	132° 06'.7	12'.0
18	353° 03'.7	58° 22'.6	16'.5	186° 03'.6	16'.6	324° 07'.5	26'.4	147° 09'.0	12'.1
19	8° 06'.2	73° 21'.8	16'.0	201° 05'.2	16'.3	339° 10'.1	26'.3	162° 11'.2	12'.2
20	23° 08'.6	88° 20'.9	15'.5	216° 06'.8	16'.0	354° 12'.6	26'.3	177° 13'.5	12'.2
21	38° 11'.1	103° 20'.1	15'.0	231° 08'.4	15'.7	9° 15'.2	26'.3	192° 15'.7	12'.3
22	53° 13'.6	118° 19'.2	14'.6	246° 10'.0	15'.4	24° 17'.8	26'.3	207° 18'.0	12'.4
23	68° 16'.0	133° 18'.3	14'.1	261° 11'.6	15'.2	39° 20'.3	26'.3	222° 20'.3	12'.4
	M.P. 18:32	v -0'.9	d 0'.4	v 1'.6	d 0'.3	v 2'.6	d 0'.0	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.5 S
Achernar	335° 27'.2	57° 10'.7 S
Acrux	173° 10'.8	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.3 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.8	55° 53'.4 N
Alkaid	153° 00'.0	49° 15'.0 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 57'.0	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.4 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.1 N
Atria	107° 31'.3	69° 02'.8 S
Avior	234° 18'.0	59° 32'.8 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.1 S
Capella	280° 35'.5	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.7 N
Denebola	182° 34'.8	14° 30'.1 N
Diphda	348° 56'.8	17° 55'.3 S
Dubhe	193° 52'.9	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.4 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.5	17° 36'.5 S
Hadar	148° 49'.9	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.9	74° 06'.1 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.4	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.3 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.8 S
Polaris	317° 55'.3	89° 19'.2 N
Pollux	243° 28'.7	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.5	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.3 S
Rigil Kent	139° 53'.7	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.0 S
Spica	158° 32'.5	11° 13'.4 S
Suhail	222° 53'.0	43° 28'.8 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	67° 38'.8	14:05
Mars	193° 36'.9	05:40
Jupiter	330° 59'.4	20:27
Saturn	154° 14'.0	08:16

SUN

GHA	Dec
181° 40'.2	23° 01'.7 S
196° 39'.9	01'.9
211° 39'.6	02'.1
226° 39'.3	02'.3
241° 39'.0	02'.5
256° 38'.7	02'.7
271° 38'.4	02'.9
286° 38'.2	03'.1
301° 37'.9	03'.3
316° 37'.6	03'.5
331° 37'.3	03'.7
346° 37'.0	03'.9
1° 36'.7	23° 04'.1 S
16° 36'.4	04'.2
31° 36'.1	04'.4
46° 35'.8	04'.6
61° 35'.6	04'.8
76° 35'.3	05'.0
91° 35'.0	05'.2
106° 34'.7	05'.4
121° 34'.4	05'.5
136° 34'.1	05'.7
151° 33'.8	05'.9
166° 33'.5	06'.1
181° 33'.2	23° 06'.3 S
196° 32'.9	06'.4
211° 32'.6	06'.6
226° 32'.3	06'.8
241° 32'.1	07'.0
256° 31'.8	07'.1
271° 31'.5	07'.3
286° 31'.2	07'.5
301° 30'.9	07'.7
316° 30'.6	07'.8
331° 30'.3	08'.0
346° 30'.0	08'.2
1° 29'.7	23° 08'.4 S
16° 29'.4	08'.5
31° 29'.1	08'.7
46° 28'.8	08'.9
61° 28'.5	09'.0
76° 28'.2	09'.2
91° 28'.0	09'.4
106° 27'.7	09'.5
121° 27'.4	09'.7
136° 27'.1	09'.9
151° 26'.8	10'.0
166° 26'.5	10'.2
181° 26'.2	23° 10'.3 S
196° 25'.9	10'.5
211° 25'.6	10'.7
226° 25'.3	10'.8
241° 25'.0	11'.0
256° 24'.7	11'.1
271° 24'.4	11'.3
286° 24'.1	11'.4
301° 23'.8	11'.6
316° 23'.5	11'.7
331° 23'.2	11'.9
346° 22'.9	12'.1
1° 22'.6	23° 12'.2 S
16° 22'.3	12'.4
31° 22'.0	12'.5
46° 21'.7	12'.7
61° 21'.4	12'.8
76° 21'.1	12'.9
91° 20'.8	13'.1
106° 20'.6	13'.2
121° 20'.3	13'.4
136° 20'.0	13'.5
151° 19'.7	13'.7
166° 19'.4	13'.8
SD 16'.2	d 0'.2

MOON

GHA	v	Dec	d	HP
344° 24'.4	9'.8	21° 24'.1 N	4'.1	55'.8
358° 53'.2	9'.8	20'.0	4'.1	
13° 22'.0	9'.8	15'.9	4'.3	
27° 50'.8	9'.8	11'.6	4'.5	55'.9
42° 19'.6	9'.8	07'.1	4'.5	
56° 48'.4	9'.8	02'.6	4'.6	
71° 17'.2	9'.8	20° 58'.0 N	4'.8	
85° 46'.0	9'.9	53'.2	4'.8	
100° 14'.9	9'.9	48'.4	5'.0	56'.0
114° 43'.8	9'.8	43'.4	5'.1	
129° 12'.6	9'.9	38'.3	5'.2	
143° 41'.5	9'.9	33'.1	5'.3	
158° 10'.4	10'.0	20° 27'.8 N	5'.5	56'.0
172° 39'.4	9'.9	22'.3	5'.5	56'.1
187° 08'.3	10'.0	16'.8	5'.6	
201° 37'.3	10'.0	11'.2	5'.8	
216° 06'.3	10'.0	05'.4	5'.8	
230° 35'.3	10'.0	19° 59'.6 N	6'.0	
245° 04'.3	10'.1	53'.6	6'.1	
259° 33'.4	10'.1	47'.5	6'.2	56'.2
274° 02'.5	10'.1	41'.3	6'.3	
288° 31'.6	10'.1	35'.0	6'.4	
303° 00'.7	10'.1	28'.6	6'.5	
317° 29'.8	10'.2	22'.1	6'.6	
331° 59'.0	10'.2	19° 15'.5 N	6'.7	56'.3
346° 28'.2	10'.2	08'.8	6'.8	
0° 57'.4	10'.2	02'.0	6'.9	
15° 26'.6	10'.3	18° 55'.1 N	7'.0	
29° 55'.9	10'.3	48'.1	7'.2	
44° 25'.2	10'.3	40'.9	7'.2	56'.4
58° 54'.5	10'.3	33'.7	7'.3	
73° 23'.8	10'.4	26'.4	7'.4	
87° 53'.2	10'.4	19'.0	7'.6	
102° 22'.6	10'.4	11'.4	7'.6	
116° 52'.0	10'.5	03'.8	7'.7	56'.5
131° 21'.5	10'.4	17° 56'.1 N	7'.9	
145° 50'.9	10'.5	17° 48'.2 N	7'.9	56'.5
160° 20'.4	10'.6	40'.3	8'.0	
174° 50'.0	10'.5	32'.3	8'.1	
189° 19'.5	10'.6	24'.2	8'.2	56'.6
203° 49'.1	10'.6	16'.0	8'.3	
218° 18'.7	10'.7	07'.7	8'.4	
232° 48'.4	10'.6	16° 59'.3 N	8'.5	
247° 18'.0	10'.7	50'.8	8'.6	56'.7
261° 47'.7	10'.8	42'.2	8'.6	
276° 17'.5	10'.7	33'.6	8'.8	
290° 47'.2	10'.8	24'.8	8'.8	
305° 17'.0	10'.8	16'.0	9'.0	
319° 46'.8	10'.9	16° 07'.0 N	9'.0	56'.8
334° 16'.7	10'.8	15° 58'.0 N	9'.1	
348° 46'.5	10'.9	48'.9	9'.2	
3° 16'.4	11'.0	39'.7	9'.3	
17° 46'.4	10'.9	30'.4	9'.4	
32° 16'.3	11'.0	21'.0	9'.5	56'.9
46° 46'.3	11'.0	11'.5	9'.5	
61° 16'.3	11'.0	02'.0	9'.6	
75° 46'.3	11'.1	14° 52'.4 N	9'.7	
90° 16'.4	11'.1	42'.7	9'.8	
104° 46'.5	11'.1	32'.9	9'.9	57'.0
119° 16'.6	11'.1	23'.0	9'.9	
133° 46'.7	11'.2	14° 13'.1 N	10'.1	57'.0
148° 16'.9	11'.2	03'.0	10'.1	
162° 47'.1	11'.2	13° 52'.9 N	10'.2	
177° 17'.3	11'.3	42'.7	10'.2	57'.1
191° 47'.6	11'.3	32'.5	10'.3	
206° 17'.9	11'.3	22'.2	10'.5	
220° 48'.2	11'.3	11'.7	10'.4	
235° 18'.5	11'.3	01'.3	10'.6	
249° 48'.8	11'.4	12° 50'.7 N	10'.6	57'.2
264° 19'.2	11'.4	40'.1	10'.7	
278° 49'.6	11'.4	29'.4	10'.8	
293° 20'.0	11'.5	18'.6	10'.8	
SD 15'.3		15'.4	15'.5	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 12	Moonrise 13	Moonrise 14
N 72°	08:17	10:39	-	-	15:34	18:16
N 70°	07:57	09:43	-	-	16:36	18:42
68°	07:42	09:10	-	15:16	17:11	19:01
66°	07:29	08:45	10:22	15:56	17:36	19:16
64°	07:18	08:26	09:42	16:24	17:55	19:29
62°	07:09	08:10	09:15	16:46	18:10	19:39
60°	07:01	07:57	08:54	17:03	18:23	19:48
N 58°	06:53	07:46	08:37	17:17	18:35	19:56
56°	06:47	07:36	08:23	17:30	18:44	20:03
54°	06:41	07:27	08:10	17:40	18:53	20:09
52°	06:35	07:19	08:00	17:50	19:00	20:14
50°	06:30	07:12	07:50	17:58	19:07	20:19
45°	06:19	06:56	07:29	18:16	19:22	20:30
N 40°	06:08	06:42	07:13	18:31	19:34	20:39
35°	05:59	06:31	06:59	18:43	19:44	20:47
30°	05:51	06:20	06:47	18:54	19:53	20:53
20°	05:34	06:02	06:26	19:13	20:09	21:05
N 10°	05:18	05:45	06:07	19:29	20:22	21:15
0°	05:02	05:28	05:50	19:44	20:34	21:24
S 10°	04:43	05:10	05:33	19:59	20:47	21:33
20°	04:21	04:50	05:14	20:15	21:00	21:43
30°	03:52	04:25	04:52	20:33	21:15	21:55
35°	03:33	04:10	04:40	20:44	21:24	22:01
40°	03:11	03:52	04:25	20:56	21:34	22:08
45°	02:41	03:30	04:07	21:10	21:46	22:17
S 50°	01:56	03:01	03:45	21:28	22:00	22:27
52°	01:30	02:46	03:34	21:36	22:06	22:32
54°	00:48	02:29	03:22	21:45	22:14	22:37
56°	-	02:07	03:08	21:55	22:22	22:43
58°	-	01:39	02:52	22:07	22:31	22:49
S 60°	-	00:53	02:32	22:21	22:41	22:57
S 62°	-	-	02:07	22:37	22:53	23:05

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 12	Moonset 13	Moonset 14
N 72°	-	13:09	15:31	-	13:24	12:27
N 70°	-	14:05	15:50	-	12:21	11:59
68°	-	14:38	16:06	11:54	11:45	11:39
66°	13:26	15:02	16:19	11:13	11:19	11:22
64°	14:05	15:22	16:29	10:44	10:59	11:08
62°	14:33	15:37	16:39	10:22	10:43	10:57
60°	14:54	15:51	16:47	10:05	10:29	10:47
N 58°	15:11	16:02	16:54	09:50	10:18	10:38
56°	15:25	16:12	17:01	09:37	10:07	10:31
54°	15:37	16:21	17:07	09:26	09:58	10:24
52°	15:48	16:29	17:13	09:16	09:50	10:18
50°	15:58	16:36	17:18	09:08	09:43	10:12
45°	16:18	16:52	17:29	08:49	09:27	10:00
N 40°	16:35	17:06	17:40	08:34	09:14	09:50
35°	16:49	17:17	17:49	08:21	09:03	09:42
30°	17:01	17:28	17:57	08:09	08:53	09:34
20°	17:22	17:46	18:14	07:50	08:37	09:21
N 10°	17:41	18:03	18:30	07:33	08:22	09:09
0°	17:58	18:20	18:46	07:17	08:08	08:58
S 10°	18:15	18:38	19:05	07:01	07:54	08:47
20°	18:34	18:58	19:28	06:44	07:39	08:36
30°	18:56	19:23	19:56	06:24	07:22	08:22
35°	19:09	19:38	20:15	06:12	07:12	08:14
40°	19:23	19:56	20:38	05:59	07:01	08:05
45°	19:41	20:18	21:08	05:43	06:47	07:54
S 50°	20:03	20:48	21:52	05:24	06:31	07:41
52°	20:14	21:03	22:19	05:15	06:23	07:35
54°	20:26	21:20	23:02	05:04	06:14	07:29
56°	20:40	21:42	-	04:52	06:04	07:21
58°	20:57	22:11	-	04:39	05:53	07:13
S 60°	21:17	22:57	-	04:23	05:40	07:03
S 62°	21:42	-	-	04:03	05:24	06:52

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
12	6 41	6 27	11:54	01:05	13:30	17d 96%
13	6 13	5 59	11:54	01:56	14:21	18d 92%
14	5 45	5 31	11:54	02:46	15:11	19d 85%

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2011 December 15, 16, 17 (Thur, Fri, Sat)

GMT	ARIES	VENUS -4.0		MARS +0.5		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
15 00	83° 18'.5	148° 17'.5	23° 13'.6 S	276° 13'.2	8° 14'.9 N	54° 22'.9	10° 26'.2 N	237° 22'.5	8° 12'.5 S
01	98° 21'.0	163° 16'.6	13'.1	291° 14'.8	14'.6	69° 25'.4	26'.2	252° 24'.8	12'.6
02	113° 23'.4	178° 15'.8	12'.6	306° 16'.4	14'.3	84° 28'.0	26'.2	267° 27'.0	12'.7
03	128° 25'.9	193° 14'.9	12'.2	321° 18'.0	14'.0	99° 30'.5	26'.2	282° 29'.3	12'.7
04	143° 28'.4	208° 14'.1	11'.7	336° 19'.6	13'.7	114° 33'.1	26'.2	297° 31'.6	12'.8
05	158° 30'.8	223° 13'.2	11'.2	351° 21'.2	13'.4	129° 35'.7	26'.1	312° 33'.8	12'.9
06	173° 33'.3	238° 12'.4	10'.7	6° 22'.8	13'.1	144° 38'.2	26'.1	327° 36'.1	12'.9
07	188° 35'.8	253° 11'.5	10'.2	21° 24'.4	12'.8	159° 40'.8	26'.1	342° 38'.3	13'.0
08	203° 38'.2	268° 10'.7	09'.7	36° 26'.0	12'.5	174° 43'.3	26'.1	357° 40'.6	13'.1
09	218° 40'.7	283° 09'.8	09'.2	51° 27'.6	12'.2	189° 45'.9	26'.1	12° 42'.9	13'.1
10	233° 43'.1	298° 09'.0	08'.7	66° 29'.2	11'.9	204° 48'.4	26'.0	27° 45'.1	13'.2
11	248° 45'.6	313° 08'.1	08'.2	81° 30'.8	11'.6	219° 51'.0	26'.0	42° 47'.4	13'.3
12	263° 48'.1	328° 07'.3	23° 07'.7 S	96° 32'.4	8° 11'.3 N	234° 53'.6	10° 26'.0 N	57° 49'.7	8° 13'.3 S
13	278° 50'.5	343° 06'.4	07'.2	111° 34'.0	11'.0	249° 56'.1	26'.0	72° 51'.9	13'.4
14	293° 53'.0	358° 05'.6	06'.7	126° 35'.6	10'.7	264° 58'.7	26'.0	87° 54'.2	13'.5
15	308° 55'.5	13° 04'.7	06'.3	141° 37'.2	10'.4	280° 01'.2	25'.9	102° 56'.4	13'.5
16	323° 57'.9	28° 03'.9	05'.8	156° 38'.8	10'.2	295° 03'.8	25'.9	117° 58'.7	13'.6
17	339° 00'.4	43° 03'.0	05'.3	171° 40'.4	09'.9	310° 06'.3	25'.9	133° 01'.0	13'.7
18	354° 02'.9	58° 02'.2	04'.7	186° 42'.0	09'.6	325° 08'.9	25'.9	148° 03'.2	13'.8
19	9° 05'.3	73° 01'.3	04'.2	201° 43'.6	09'.3	340° 11'.4	25'.9	163° 05'.5	13'.8
20	24° 07'.8	88° 00'.5	03'.7	216° 45'.2	09'.0	355° 14'.0	25'.8	178° 07'.7	13'.9
21	39° 10'.2	102° 59'.6	03'.2	231° 46'.9	08'.7	10° 16'.5	25'.8	193° 10'.0	14'.0
22	54° 12'.7	117° 58'.8	02'.7	246° 48'.5	08'.4	25° 19'.1	25'.8	208° 12'.3	14'.0
23	69° 15'.2	132° 57'.9	02'.2	261° 50'.1	08'.1	40° 21'.6	25'.8	223° 14'.5	14'.1
16 00	84° 17'.6	147° 57'.1	23° 01'.7 S	276° 51'.7	8° 07'.8 N	55° 24'.2	10° 25'.8 N	238° 16'.8	8° 14'.2 S
01	99° 20'.1	162° 56'.3	01'.2	291° 53'.3	07'.5	70° 26'.7	25'.7	253° 19'.1	14'.2
02	114° 22'.6	177° 55'.4	00'.7	306° 54'.9	07'.2	85° 29'.3	25'.7	268° 21'.3	14'.3
03	129° 25'.0	192° 54'.6	00'.2	321° 56'.5	07'.0	100° 31'.8	25'.7	283° 23'.6	14'.4
04	144° 27'.5	207° 53'.7	22° 59'.7 S	336° 58'.1	06'.7	115° 34'.4	25'.7	298° 25'.8	14'.4
05	159° 30'.0	222° 52'.9	59'.2	351° 59'.8	06'.4	130° 36'.9	25'.7	313° 28'.1	14'.5
06	174° 32'.4	237° 52'.0	58'.6	7° 01'.4	06'.1	145° 39'.5	25'.7	328° 30'.4	14'.6
07	189° 34'.9	252° 51'.2	58'.1	22° 03'.0	05'.8	160° 42'.0	25'.6	343° 32'.6	14'.6
08	204° 37'.4	267° 50'.4	57'.6	37° 04'.6	05'.5	175° 44'.6	25'.6	358° 34'.9	14'.7
09	219° 39'.8	282° 49'.5	57'.1	52° 06'.2	05'.2	190° 47'.1	25'.6	13° 37'.2	14'.8
10	234° 42'.3	297° 48'.7	56'.6	67° 07'.8	04'.9	205° 49'.7	25'.6	28° 39'.4	14'.8
11	249° 44'.7	312° 47'.9	56'.0	82° 09'.5	04'.7	220° 52'.2	25'.6	43° 41'.7	14'.9
12	264° 47'.2	327° 47'.0	22° 55'.5 S	97° 11'.1	8° 04'.4 N	235° 54'.8	10° 25'.6 N	58° 43'.9	8° 15'.0 S
13	279° 49'.7	342° 46'.2	55'.0	112° 12'.7	04'.1	250° 57'.3	25'.5	73° 46'.2	15'.0
14	294° 52'.1	357° 45'.3	54'.5	127° 14'.3	03'.8	265° 59'.9	25'.5	88° 48'.5	15'.1
15	309° 54'.6	12° 44'.5	53'.9	142° 15'.9	03'.5	281° 02'.4	25'.5	103° 50'.7	15'.2
16	324° 57'.1	27° 43'.7	53'.4	157° 17'.6	03'.2	296° 05'.0	25'.5	118° 53'.0	15'.2
17	339° 59'.5	42° 42'.8	52'.9	172° 19'.2	02'.9	311° 07'.5	25'.5	133° 55'.3	15'.3
18	355° 02'.0	57° 42'.0	52'.3	187° 20'.8	02'.6	326° 10'.1	25'.5	148° 57'.5	15'.4
19	10° 04'.5	72° 41'.2	51'.8	202° 22'.4	02'.4	341° 12'.6	25'.4	163° 59'.8	15'.4
20	25° 06'.9	87° 40'.3	51'.3	217° 24'.0	02'.1	356° 15'.1	25'.4	179° 02'.1	15'.5
21	40° 09'.4	102° 39'.5	50'.8	232° 25'.7	01'.8	11° 17'.7	25'.4	194° 04'.3	15'.6
22	55° 11'.9	117° 38'.7	50'.2	247° 27'.3	01'.5	26° 20'.2	25'.4	209° 06'.6	15'.6
23	70° 14'.3	132° 37'.8	49'.7	262° 28'.9	01'.2	41° 22'.8	25'.4	224° 08'.9	15'.7
17 00	85° 16'.8	147° 37'.0	22° 49'.1 S	277° 30'.5	8° 00'.9 N	56° 25'.3	10° 25'.4 N	239° 11'.1	8° 15'.8 S
01	100° 19'.2	162° 36'.2	48'.6	292° 32'.2	00'.7	71° 27'.9	25'.3	254° 13'.4	15'.8
02	115° 21'.7	177° 35'.3	48'.1	307° 33'.8	00'.4	86° 30'.4	25'.3	269° 15'.6	15'.9
03	130° 24'.2	192° 34'.5	47'.5	322° 35'.4	00'.1	101° 32'.9	25'.3	284° 17'.9	16'.0
04	145° 26'.6	207° 33'.7	47'.0	337° 37'.1	7° 59'.8 N	116° 35'.5	25'.3	299° 20'.2	16'.0
05	160° 29'.1	222° 32'.8	46'.4	352° 38'.7	59'.5	131° 38'.0	25'.3	314° 22'.4	16'.1
06	175° 31'.6	237° 32'.0	45'.9	7° 40'.3	59'.2	146° 40'.6	25'.3	329° 24'.7	16'.2
07	190° 34'.0	252° 31'.2	45'.4	22° 41'.9	59'.0	161° 43'.1	25'.3	344° 27'.0	16'.2
08	205° 36'.5	267° 30'.3	44'.8	37° 43'.6	58'.7	176° 45'.6	25'.2	359° 29'.2	16'.3
09	220° 39'.0	282° 29'.5	44'.3	52° 45'.2	58'.4	191° 48'.2	25'.2	14° 31'.5	16'.4
10	235° 41'.4	297° 28'.7	43'.7	67° 46'.8	58'.1	206° 50'.7	25'.2	29° 33'.8	16'.4
11	250° 43'.9	312° 27'.9	43'.2	82° 48'.5	57'.8	221° 53'.3	25'.2	44° 36'.0	16'.5
12	265° 46'.3	327° 27'.0	22° 42'.6 S	97° 50'.1	7° 57'.5 N	236° 55'.8	10° 25'.2 N	59° 38'.3	8° 16'.6 S
13	280° 48'.8	342° 26'.2	42'.1	112° 51'.7	57'.3	251° 58'.3	25'.2	74° 40'.6	16'.6
14	295° 51'.3	357° 25'.4	41'.5	127° 53'.4	57'.0	267° 00'.9	25'.2	89° 42'.8	16'.7
15	310° 53'.7	12° 24'.6	40'.9	142° 55'.0	56'.7	282° 03'.4	25'.1	104° 45'.1	16'.8
16	325° 56'.2	27° 23'.7	40'.4	157° 56'.6	56'.4	297° 06'.0	25'.1	119° 47'.4	16'.8
17	340° 58'.7	42° 22'.9	39'.8	172° 58'.3	56'.1	312° 08'.5	25'.1	134° 49'.6	16'.9
18	356° 01'.1	57° 22'.1	39'.3	187° 59'.9	55'.9	327° 11'.0	25'.1	149° 51'.9	17'.0
19	11° 03'.6	72° 21'.3	38'.7	203° 01'.6	55'.6	342° 13'.6	25'.1	164° 54'.2	17'.0
20	26° 06'.1	87° 20'.4	38'.2	218° 03'.2	55'.3	357° 16'.1	25'.1	179° 56'.4	17'.1
21	41° 08'.5	102° 19'.6	37'.6	233° 04'.8	55'.0	12° 18'.6	25'.1	194° 58'.7	17'.1
22	56° 11'.0	117° 18'.8	37'.0	248° 06'.5	54'.7	27° 21'.2	25'.1	210° 01'.0	17'.2
23	71° 13'.5	132° 18'.0	36'.5	263° 08'.1	54'.5	42° 23'.7	25'.0	225° 03'.2	17'.3
	M.P. 18:20	v -0'.8	d 0'.5	v 1'.6	d 0'.3	v 2'.5	d 0'.0	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.5 S
Achernar	335° 27'.2	57° 10'.7 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.3 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.8	55° 53'.3 N
Alkaid	153° 00'.0	49° 14'.9 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 56'.9	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.4 N
Alpheratz	357° 44'.5	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.1 N
Atria	107° 31'.3	69° 02'.8 S
Avior	234° 18'.0	59° 32'.8 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.2 S
Capella	280° 35'.5	46° 00'.5 N
Deneb	49° 32'.5	45° 19'.7 N
Denebola	182° 34'.7	14° 30'.1 N
Diphda	348° 56'.8	17° 55'.3 S
Dubhe	193° 52'.8	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.3 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.3	57° 10'.6 S
Gienah	175° 53'.4	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.8	74° 06'.1 N
Markab	13° 39'.4	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.3	69° 45'.8 S
Mirfak	308° 41'.4	49° 54'.4 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.3	56° 41'.8 S
Polaris	317° 56'.1	89° 19'.2 N
Pollux	243° 28'.7	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.5	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.3 S
Rigil Kent	139° 53'.6	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.0 S
Spica	158° 32'.5	11° 13'.4 S
Suhail	222° 52'.9	43° 28'.8 S
Vega	80° 40'.1	38° 47'.9 N
Zuben'ubi	137° 06'.9	16° 05'.4 S

	SHA	Mer.Pass.
Venus	63° 39'.5	14:09
Mars	192° 34'.0	05:32
Jupiter	331° 06'.6	20:15
Saturn	153° 59'.1	08:06

SUN

GMT	GHA	Dec
15 00	181° 19'.1	23° 14'.0 S
01	196° 18'.8	14'.1
02	211° 18'.5	14'.2
03	226° 18'.2	14'.4
04	241° 17'.9	14'.5
05	256° 17'.6	14'.6
06	271° 17'.3	14'.8
07	286° 17'.0	14'.9
08	301° 16'.7	15'.1
09	316° 16'.4	15'.2
10	331° 16'.1	15'.3
11	346° 15'.8	15'.5
12	1° 15'.5	23° 15'.6 S
13	16° 15'.2	15'.7
14	31° 14'.9	15'.8
15	46° 14'.6	16'.0
16	61° 14'.3	16'.1
17	76° 14'.0	16'.2
18	91° 13'.7	16'.4
19	106° 13'.4	16'.5
20	121° 13'.1	16'.6
21	136° 12'.8	16'.7
22	151° 12'.5	16'.9
23	166° 12'.2	17'.0
16 00	181° 11'.9	23° 17'.1 S
01	196° 11'.6	17'.2
02	211° 11'.3	17'.3
03	226° 11'.0	17'.5
04	241° 10'.7	17'.6
05	256° 10'.4	17'.7
06	271° 10'.1	17'.8
07	286° 09'.8	17'.9
08	301° 09'.5	18'.1
09	316° 09'.2	18'.2
10	331° 08'.8	18'.3
11	346° 08'.5	18'.4
12	1° 08'.2	23° 18'.5 S
13	16° 07'.9	18'.6
14	31° 07'.6	18'.7
15	46° 07'.3	18'.8
16	61° 07'.0	18'.9
17	76° 06'.7	19'.1
18	91° 06'.4	19'.2
19	106° 06'.1	19'.3
20	121° 05'.8	19'.4
21	136° 05'.5	19'.5
22	151° 05'.2	19'.6
23	166° 04'.9	19'.7
17 00	181° 04'.6	23° 19'.8 S
01	196° 04'.3	19'.9
02	211° 04'.0	20'.0
03	226° 03'.7	20'.1
04	241° 03'.4	20'.2
05	256° 03'.1	20'.3
06	271° 02'.8	20'.4
07	286° 02'.5	20'.5
08	301° 02'.2	20'.6
09	316° 01'.9	20'.7
10	331° 01'.6	20'.8
11	346° 01'.3	20'.9
12	1° 01'.0	23° 21'.0 S
13	16° 00'.6	21'.1
14	31° 00'.3	21'.1
15	46° 00'.0	21'.2
16	60° 59'.7	21'.3
17	75° 59'.4	21'.4
18	90° 59'.1	21'.5
19	105° 58'.8	21'.6
20	120° 58'.5	21'.7
21	135° 58'.2	21'.8
22	150° 57'.9	21'.8
23	165° 57'.6	21'.9
	SD 16'.3	d 0'.1

MOON

GMT	GHA	v	Dec	d	HP
15 00	307° 50'.5	11'.4	12° 07'.8 N	10'.9	57'.3
01	322° 20'.9	11'.5	11° 56'.9 N	11'.0	
02	336° 51'.4	11'.5	45'.9	11'.0	
03	351° 21'.9	11'.6	34'.9	11'.1	
04	5° 52'.5	11'.5	23'.8	11'.2	
05	20° 23'.0	11'.6	12'.6	11'.2	57'.4
06	34° 53'.6	11'.6	01'.4	11'.3	
07	49° 24'.2	11'.6	10° 50'.1 N	11'.4	
08	63° 54'.8	11'.6	38'.7	11'.4	
09	78° 25'.4	11'.6	27'.3	11'.5	
10	92° 56'.0	11'.7	15'.8	11'.5	57'.5
11	107° 26'.7	11'.7	04'.3	11'.6	
12	121° 57'.4	11'.7	9° 52'.7 N	11'.7	57'.5
13	136° 28'.1	11'.7	41'.0	11'.7	
14	150° 58'.8	11'.7	29'.3	11'.8	57'.6
15	165° 29'.5	11'.7	17'.5	11'.8	
16	180° 00'.2	11'.8	05'.7	11'.9	
17	194° 31'.0	11'.8	8° 53'.8 N	11'.9	
18	209° 01'.8	11'.7	41'.9	12'.0	
19	223° 32'.5	11'.8	29'.9	12'.0	57'.7
20	238° 03'.3	11'.8	17'.9	12'.1	
21	252° 34'.1	11'.8	05'.8	12'.1	
22	267° 04'.9	11'.9	7° 53'.7 N	12'.2	
23	281° 35'.8	11'.8	41'.5	12'.2	
16 00	296° 06'.6	11'.8	7° 29'.3 N	12'.3	57'.8
01	310° 37'.4	11'.9	17'.0	12'.3	
02	325° 08'.3	11'.8	04'.7	12'.4	
03	339° 39'.1	11'.9	6° 52'.3 N	12'.4	
04	354° 10'.0	11'.8	39'.9	12'.4	57'.9
05	8° 40'.8	11'.9	27'.5	12'.5	
06	23° 11'.7	11'.9	15'.0	12'.5	
07	37° 42'.6	11'.8	02'.5	12'.6	
08	52° 13'.4	11'.9	5° 49'.9 N	12'.6	
09	66° 44'.3	11'.9	37'.3	12'.6	58'.0
10	81° 15'.2	11'.8	24'.7	12'.7	
11	95° 46'.0	11'.9	12'.0	12'.7	
12	110° 16'.9	11'.9	4° 59'.3 N	12'.8	58'.0
13	124° 47'.8	11'.8	46'.5	12'.7	58'.1
14	139° 18'.6	11'.9	33'.8	12'.8	
15	153° 49'.5	11'.9	21'.0	12'.9	
16	168° 20'.4	11'.8	08'.1	12'.9	
17	182° 51'.2	11'.9	3° 55'.2 N	12'.9	
18	197° 22'.1	11'.8	42'.3	12'.9	58'.2
19	211° 52'.9	11'.8	29'.4	12'.9	
20	226° 23'.7	11'.9	16'.5	13'.0	
21	240° 54'.6	11'.8	03'.5	13'.0	
22	255° 25'.4	11'.8	2° 50'.5 N	13'.0	
23	269° 56'.2	11'.8	37'.5	13'.1	58'.3
17 00	284° 27'.0	11'.8	2° 24'.4 N	13'.1	58'.3
01	298° 57'.8	11'.7	11'.3	13'.1	
02	313° 28'.5	11'.8	1° 58'.2 N	13'.1	
03	327° 59'.3	11'.7	45'.1	13'.1	58'.4
04	342° 30'.0	11'.7	32'.0	13'.1	
05	357° 00'.7	11'.7	18'.9	13'.2	
06	11° 31'.4	11'.7	05'.7	13'.2	
07	26° 02'.1	11'.7	0° 52'.5 N	13'.2	
08	40° 32'.8	11'.6	39'.3	13'.2	58'.5
09	55° 03'.4	11'.7	26'.1	13'.2	
10	69° 34'.1	11'.6	12'.9	13'.2	
11	84° 04'.7	11'.6	0° 00'.3 S	13'.3	
12	98° 35'.3	11'.5	0° 13'.6 S	13'.2	58'.6
13	113° 05'.8	11'.6	26'.8	13'.3	
14	127° 36'.4	11'.5	40'.1	13'.2	
15	142° 06'.9	11'.4	53'.3	13'.3	
16	156° 37'.3	11'.5	1° 06'.6 S	13'.3	
17	171° 07'.8	11'.4	19'.9	13'.2	58'.7
18	185° 38'.2	11'.4	33'.1	13'.3	
19	200° 08'.6	11'.4	46'.4	13'.3	
20	214° 39'.0	11'.3	59'.7	13'.2	
21	229° 09'.3	11'.3	2° 12'.9 S	13'.3	
22	243° 39'.6	11'.3	26'.2	13'.3	58'.8
23	258° 09'.9	11'.2	39'.5	13'.2	
	SD 15'.7		15'.8	16'.0	

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 15	Moonrise 16	Moonrise 17
N 72°	08:21	10:48	-	20:25	22:27	24:29
N 70°	08:01	09:49	-	20:38	22:31	24:25
68°	07:45	09:14	-	20:48	22:34	24:21
66°	07:32	08:49	10:28	20:56	22:36	24:18
64°	07:21	08:30	09:47	21:03	22:39	24:15
62°	07:12	08:14	09:19	21:09	22:41	24:13
60°	07:04	08:00	08:58	21:15	22:42	24:11
N 58°	06:56	07:49	08:40	21:19	22:44	24:09
56°	06:49	07:38	08:26	21:23	22:45	24:08
54°	06:43	07:29	08:13	21:27	22:46	24:07
52°	06:38	07:21	08:02	21:30	22:47	24:05
50°	06:32	07:14	07:52	21:33	22:48	24:04
45°	06:21	06:58	07:32	21:40	22:50	24:02
N 40°	06:10	06:44	07:15	21:45	22:52	24:00
35°	06:01	06:33	07:01	21:50	22:53	23:58
30°	05:52	06:22	06:49	21:54	22:55	23:57
20°	05:36	06:03	06:27	22:01	22:57	23:54
N 10°	05:20	05:46	06:09	22:07	22:59	23:52
0°	05:03	05:29	05:52	22:13	23:01	23:50
S 10°	04:44	05:11	05:34	22:18	23:03	23:48
20°	04:22	04:51	05:15	22:24	23:05	23:45
30°	03:53	04:26	04:53	22:31	23:07	23:43
35°	03:34	04:11	04:40	22:35	23:08	23:42
40°	03:11	03:53	04:25	22:40	23:10	23:40
45°	02:41	03:30	04:08	22:45	23:12	23:38
S 50°	01:56	03:01	03:45	22:51	23:14	23:36
52°	01:28	02:46	03:34	22:54	23:15	23:35
54°	00:44	02:28	03:22	22:57	23:16	23:34
56°	-	02:06	03:08	23:01	23:17	23:33
58°	-	01:37	02:51	23:05	23:18	23:32
S 60°	-	00:49	02:31	23:09	23:20	23:30
S 62°	-	-	02:05	23:14	23:21	23:29

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 15	Moonset 16	Moonset 17
N 72°	-	13:02	15:30	12:00	11:40	11:21
N 70°	-	14:02	15:50	11:45	11:33	11:22
68°	-	14:37	16:05	11:33	11:27	11:22
66°	13:22	15:02	16:18	11:23	11:23	11:22
64°	14:04	15:21	16:29	11:14	11:19	11:22
62°	14:32	15:37	16:39	11:07	11:15	11:23
60°	14:53	15:50	16:47	11:01	11:12	11:23
N 58°	15:10	16:02	16:55	10:55	11:09	11:23
56°	15:25	16:12	17:01	10:50	11:07	11:23
54°	15:38	16:21	17:08	10:46	11:05	11:23
52°	15:49	16:29	17:13	10:42	11:03	11:23
50°	15:58	16:37	17:18	10:38	11:01	11:23
45°	16:19	16:53	17:30	10:30	10:57	11:23
N 40°	16:36	17:06	17:40	10:23	10:54	11:23
35°	16:50	17:18	17:50	10:17	10:51	11:23
30°	17:02	17:29	17:58	10:12	10:48	11:24
20°	17:23	17:47	18:15	10:03	10:43	11:24
N 10°	17:42	18:05	18:31	09:55	10:39	11:24
0°	17:59	18:22	18:48	09:47	10:36	11:24
S 10°	18:17	18:40	19:07	09:40	10:32	11:24
20°	18:36	19:00	19:29	09:32	10:28	11:24
30°	18:58	19:25	19:58	09:22	10:23	11:24
35°	19:11	19:40	20:17	09:17	10:20	11:24
40°	19:26	19:58	20:40	09:10	10:17	11:24
45°	19:43	20:21	21:10	09:03	10:13	11:24
S 50°	20:06	20:50	21:56	08:54	10:09	11:24
52°	20:17	21:05	22:23	08:50	10:07	11:24
54°	20:29	21:23	23:08	08:46	10:04	11:24
56°	20:43	21:45	-	08:41	10:02	11:24
58°	21:00	22:15	-	08:35	09:59	11:24
S 60°	21:20	23:04	-	08:29	09:56	11:24
S 62°	21:46	-	-	08:22	09:52	11:24

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	Age/ Vis
15	5 17	5 02	11:55	03:36	16:00	20d 77%
16	4 48	4 34	11:55	04:24	16:48	21d 67%
17	4 19	4 04	11:56	05:12	17:37	22d 56%

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2011 December 18, 19, 20 (Sun, Monday, Tuesday)

GMT	ARIES	VENUS -4.0		MARS +0.4		JUPITER -2.7		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
18 Sunday 00	86° 15'.9	147° 17'.2	22° 35'.9 S	278° 09'.8	7° 54'.2 N	57° 26'.2	10° 25'.0 N	240° 05'.5	8° 17'.3 S
01	101° 18'.4	162° 16'.3	35'.3	293° 11'.4	53'.9	72° 28'.8	25'.0	255° 07'.8	17'.4
02	116° 20'.8	177° 15'.5	34'.8	308° 13'.0	53'.6	87° 31'.3	25'.0	270° 10'.0	17'.5
03	131° 23'.3	192° 14'.7	34'.2	323° 14'.7	53'.4	102° 33'.8	25'.0	285° 12'.3	17'.5
04	146° 25'.8	207° 13'.9	33'.6	338° 16'.3	53'.1	117° 36'.4	25'.0	300° 14'.6	17'.6
05	161° 28'.2	222° 13'.1	33'.1	353° 18'.0	52'.8	132° 38'.9	25'.0	315° 16'.8	17'.7
06	176° 30'.7	237° 12'.2	32'.5	8° 19'.6	52'.5	147° 41'.4	25'.0	330° 19'.1	17'.7
07	191° 33'.2	252° 11'.4	31'.9	23° 21'.3	52'.3	162° 44'.0	25'.0	345° 21'.4	17'.8
08	206° 35'.6	267° 10'.6	31'.3	38° 22'.9	52'.0	177° 46'.5	24'.9	0° 23'.7	17'.9
09	221° 38'.1	282° 09'.8	30'.8	53° 24'.5	51'.7	192° 49'.0	24'.9	15° 25'.9	17'.9
10	236° 40'.6	297° 09'.0	30'.2	68° 26'.2	51'.4	207° 51'.6	24'.9	30° 28'.2	18'.0
11	251° 43'.0	312° 08'.2	29'.6	83° 27'.8	51'.2	222° 54'.1	24'.9	45° 30'.5	18'.1
12	266° 45'.5	327° 07'.3	22° 29'.0 S	98° 29'.5	7° 50'.9 N	237° 56'.6	10° 24'.9 N	60° 32'.7	8° 18'.1 S
13	281° 48'.0	342° 06'.5	28'.5	113° 31'.1	50'.6	252° 59'.2	24'.9	75° 35'.0	18'.2
14	296° 50'.4	357° 05'.7	27'.9	128° 32'.8	50'.3	268° 01'.7	24'.9	90° 37'.3	18'.3
15	311° 52'.9	12° 04'.9	27'.3	143° 34'.4	50'.1	283° 04'.2	24'.9	105° 39'.5	18'.3
16	326° 55'.3	27° 04'.1	26'.7	158° 36'.1	49'.8	298° 06'.8	24'.9	120° 41'.8	18'.4
17	341° 57'.8	42° 03'.3	26'.1	173° 37'.7	49'.5	313° 09'.3	24'.8	135° 44'.1	18'.4
18	357° 00'.3	57° 02'.5	25'.5	188° 39'.4	49'.2	328° 11'.8	24'.8	150° 46'.3	18'.5
19	12° 02'.7	72° 01'.7	25'.0	203° 41'.0	49'.0	343° 14'.3	24'.8	165° 48'.6	18'.6
20	27° 05'.2	87° 00'.8	24'.4	218° 42'.7	48'.7	358° 16'.9	24'.8	180° 50'.9	18'.6
21	42° 07'.7	102° 00'.0	23'.8	233° 44'.3	48'.4	13° 19'.4	24'.8	195° 53'.2	18'.7
22	57° 10'.1	116° 59'.2	23'.2	248° 46'.0	48'.1	28° 21'.9	24'.8	210° 55'.4	18'.8
23	72° 12'.6	131° 58'.4	22'.6	263° 47'.7	47'.9	43° 24'.4	24'.8	225° 57'.7	18'.8
19 Monday 00	87° 15'.1	146° 57'.6	22° 22'.0 S	278° 49'.3	7° 47'.6 N	58° 27'.0	10° 24'.8 N	241° 00'.0	8° 18'.9 S
01	102° 17'.5	161° 56'.8	21'.4	293° 51'.0	47'.3	73° 29'.5	24'.8	256° 02'.2	19'.0
02	117° 20'.0	176° 56'.0	20'.8	308° 52'.6	47'.1	88° 32'.0	24'.8	271° 04'.5	19'.0
03	132° 22'.4	191° 55'.2	20'.2	323° 54'.3	46'.8	103° 34'.6	24'.7	286° 06'.8	19'.1
04	147° 24'.9	206° 54'.4	19'.6	338° 55'.9	46'.5	118° 37'.1	24'.7	301° 09'.1	19'.2
05	162° 27'.4	221° 53'.6	19'.0	353° 57'.6	46'.2	133° 39'.6	24'.7	316° 11'.3	19'.2
06	177° 29'.8	236° 52'.8	18'.4	8° 59'.3	46'.0	148° 42'.1	24'.7	331° 13'.6	19'.3
07	192° 32'.3	251° 52'.0	17'.8	24° 00'.9	45'.7	163° 44'.7	24'.7	346° 15'.9	19'.3
08	207° 34'.8	266° 51'.2	17'.2	39° 02'.6	45'.4	178° 47'.2	24'.7	1° 18'.1	19'.4
09	222° 37'.2	281° 50'.4	16'.6	54° 04'.2	45'.2	193° 49'.7	24'.7	16° 20'.4	19'.5
10	237° 39'.7	296° 49'.6	16'.0	69° 05'.9	44'.9	208° 52'.2	24'.7	31° 22'.7	19'.5
11	252° 42'.2	311° 48'.8	15'.4	84° 07'.6	44'.6	223° 54'.7	24'.7	46° 25'.0	19'.6
12	267° 44'.6	326° 47'.9	22° 14'.8 S	99° 09'.2	7° 44'.4 N	238° 57'.3	10° 24'.7 N	61° 27'.2	8° 19'.7 S
13	282° 47'.1	341° 47'.1	14'.2	114° 10'.9	44'.1	253° 59'.8	24'.7	76° 29'.5	19'.7
14	297° 49'.6	356° 46'.3	13'.6	129° 12'.6	43'.8	269° 02'.3	24'.7	91° 31'.8	19'.8
15	312° 52'.0	11° 45'.5	13'.0	144° 14'.2	43'.5	284° 04'.8	24'.7	106° 34'.0	19'.8
16	327° 54'.5	26° 44'.7	12'.4	159° 15'.9	43'.3	299° 07'.4	24'.6	121° 36'.3	19'.9
17	342° 56'.9	41° 43'.9	11'.8	174° 17'.6	43'.0	314° 09'.9	24'.6	136° 38'.6	20'.0
18	357° 59'.4	56° 43'.1	11'.1	189° 19'.2	42'.7	329° 12'.4	24'.6	151° 40'.9	20'.0
19	13° 01'.9	71° 42'.3	10'.5	204° 20'.9	42'.5	344° 14'.9	24'.6	166° 43'.1	20'.1
20	28° 04'.3	86° 41'.5	09'.9	219° 22'.6	42'.2	359° 17'.4	24'.6	181° 45'.4	20'.2
21	43° 06'.8	101° 40'.8	09'.3	234° 24'.2	41'.9	14° 20'.0	24'.6	196° 47'.7	20'.2
22	58° 09'.3	116° 40'.0	08'.7	249° 25'.9	41'.7	29° 22'.5	24'.6	211° 50'.0	20'.3
23	73° 11'.7	131° 39'.2	08'.1	264° 27'.6	41'.4	44° 25'.0	24'.6	226° 52'.2	20'.4
20 Tuesday 00	88° 14'.2	146° 38'.4	22° 07'.4 S	279° 29'.2	7° 41'.1 N	59° 27'.5	10° 24'.6 N	241° 54'.5	8° 20'.4 S
01	103° 16'.7	161° 37'.6	06'.8	294° 30'.9	40'.9	74° 30'.0	24'.6	256° 56'.8	20'.5
02	118° 19'.1	176° 36'.8	06'.2	309° 32'.6	40'.6	89° 32'.5	24'.6	271° 59'.0	20'.5
03	133° 21'.6	191° 36'.0	05'.6	324° 34'.2	40'.4	104° 35'.1	24'.6	287° 01'.3	20'.6
04	148° 24'.1	206° 35'.2	05'.0	339° 35'.9	40'.1	119° 37'.6	24'.6	302° 03'.6	20'.7
05	163° 26'.5	221° 34'.4	04'.3	354° 37'.6	39'.8	134° 40'.1	24'.6	317° 05'.9	20'.7
06	178° 29'.0	236° 33'.6	03'.7	9° 39'.3	39'.6	149° 42'.6	24'.6	332° 08'.1	20'.8
07	193° 31'.4	251° 32'.8	03'.1	24° 40'.9	39'.3	164° 45'.1	24'.6	347° 10'.4	20'.9
08	208° 33'.9	266° 32'.0	02'.5	39° 42'.6	39'.0	179° 47'.6	24'.5	2° 12'.7	20'.9
09	223° 36'.4	281° 31'.2	01'.8	54° 44'.3	38'.8	194° 50'.2	24'.5	17° 15'.0	21'.0
10	238° 38'.8	296° 30'.4	01'.2	69° 46'.0	38'.5	209° 52'.7	24'.5	32° 17'.2	21'.0
11	253° 41'.3	311° 29'.6	00'.6	84° 47'.6	38'.2	224° 55'.2	24'.5	47° 19'.5	21'.1
12	268° 43'.8	326° 28'.9	21° 59'.9 S	99° 49'.3	7° 38'.0 N	239° 57'.7	10° 24'.5 N	62° 21'.8	8° 21'.2 S
13	283° 46'.2	341° 28'.1	59'.3	114° 51'.0	37'.7	255° 00'.2	24'.5	77° 24'.1	21'.2
14	298° 48'.7	356° 27'.3	58'.7	129° 52'.7	37'.5	270° 02'.7	24'.5	92° 26'.3	21'.3
15	313° 51'.2	11° 26'.5	58'.0	144° 54'.4	37'.2	285° 05'.2	24'.5	107° 28'.6	21'.3
16	328° 53'.6	26° 25'.7	57'.4	159° 56'.0	36'.9	300° 07'.8	24'.5	122° 30'.9	21'.4
17	343° 56'.1	41° 24'.9	56'.7	174° 57'.7	36'.7	315° 10'.3	24'.5	137° 33'.2	21'.5
18	358° 58'.5	56° 24'.1	56'.1	189° 59'.4	36'.4	330° 12'.8	24'.5	152° 35'.4	21'.5
19	14° 01'.0	71° 23'.3	55'.5	205° 01'.1	36'.2	345° 15'.3	24'.5	167° 37'.7	21'.6
20	29° 03'.5	86° 22'.6	54'.8	220° 02'.8	35'.9	0° 17'.8	24'.5	182° 40'.0	21'.7
21	44° 05'.9	101° 21'.8	54'.2	235° 04'.5	35'.6	15° 20'.3	24'.5	197° 42'.3	21'.7
22	59° 08'.4	116° 21'.0	53'.5	250° 06'.1	35'.4	30° 22'.8	24'.5	212° 44'.5	21'.8
23	74° 10'.9	131° 20'.2	52'.9	265° 07'.8	35'.1	45° 25'.3	24'.5	227° 46'.8	21'.8
	M.P. 18:08	v -0'.8	d 0'.6	v 1'.7	d 0'.3	v 2'.5	d 0'.0	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.5 S
Achernar	335° 27'.2	57° 10'.8 S
Acrux	173° 10'.7	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.4 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.7	55° 53'.3 N
Alkaid	153° 00'.0	49° 14'.9 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.7 S
Alphard	217° 56'.9	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.4 N
Alpheratz	357° 44'.6	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.6	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.1 N
Atria	107° 31'.3	69° 02'.8 S
Avior	234° 17'.9	59° 32'.8 S
Bellatrix	278° 32'.8	6° 21'.6 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.1	52° 42'.2 S
Capella	280° 35'.5	46° 00'.5 N
Deneb	49° 32'.6	45° 19'.7 N
Denebola	182° 34'.7	14° 30'.1 N
Diphda	348° 56'.8	17° 55'.3 S
Dubhe	193° 52'.8	61° 40'.8 N
Elnath	278° 13'.6	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.3 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.6 S
Gienah	175° 53'.4	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.8	74° 06'.1 N
Markab	13° 39'.5	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.1	36° 25'.6 S
Miaplacidus	221° 39'.3	69° 45'.9 S
Mirfak	308° 41'.4	49° 54'.4 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.8 S
Polaris	317° 56'.9	89° 19'.2 N
Pollux	243° 28'.7	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.5	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.3 S
Rigil Kent	139° 53'.6	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.5 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.0 S
Spica	158° 32'.5	11° 13'.4 S
Suhail	222° 52'.9	43° 28'.8 S
Vega	80° 40'.1	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	59° 42'.6	14:13
Mars	191° 34'.3	05:24
Jupiter	331° 11'.9	20:03
Saturn	153° 44'.9	07:55

SUN

GHA	v	Dec	d	HP
180° 57'.3	23° 22'.0 S	272° 40'.1	11'.2	2° 52'.7 S	13'.3	58'.8
195° 57'.0	22'.1	287° 10'.3	11'.2	3° 06'.0 S	13'.2	
210° 56'.7	22'.2	301° 40'.5	11'.1	19'.2	13'.3	
225° 56'.4	22'.3	316° 10'.6	11'.1	32'.5	13'.2	58'.9
240° 56'.1	22'.3	330° 40'.7	11'.0	45'.7	13'.2	
255° 55'.8	22'.4	345° 10'.7	11'.0	58'.9	13'.2	
270° 55'.4	22'.5	359° 40'.7	11'.0	4° 12'.1 S	13'.2	
285° 55'.1	22'.6	14° 10'.7	10'.9	25'.3	13'.2	59'.0
300° 54'.8	22'.6	28° 40'.6	10'.9	38'.5	13'.2	
315° 54'.5	22'.7	43° 10'.5	10'.8	51'.7	13'.1	
330° 54'.2	22'.8	57° 40'.3	10'.8	5° 04'.8 S	13'.1	
345° 53'.9	22'.9	72° 10'.1	10'.8	17'.9	13'.1	
0° 53'.6	23° 22'.9 S	86° 39'.9	10'.7	5° 31'.0 S	13'.1	59'.1
15° 53'.3	23'.0	101° 09'.6	10'.6	44'.1	13'.1	
30° 53'.0	23'.1	115° 39'.2	10'.6	57'.2	13'.0	
45° 52'.7	23'.2	130° 08'.8	10'.6	6° 10'.2 S	13'.1	
60° 52'.4	23'.2	144° 38'.4	10'.5	23'.3	12'.9	
75° 52'.1	23'.3	159° 07'.9	10'.4	36'.2	13'.0	59'.2
90° 51'.8	23'.4	173° 37'.3	10'.4	49'.2	12'.9	
105° 51'.5	23'.4	188° 06'.7	10'.4	7° 02'.1 S	13'.0	
120° 51'.1	23'.5	202° 36'.1	10'.3	15'.1	12'.8	
135° 50'.8	23'.6	217° 05'.4	10'.2	27'.9	12'.9	
150° 50'.5	23'.6	231° 34'.6	10'.2	40'.8	12'.8	
165° 50'.2	23'.7	246° 03'.8	10'.1	53'.6	12'.8	59'.3
180° 49'.9	23° 23'.8 S	260° 32'.9	10'.1	8° 06'.4 S	12'.7	59'.3
195° 49'.6	23'.8	275° 02'.0	10'.0	19'.1	12'.7	
210° 49'.3	23'.9	289° 31'.0	9'.9	31'.8	12'.7	
225° 49'.0	23'.9	303° 59'.9	9'.9	44'.5	12'.6	
240° 48'.7	24'.0	318° 28'.8	9'.8	57'.1	12'.5	59'.4
255° 48'.4	24'.1	332° 57'.6	9'.8	9° 09'.6 S	12'.6	
270° 48'.1	24'.1	347° 26'.4	9'.7	22'.2	12'.5	
285° 47'.8	24'.2	1° 55'.1	9'.6	34'.7	12'.4	
300° 47'.4	24'.2	16° 23'.7	9'.6	47'.1	12'.4	
315° 47'.1	24'.3	30° 52'.3	9'.5	59'.5	12'.3	59'.5
330° 46'.8	24'.4	45° 20'.8	9'.5	10° 11'.8 S	12'.3	
345° 46'.5	24'.4	59° 49'.3	9'.4	24'.1	12'.3	
0° 46'.2	23° 24'.5 S	74° 17'.7	9'.3	10° 36'.4 S	12'.2	59'.5
15° 45'.9	24'.5	88° 46'.0	9'.2	48'.6	12'.1	
30° 45'.6	24'.6	103° 14'.2	9'.2	11° 00'.7 S	12'.1	
45° 45'.3	24'.6	117° 42'.4	9'.1	12'.8	12'.0	59'.6
60° 45'.0	24'.7	132° 10'.5	9'.0	24'.8	12'.0	
75° 44'.7	24'.7	146° 38'.5	9'.0	36'.8	11'.9	
90° 44'.4	24'.8	161° 06'.5	8'.9	48'.7	11'.8	
105° 44'.0	24'.8	175° 34'.4	8'.8	12° 00'.5 S	11'.8	
120° 43'.7	24'.9	190° 02'.2	8'.8	12'.3	11'.7	
135° 43'.4	24'.9	204° 30'.0	8'.7	24'.0	11'.6	
150° 43'.1	25'.0	218° 57'.7	8'.6	35'.6	11'.6	59'.7
165° 42'.8	25'.0	233° 25'.3	8'.5	47'.2	11'.5	
180° 42'.5	23° 25'.0 S	247° 52'.8	8'.5	12° 58'.7 S	11'.4	59'.7
195° 42'.2	25'.1	262° 20'.3	8'.4	13° 10'.1 S	11'.4	
210° 41'.9	25'.1	276° 47'.7	8'.3	21'.5	11'.2	
225° 41'.6	25'.2	291° 15'.0	8'.3	32'.7	11'.2	
240° 41'.3	25'.2	305° 42'.3	8'.2	43'.9	11'.2	59'.8
255° 41'.0	25'.3	320° 09'.5	8'.0	55'.1	11'.0	
270° 40'.6	25'.3	334° 36'.5	8'.1	14° 06'.1 S	11'.0	
285° 40'.3	25'.3	349° 03'.6	7'.9	17'.1	10'.9	
300° 40'.0	25'.4	3° 30'.5	7'.9	28'.0	10'.8	
315° 39'.7	25'.4	17° 57'.4	7'.8	38'.8	10'.7	
330° 39'.4	25'.4	32° 24'.2	7'.7	49'.5	10'.6	
345° 39'.1	25'.5	46° 50'.9	7'.6	15° 00'.1 S	10'.6	
0° 38'.8	23° 25'.5 S	61° 17'.5	7'.6	15° 10'.7 S	10'.4	59'.9
15° 38'.5	25'.5	75° 44'.1	7'.5	21'.1	10'.4	
30° 38'.2	25'.6	90° 10'.6	7'.4	31'.5	10'.3	
45° 37'.9	25'.6	104° 37'.0	7'.3	41'.8	10'.2	
60° 37'.5	25'.6	119° 03'.3	7'.3	52'.0	10'.0	
75° 37'.2	25'.7	133° 29'.6	7'.2	16° 02'.0 S	10'.0	
90° 36'.9	25'.7	147° 55'.8	7'.1	12'.0	9'.9	
105° 36'.6	25'.7	162° 21'.9	7'.0	21'.9	9'.8	
120° 36'.3	25'.8	176° 47'.9	7'.0	31'.7	9'.7	
135° 36'.0	25'.8	191° 13'.9	6'.8	41'.4	9'.6	60'.0
150° 35'.7	25'.8	205° 39'.7	6'.8	51'.0	9'.4	
165° 35'.4	25'.8	220° 05'.5	6'.8	17° 00'.4 S	9'.4	
SD 16'.3	d 0'.1	SD	16'.1	16'.2	16'.3	

MOON

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 18	Moonrise 19	Moonrise 20
N 72°	08:24	10:55	-	00:29	02:37	05:02
N 70°	08:04	09:52	-	00:25	02:23	04:31
68°	07:48	09:17	-	00:21	02:12	04:09
66°	07:35	08:52	10:33	00:18	02:02	03:52
64°	07:24	08:32	09:50	00:15	01:55	03:38
62°	07:14	08:16	09:22	00:13	01:48	03:26
60°	07:06	08:03	09:00	00:11	01:42	03:16
N 58°	06:58	07:51	08:43	00:09	01:37	03:07
56°	06:52	07:41	08:28	00:08	01:33	03:00
54°	06:45	07:32	08:15	00:07	01:29	02:53
52°	06:40	07:23	08:04	00:05	01:25	02:47
50°	06:34	07:16	07:54	00:04	01:22	02:42
45°	06:23	07:00	07:34	00:02	01:15	02:30
N 40°	06:12	06:46	07:17	-	01:09	02:21
35°	06:03	06:35	07:03	-	01:04	02:12
30°	05:54	06:24	06:50	-	01:00	02:05
20°	05:38	06:05	06:29	-	00:52	01:53
N 10°	05:21	05:48	06:11	-	00:46	01:42
0°	05:04	05:31	05:53	-	00:40	01:32
S 10°	04:45	05:12	05:36	-	00:34	01:23
20°	04:23	04:52	05:17	-	00:27	01:12
30°	03:54	04:27	04:55	-	00:20	01:00
35°	03:35	04:12	04:42	-	00:16	00:54
40°	03:12	03:54	04:26	-	00:11	00:46
45°	02:41	03:31	04:08	-	00:06	00:37
S 50°	01:56	03:01	03:46	24:00	-	00:26
52°	01:28	02:46	03:35	23:57	-	00:21
54°	00:42	02:28	03:23	23:54	-	00:16
56°	-	02:06	03:08	23:50	-	00:10
58°	-	01:36	02:52	23:46	-	00:03
S 60°	-	00:46	02:31	23:42	23:56	24:14
S 62°	-	-	02:05	23:37	23:47	24:02

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 18	Moonset 19	Moonset 20
N 72°	-	12:59	15:30	11:03	10:41	10:08
N 70°	-	14:01	15:50	11:10	10:57	10:40
68°	-	14:36	16:06	11:17	11:11	11:04
66°	13:21	15:02	16:19	11:22	11:22	11:23
64°	14:03	15:21	16:30	11:26	11:31	11:38
62°	14:32	15:38	16:40	11:30	11:39	11:50
60°	14:53	15:51	16:48	11:33	11:46	12:01
N 58°	15:11	16:03	16:55	11:36	11:52	12:11
56°	15:26	16:13	17:02	11:39	11:57	12:19
54°	15:38	16:22	17:08	11:42	12:02	12:26
52°	15:49	16:30	17:14	11:44	12:06	12:33
50°	15:59	16:38	17:19	11:46	12:10	12:39
45°	16:20	16:54	17:31	11:50	12:19	12:52
N 40°	16:37	17:07	17:42	11:54	12:26	13:03
35°	16:51	17:19	17:51	11:57	12:33	13:12
30°	17:03	17:30	18:00	12:00	12:38	13:20
20°	17:25	17:49	18:16	12:05	12:48	13:35
N 10°	17:43	18:06	18:32	12:09	12:56	13:47
0°	18:01	18:23	18:49	12:13	13:04	13:59
S 10°	18:18	18:41	19:08	12:17	13:12	14:10
20°	18:37	19:02	19:31	12:22	13:21	14:23
30°	18:59	19:27	20:00	12:27	13:31	14:37
35°	19:12	19:42	20:19	12:29	13:37	14:45
40°	19:27	20:00	20:42	12:33	13:43	14:55
45°	19:45	20:23	21:13	12:36	13:51	15:06
S 50°	20:08	20:53	21:58	12:41	14:00	15:20
52°	20:19	21:08	22:26	12:43	14:04	15:26
54°	20:31	21:26	23:13	12:45	14:09	15:33
56°	20:45	21:48	-	12:48	14:14	15:41
58°	21:02	22:18	-	12:51	14:20	15:50
S 60°	21:23	23:09	-	12:54	14:26	16:00
S 62°	21:49	-	-	12:57	14:34	16:12

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
18	3 50	3 35	11:56	06:01	18:26	23d 45%
19	3 20	3 05	11:57	06:52	19:18	24d 34%
20	2 51	2 36	11:57	07:45	20:13	25d 23%

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2011 December 21, 22, 23 (Wed, Thur, Fri)

GMT	ARIES	VENUS -4.0		MARS +0.4		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
21 Wednesday 00	89° 13'.3	146° 19'.4	21° 52'.2 S	280° 09'.5	7° 34'.9 N	60° 27'.8	10° 24'.5 N	242° 49'.1	8° 21'.9 S
01	104° 15'.8	161° 18'.6	51'.6	295° 11'.2	34'.6	75° 30'.4	24'.5	257° 51'.4	22'.0
02	119° 18'.3	176° 17'.9	51'.0	310° 12'.9	34'.3	90° 32'.9	24'.5	272° 53'.7	22'.0
03	134° 20'.7	191° 17'.1	50'.3	325° 14'.6	34'.1	105° 35'.4	24'.5	287° 55'.9	22'.1
04	149° 23'.2	206° 16'.3	49'.7	340° 16'.3	33'.8	120° 37'.9	24'.5	302° 58'.2	22'.1
05	164° 25'.7	221° 15'.5	49'.0	355° 18'.0	33'.6	135° 40'.4	24'.5	318° 00'.5	22'.2
06	179° 28'.1	236° 14'.7	48'.4	10° 19'.6	33'.3	150° 42'.9	24'.5	333° 02'.8	22'.3
07	194° 30'.6	251° 14'.0	47'.7	25° 21'.3	33'.1	165° 45'.4	24'.5	348° 05'.0	22'.3
08	209° 33'.0	266° 13'.2	47'.0	40° 23'.0	32'.8	180° 47'.9	24'.5	3° 07'.3	22'.4
09	224° 35'.5	281° 12'.4	46'.4	55° 24'.7	32'.5	195° 50'.4	24'.5	18° 09'.6	22'.5
10	239° 38'.0	296° 11'.6	45'.7	70° 26'.4	32'.3	210° 52'.9	24'.5	33° 11'.9	22'.5
11	254° 40'.4	311° 10'.8	45'.1	85° 28'.1	32'.0	225° 55'.4	24'.5	48° 14'.2	22'.6
12	269° 42'.9	326° 10'.1	21° 44'.4 S	100° 29'.8	7° 31'.8 N	240° 57'.9	10° 24'.5 N	63° 16'.4	8° 22'.6 S
13	284° 45'.4	341° 09'.3	43'.8	115° 31'.5	31'.5	256° 00'.4	24'.5	78° 18'.7	22'.7
14	299° 47'.8	356° 08'.5	43'.1	130° 33'.2	31'.3	271° 03'.0	24'.5	93° 21'.0	22'.8
15	314° 50'.3	11° 07'.7	42'.4	145° 34'.9	31'.0	286° 05'.5	24'.5	108° 23'.3	22'.8
16	329° 52'.8	26° 07'.0	41'.8	160° 36'.6	30'.8	301° 08'.0	24'.5	123° 25'.5	22'.9
17	344° 55'.2	41° 06'.2	41'.1	175° 38'.3	30'.5	316° 10'.5	24'.5	138° 27'.8	22'.9
18	359° 57'.7	56° 05'.4	40'.4	190° 40'.0	30'.2	331° 13'.0	24'.5	153° 30'.1	23'.0
19	15° 00'.2	71° 04'.6	39'.8	205° 41'.7	30'.0	346° 15'.5	24'.5	168° 32'.4	23'.1
20	30° 02'.6	86° 03'.9	39'.1	220° 43'.4	29'.7	1° 18'.0	24'.4	183° 34'.7	23'.1
21	45° 05'.1	101° 03'.1	38'.4	235° 45'.1	29'.5	16° 20'.5	24'.4	198° 36'.9	23'.2
22	60° 07'.5	116° 02'.3	37'.8	250° 46'.8	29'.2	31° 23'.0	24'.4	213° 39'.2	23'.2
23	75° 10'.0	131° 01'.6	37'.1	265° 48'.5	29'.0	46° 25'.5	24'.4	228° 41'.5	23'.3
22 Thursday 00	90° 12'.5	146° 00'.8	21° 36'.4 S	280° 50'.2	7° 28'.7 N	61° 28'.0	10° 24'.4 N	243° 43'.8	8° 23'.4 S
01	105° 14'.9	161° 00'.0	35'.7	295° 51'.9	28'.5	76° 30'.5	24'.4	258° 46'.1	23'.4
02	120° 17'.4	175° 59'.3	35'.1	310° 53'.6	28'.2	91° 33'.0	24'.4	273° 48'.3	23'.5
03	135° 19'.9	190° 58'.5	34'.4	325° 55'.3	28'.0	106° 35'.5	24'.4	288° 50'.6	23'.5
04	150° 22'.3	205° 57'.7	33'.7	340° 57'.0	27'.7	121° 38'.0	24'.5	303° 52'.9	23'.6
05	165° 24'.8	220° 57'.0	33'.0	355° 58'.7	27'.5	136° 40'.5	24'.5	318° 55'.2	23'.7
06	180° 27'.3	235° 56'.2	32'.4	11° 00'.4	27'.2	151° 43'.0	24'.5	333° 57'.5	23'.7
07	195° 29'.7	250° 55'.4	31'.7	26° 02'.1	27'.0	166° 45'.5	24'.5	348° 59'.7	23'.8
08	210° 32'.2	265° 54'.7	31'.0	41° 03'.8	26'.7	181° 48'.0	24'.5	4° 02'.0	23'.8
09	225° 34'.7	280° 53'.9	30'.3	56° 05'.5	26'.5	196° 50'.5	24'.5	19° 04'.3	23'.9
10	240° 37'.1	295° 53'.1	29'.6	71° 07'.2	26'.2	211° 53'.0	24'.5	34° 06'.6	24'.0
11	255° 39'.6	310° 52'.4	29'.0	86° 08'.9	26'.0	226° 55'.5	24'.5	49° 08'.9	24'.0
12	270° 42'.0	325° 51'.6	21° 28'.3 S	101° 10'.7	7° 25'.7 N	241° 58'.0	10° 24'.5 N	64° 11'.1	8° 24'.1 S
13	285° 44'.5	340° 50'.8	27'.6	116° 12'.4	25'.5	257° 00'.5	24'.5	79° 13'.4	24'.1
14	300° 47'.0	355° 50'.1	26'.9	131° 14'.1	25'.2	272° 03'.0	24'.5	94° 15'.7	24'.2
15	315° 49'.4	10° 49'.3	26'.2	146° 15'.8	25'.0	287° 05'.5	24'.5	109° 18'.0	24'.3
16	330° 51'.9	25° 48'.6	25'.5	161° 17'.5	24'.7	302° 08'.0	24'.5	124° 20'.3	24'.3
17	345° 54'.4	40° 47'.8	24'.8	176° 19'.2	24'.5	317° 10'.5	24'.5	139° 22'.5	24'.4
18	0° 56'.8	55° 47'.0	24'.1	191° 20'.9	24'.2	332° 13'.0	24'.5	154° 24'.8	24'.4
19	15° 59'.3	70° 46'.3	23'.4	206° 22'.6	24'.0	347° 15'.5	24'.5	169° 27'.1	24'.5
20	31° 01'.8	85° 45'.5	22'.8	221° 24'.4	23'.7	2° 17'.9	24'.5	184° 29'.4	24'.6
21	46° 04'.2	100° 44'.8	22'.1	236° 26'.1	23'.5	17° 20'.4	24'.5	199° 31'.7	24'.6
22	61° 06'.7	115° 44'.0	21'.4	251° 27'.8	23'.3	32° 22'.9	24'.5	214° 34'.0	24'.7
23	76° 09'.2	130° 43'.2	20'.7	266° 29'.5	23'.0	47° 25'.4	24'.5	229° 36'.2	24'.7
23 Friday 00	91° 11'.6	145° 42'.5	21° 20'.0 S	281° 31'.2	7° 22'.8 N	62° 27'.9	10° 24'.5 N	244° 38'.5	8° 24'.8 S
01	106° 14'.1	160° 41'.7	19'.3	296° 32'.9	22'.5	77° 30'.4	24'.5	259° 40'.8	24'.8
02	121° 16'.5	175° 41'.0	18'.6	311° 34'.7	22'.3	92° 32'.9	24'.5	274° 43'.1	24'.9
03	136° 19'.0	190° 40'.2	17'.9	326° 36'.4	22'.0	107° 35'.4	24'.5	289° 45'.4	25'.0
04	151° 21'.5	205° 39'.5	17'.2	341° 38'.1	21'.8	122° 37'.9	24'.5	304° 47'.7	25'.0
05	166° 23'.9	220° 38'.7	16'.5	356° 39'.8	21'.5	137° 40'.4	24'.5	319° 49'.9	25'.1
06	181° 26'.4	235° 38'.0	15'.8	11° 41'.5	21'.3	152° 42'.9	24'.5	334° 52'.2	25'.1
07	196° 28'.9	250° 37'.2	15'.1	26° 43'.3	21'.1	167° 45'.4	24'.5	349° 54'.5	25'.2
08	211° 31'.3	265° 36'.5	14'.3	41° 45'.0	20'.8	182° 47'.9	24'.5	4° 56'.8	25'.3
09	226° 33'.8	280° 35'.7	13'.6	56° 46'.7	20'.6	197° 50'.3	24'.5	19° 59'.1	25'.3
10	241° 36'.3	295° 35'.0	12'.9	71° 48'.4	20'.3	212° 52'.8	24'.5	35° 01'.4	25'.4
11	256° 38'.7	310° 34'.2	12'.2	86° 50'.2	20'.1	227° 55'.3	24'.5	50° 03'.6	25'.4
12	271° 41'.2	325° 33'.5	21° 11'.5 S	101° 51'.9	7° 19'.8 N	242° 57'.8	10° 24'.5 N	65° 05'.9	8° 25'.5 S
13	286° 43'.6	340° 32'.7	10'.8	116° 53'.6	19'.6	258° 00'.3	24'.5	80° 08'.2	25'.5
14	301° 46'.1	355° 32'.0	10'.1	131° 55'.3	19'.4	273° 02'.8	24'.5	95° 10'.5	25'.6
15	316° 48'.6	10° 31'.2	09'.4	146° 57'.1	19'.1	288° 05'.3	24'.6	110° 12'.8	25'.7
16	331° 51'.0	25° 30'.5	08'.7	161° 58'.8	18'.9	303° 07'.8	24'.6	125° 15'.1	25'.7
17	346° 53'.5	40° 29'.7	07'.9	177° 00'.5	18'.6	318° 10'.3	24'.6	140° 17'.3	25'.8
18	1° 56'.0	55° 29'.0	07'.2	192° 02'.3	18'.4	333° 12'.7	24'.6	155° 19'.6	25'.8
19	16° 58'.4	70° 28'.2	06'.5	207° 04'.0	18'.2	348° 15'.2	24'.6	170° 21'.9	25'.9
20	32° 00'.9	85° 27'.5	05'.8	222° 05'.7	17'.9	3° 17'.7	24'.6	185° 24'.2	26'.0
21	47° 03'.4	100° 26'.7	05'.1	237° 07'.5	17'.7	18° 20'.2	24'.6	200° 26'.5	26'.0
22	62° 05'.8	115° 26'.0	04'.3	252° 09'.2	17'.4	33° 22'.7	24'.6	215° 28'.8	26'.1
23	77° 08'.3	130° 25'.3	03'.6	267° 10'.9	17'.2	48° 25'.2	24'.6	230° 31'.1	26'.1
	M.P. 17:56	v -0'.8	d 0'.7	v 1'.7	d 0'.2	v 2'.5	d 0'.0	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.6 S
Achernar	335° 27'.3	57° 10'.8 S
Acrux	173° 10'.6	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.4 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.7	55° 53'.3 N
Alkaid	152° 59'.9	49° 14'.9 N
Alnair	27° 45'.2	46° 54'.3 S
Alnilam	275° 47'.1	1° 11'.8 S
Alphard	217° 56'.9	8° 42'.7 S
Alphecca	126° 12'.2	26° 40'.4 N
Alpheratz	357° 44'.6	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.7	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.9	19° 07'.1 N
Atria	107° 31'.2	69° 02'.8 S
Avior	234° 17'.9	59° 32'.8 S
Bellatrix	278° 32'.8	6° 21'.5 N
Betelgeuse	271° 02'.1	7° 24'.5 N
Canopus	263° 56'.0	52° 42'.2 S
Capella	280° 35'.5	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.7 N
Denebola	182° 34'.7	14° 30'.1 N
Diphda	348° 56'.9	17° 55'.3 S
Dubhe	193° 52'.8	61° 40'.8 N
Elnath	278° 13'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.3 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.2	57° 10'.6 S
Gienah	175° 53'.4	17° 36'.5 S
Hadar	148° 49'.8	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.8	74° 06'.1 N
Markab	13° 39'.5	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.0	36° 25'.6 S
Miaplacidus	221° 39'.3	69° 45'.9 S
Mirfak	308° 41'.4	49° 54'.4 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.8 S
Polaris	317° 57'.5	89° 19'.2 N
Pollux	243° 28'.7	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.2 N
Regulus	207° 44'.5	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.4 S
Rigil Kent	139° 53'.6	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.6 N
Shaula	96° 23'.8	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.1 S
Spica	158° 32'.5	11° 13'.4 S
Suhail	222° 52'.9	43° 28'.8 S
Vega	80° 40'.1	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	55° 48'.3	14:17
Mars	190° 37'.7	05:16
Jupiter	331° 15'.5	19:51
Saturn	153° 31'.3	07:44

SUN

GHA	Dec
180° 35'.1	23° 25'.9 S
195° 34'.7	25'.9
210° 34'.4	25'.9
225° 34'.1	25'.9
240° 33'.8	25'.9
255° 33'.5	26'.0
270° 33'.2	26'.0
285° 32'.9	26'.0
300° 32'.6	26'.0
315° 32'.3	26'.0
330° 31'.9	26'.1
345° 31'.6	26'.1
0° 31'.3	23° 26'.1 S
15° 31'.0	26'.1
30° 30'.7	26'.1
45° 30'.4	26'.1
60° 30'.1	26'.1
75° 29'.8	26'.1
90° 29'.5	26'.2
105° 29'.1	26'.2
120° 28'.8	26'.2
135° 28'.5	26'.2
150° 28'.2	26'.2
165° 27'.9	26'.2
180° 27'.6	23° 26'.2 S
195° 27'.3	26'.2
210° 27'.0	26'.2
225° 26'.7	26'.2
240° 26'.3	26'.2
255° 26'.0	26'.2
270° 25'.7	26'.2
285° 25'.4	26'.2
300° 25'.1	26'.2
315° 24'.8	26'.2
330° 24'.5	26'.2
345° 24'.2	26'.2
0° 23'.8	23° 26'.2 S
15° 23'.5	26'.2
30° 23'.2	26'.2
45° 22'.9	26'.2
60° 22'.6	26'.2
75° 22'.3	26'.2
90° 22'.0	26'.1
105° 21'.7	26'.1
120° 21'.4	26'.1
135° 21'.0	26'.1
150° 20'.7	26'.1
165° 20'.4	26'.1
180° 20'.1	23° 26'.1 S
195° 19'.8	26'.0
210° 19'.5	26'.0
225° 19'.2	26'.0
240° 18'.9	26'.0
255° 18'.5	26'.0
270° 18'.2	26'.0
285° 17'.9	25'.9
300° 17'.6	25'.9
315° 17'.3	25'.9
330° 17'.0	25'.9
345° 16'.7	25'.8
0° 16'.4	23° 25'.8 S
15° 16'.0	25'.8
30° 15'.7	25'.8
45° 15'.4	25'.7
60° 15'.1	25'.7
75° 14'.8	25'.7
90° 14'.5	25'.7
105° 14'.2	25'.6
120° 13'.9	25'.6
135° 13'.6	25'.6
150° 13'.2	25'.5
165° 12'.9	25'.5

SD 16'.3 d 0'.0

MOON

GHA	v	Dec	d	HP
234° 31'.3	6'.6	17° 09'.8 S	9'.3	60'.0
248° 56'.9	6'.6	19'.1	9'.1	
263° 22'.5	6'.5	28'.2	9'.1	
277° 48'.0	6'.4	37'.3	8'.9	
292° 13'.4	6'.4	46'.2	8'.8	
306° 38'.8	6'.3	55'.0	8'.7	
321° 04'.1	6'.2	18° 03'.7 S	8'.6	
335° 29'.3	6'.1	12'.3	8'.5	
349° 54'.4	6'.1	20'.8	8'.4	
4° 19'.5	6'.0	29'.2	8'.2	60'.1
18° 44'.5	5'.9	37'.4	8'.1	
33° 09'.4	5'.8	45'.5	8'.0	
47° 34'.2	5'.8	18° 53'.5 S	7'.9	60'.1
61° 59'.0	5'.7	19° 01'.4 S	7'.7	
76° 23'.7	5'.7	09'.1	7'.6	
90° 48'.4	5'.6	16'.7	7'.5	
105° 13'.0	5'.5	24'.2	7'.4	
119° 37'.5	5'.4	31'.6	7'.2	
134° 01'.9	5'.4	38'.8	7'.1	
148° 26'.3	5'.3	45'.9	6'.9	
162° 50'.6	5'.3	52'.8	6'.9	
177° 14'.9	5'.2	59'.7	6'.7	
191° 39'.1	5'.2	20° 06'.4 S	6'.5	
206° 03'.3	5'.1	12'.9	6'.4	
220° 27'.4	5'.0	20° 19'.3 S	6'.3	60'.1
234° 51'.4	5'.0	25'.6	6'.1	
249° 15'.4	4'.9	31'.7	6'.0	
263° 39'.3	4'.9	37'.7	5'.9	
278° 03'.2	4'.8	43'.6	5'.7	
292° 27'.0	4'.7	49'.3	5'.6	
306° 50'.7	4'.8	54'.9	5'.4	
321° 14'.5	4'.6	21° 00'.3 S	5'.3	
335° 38'.1	4'.7	05'.6	5'.1	
350° 01'.8	4'.5	10'.7	5'.0	
4° 25'.3	4'.6	15'.7	4'.8	
18° 48'.9	4'.5	20'.5	4'.7	
33° 12'.4	4'.4	21° 25'.2 S	4'.5	60'.1
47° 35'.8	4'.5	29'.7	4'.4	
61° 59'.3	4'.4	34'.1	4'.2	
76° 22'.7	4'.3	38'.3	4'.1	
90° 46'.0	4'.3	42'.4	3'.9	
105° 09'.3	4'.3	46'.3	3'.8	
119° 32'.6	4'.3	50'.1	3'.6	
133° 55'.9	4'.2	53'.7	3'.5	
148° 19'.1	4'.2	57'.2	3'.3	
162° 42'.3	4'.2	22° 00'.5 S	3'.1	60'.0
177° 05'.5	4'.2	03'.6	3'.0	
191° 28'.7	4'.1	06'.6	2'.8	
205° 51'.8	4'.1	22° 09'.4 S	2'.7	60'.0
220° 14'.9	4'.2	12'.1	2'.5	
234° 38'.1	4'.1	14'.6	2'.4	
249° 01'.2	4'.0	17'.0	2'.2	
263° 24'.2	4'.1	19'.2	2'.0	
277° 47'.3	4'.1	21'.2	1'.9	
292° 10'.4	4'.1	23'.1	1'.7	
306° 33'.5	4'.0	24'.8	1'.6	
320° 56'.5	4'.1	26'.4	1'.4	
335° 19'.6	4'.0	27'.8	1'.2	59'.9
349° 42'.6	4'.1	29'.0	1'.1	
4° 05'.7	4'.1	30'.1	0'.9	
18° 28'.8	4'.0	22° 31'.0 S	0'.8	59'.9
32° 51'.8	4'.1	31'.8	0'.6	
47° 14'.9	4'.1	32'.4	0'.5	
61° 38'.0	4'.1	32'.9	0'.2	
76° 01'.1	4'.1	33'.1	0'.2	
90° 24'.2	4'.2	33'.3	0'.1	59'.8
104° 47'.4	4'.1	33'.2	0'.2	
119° 10'.5	4'.2	33'.0	0'.3	
133° 33'.7	4'.2	32'.7	0'.5	
147° 56'.9	4'.3	32'.2	0'.7	
162° 20'.2	4'.2	31'.5	0'.8	
176° 43'.4	4'.3	30'.7	1'.0	59'.7

SD 16'.4 16'.4 16'.3

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 21	Moonrise 22	Moonrise 23
N 72°	08:26	10:58	-	-	-	-
N 70°	08:06	09:55	-	07:02	-	-
68°	07:50	09:19	-	06:15	08:39	-
66°	07:37	08:54	10:35	05:45	07:40	09:17
64°	07:26	08:34	09:52	05:23	07:06	08:32
62°	07:16	08:18	09:24	05:05	06:41	08:03
60°	07:08	08:04	09:02	04:51	06:21	07:40
N 58°	07:00	07:53	08:45	04:38	06:05	07:22
56°	06:53	07:42	08:30	04:28	05:52	07:06
54°	06:47	07:33	08:17	04:18	05:40	06:53
52°	06:41	07:25	08:06	04:10	05:29	06:42
50°	06:36	07:18	07:56	04:02	05:20	06:32
45°	06:24	07:02	07:35	03:46	05:01	06:10
N 40°	06:14	06:48	07:19	03:33	04:45	05:53
35°	06:04	06:36	07:04	03:22	04:32	05:38
30°	05:56	06:26	06:52	03:12	04:20	05:26
20°	05:39	06:07	06:31	02:56	04:00	05:04
N 10°	05:23	05:49	06:12	02:42	03:43	04:46
0°	05:06	05:32	05:55	02:28	03:27	04:28
S 10°	04:47	05:14	05:37	02:15	03:11	04:11
20°	04:24	04:53	05:18	02:01	02:54	03:52
30°	03:55	04:28	04:56	01:45	02:35	03:31
35°	03:36	04:13	04:43	01:36	02:24	03:19
40°	03:13	03:55	04:28	01:25	02:11	03:05
45°	02:42	03:32	04:10	01:13	01:56	02:48
S 50°	01:57	03:02	03:47	00:58	01:37	02:27
52°	01:29	02:47	03:36	00:51	01:29	02:17
54°	00:41	02:29	03:24	00:43	01:19	02:06
56°	-	02:07	03:10	00:35	01:08	01:53
58°	-	01:37	02:53	00:25	00:56	01:39
S 60°	-	00:46	02:32	00:14	00:41	01:22
S 62°	-	-	02:06	00:02	00:24	01:01

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 21	Moonset 22	Moonset 23
N 72°	-	12:59	15:31	-	-	-
N 70°	-	14:02	15:51	10:08	-	-
68°	-	14:37	16:07	10:55	10:37	-
66°	13:22	15:03	16:20	11:26	11:36	12:07
64°	14:04	15:23	16:31	11:49	12:11	12:52
62°	14:33	15:39	16:41	12:08	12:36	13:22
60°	14:55	15:52	16:49	12:23	12:56	13:45
N 58°	15:12	16:04	16:57	12:36	13:12	14:03
56°	15:27	16:14	17:04	12:47	13:26	14:18
54°	15:40	16:23	17:10	12:57	13:38	14:31
52°	15:51	16:32	17:15	13:06	13:49	14:43
50°	16:01	16:39	17:21	13:14	13:58	14:53
45°	16:21	16:55	17:33	13:31	14:18	15:15
N 40°	16:38	17:09	17:43	13:45	14:35	15:32
35°	16:52	17:21	17:52	13:57	14:49	15:47
30°	17:05	17:31	18:01	14:08	15:01	16:00
20°	17:26	17:50	18:18	14:26	15:21	16:21
N 10°	17:45	18:08	18:34	14:41	15:39	16:40
0°	18:02	18:25	18:51	14:56	15:56	16:58
S 10°	18:20	18:43	19:10	15:11	16:13	17:15
20°	18:39	19:03	19:33	15:26	16:31	17:34
30°	19:01	19:28	20:02	15:45	16:52	17:55
35°	19:14	19:44	20:20	15:55	17:04	18:08
40°	19:29	20:02	20:44	16:07	17:18	18:22
45°	19:47	20:25	21:14	16:22	17:34	18:40
S 50°	20:10	20:54	22:00	16:39	17:54	19:01
52°	20:21	21:09	22:28	16:48	18:04	19:11
54°	20:33	21:28	23:15	16:57	18:15	19:22
56°	20:47	21:50	-	17:07	18:27	19:35
58°	21:04	22:20	-	17:19	18:42	19:50
S 60°	21:25	23:11	-	17:33	18:59	20:08
S 62°	21:51	-	-	17:50	19:19	20:30

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
21	2 21	2 06	11:58	08:42	21:11	26d 14%
22	1 51	1 36	11:58	09:42	22:12	27d 7%
23	1 21	1 06	11:59	10:43	23:14	28d 2%

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2011 December 24, 25, 26 (Sat, Sun, Monday)

GMT	ARIES	VENUS -4.0		MARS +0.3		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
24 Saturday 00	92° 10'.8	145° 24'.5	21° 02'.9 S	282° 12'.7	7° 17'.0 N	63° 27'.7	10° 24'.6 N	245° 33'.3	8° 26'.2 S
01	107° 13'.2	160° 23'.8	02'.2	297° 14'.4	16'.7	78° 30'.1	24'.6	260° 35'.6	26'.2
02	122° 15'.7	175° 23'.0	01'.5	312° 16'.1	16'.5	93° 32'.6	24'.6	275° 37'.9	26'.3
03	137° 18'.1	190° 22'.3	00'.7	327° 17'.9	16'.3	108° 35'.1	24'.6	290° 40'.2	26'.4
04	152° 20'.6	205° 21'.5	00'.0	342° 19'.6	16'.0	123° 37'.6	24'.6	305° 42'.5	26'.4
05	167° 23'.1	220° 20'.8	20° 59'.3 S	357° 21'.3	15'.8	138° 40'.1	24'.6	320° 44'.8	26'.5
06	182° 25'.5	235° 20'.1	58'.5	12° 23'.1	15'.5	153° 42'.6	24'.6	335° 47'.1	26'.5
07	197° 28'.0	250° 19'.3	57'.8	27° 24'.8	15'.3	168° 45'.0	24'.6	350° 49'.3	26'.6
08	212° 30'.5	265° 18'.6	57'.1	42° 26'.6	15'.1	183° 47'.5	24'.7	5° 51'.6	26'.6
09	227° 32'.9	280° 17'.9	56'.3	57° 28'.3	14'.8	198° 50'.0	24'.7	20° 53'.9	26'.7
10	242° 35'.4	295° 17'.1	55'.6	72° 30'.0	14'.6	213° 52'.5	24'.7	35° 56'.2	26'.8
11	257° 37'.9	310° 16'.4	54'.9	87° 31'.8	14'.4	228° 55'.0	24'.7	50° 58'.5	26'.8
12	272° 40'.3	325° 15'.6	20° 54'.1 S	102° 33'.5	7° 14'.1 N	243° 57'.5	10° 24'.7 N	66° 00'.8	8° 26'.9 S
13	287° 42'.8	340° 14'.9	53'.4	117° 35'.3	13'.9	258° 59'.9	24'.7	81° 03'.1	26'.9
14	302° 45'.3	355° 14'.2	52'.7	132° 37'.0	13'.7	274° 02'.4	24'.7	96° 05'.4	27'.0
15	317° 47'.7	10° 13'.4	51'.9	147° 38'.8	13'.4	289° 04'.9	24'.7	111° 07'.6	27'.0
16	332° 50'.2	25° 12'.7	51'.2	162° 40'.5	13'.2	304° 07'.4	24'.7	126° 09'.9	27'.1
17	347° 52'.6	40° 12'.0	50'.5	177° 42'.3	13'.0	319° 09'.9	24'.7	141° 12'.2	27'.2
18	2° 55'.1	55° 11'.2	49'.7	192° 44'.0	12'.7	334° 12'.3	24'.7	156° 14'.5	27'.2
19	17° 57'.6	70° 10'.5	49'.0	207° 45'.8	12'.5	349° 14'.8	24'.7	171° 16'.8	27'.3
20	33° 00'.0	85° 09'.8	48'.2	222° 47'.5	12'.3	4° 17'.3	24'.8	186° 19'.1	27'.3
21	48° 02'.5	100° 09'.1	47'.5	237° 49'.3	12'.0	19° 19'.8	24'.8	201° 21'.4	27'.4
22	63° 05'.0	115° 08'.3	46'.7	252° 51'.0	11'.8	34° 22'.2	24'.8	216° 23'.7	27'.4
23	78° 07'.4	130° 07'.6	46'.0	267° 52'.8	11'.6	49° 24'.7	24'.8	231° 25'.9	27'.5
25 Sunday 00	93° 09'.9	145° 06'.9	20° 45'.2 S	282° 54'.5	7° 11'.3 N	64° 27'.2	10° 24'.8 N	246° 28'.2	8° 27'.5 S
01	108° 12'.4	160° 06'.1	44'.5	297° 56'.3	11'.1	79° 29'.7	24'.8	261° 30'.5	27'.6
02	123° 14'.8	175° 05'.4	43'.7	312° 58'.0	10'.9	94° 32'.1	24'.8	276° 32'.8	27'.7
03	138° 17'.3	190° 04'.7	43'.0	327° 59'.8	10'.7	109° 34'.6	24'.8	291° 35'.1	27'.7
04	153° 19'.8	205° 04'.0	42'.2	343° 01'.5	10'.4	124° 37'.1	24'.8	306° 37'.4	27'.8
05	168° 22'.2	220° 03'.2	41'.5	358° 03'.3	10'.2	139° 39'.6	24'.8	321° 39'.7	27'.8
06	183° 24'.7	235° 02'.5	40'.7	13° 05'.0	10'.0	154° 42'.0	24'.8	336° 42'.0	27'.9
07	198° 27'.1	250° 01'.8	40'.0	28° 06'.8	09'.7	169° 44'.5	24'.9	351° 44'.3	27'.9
08	213° 29'.6	265° 01'.1	39'.2	43° 08'.5	09'.5	184° 47'.0	24'.9	6° 46'.5	28'.0
09	228° 32'.1	280° 00'.3	38'.5	58° 10'.3	09'.3	199° 49'.5	24'.9	21° 48'.8	28'.0
10	243° 34'.5	294° 59'.6	37'.7	73° 12'.1	09'.1	214° 51'.9	24'.9	36° 51'.1	28'.1
11	258° 37'.0	309° 58'.9	36'.9	88° 13'.8	08'.8	229° 54'.4	24'.9	51° 53'.4	28'.2
12	273° 39'.5	324° 58'.2	20° 36'.2 S	103° 15'.6	7° 08'.6 N	244° 56'.9	10° 24'.9 N	66° 55'.7	8° 28'.2 S
13	288° 41'.9	339° 57'.5	35'.4	118° 17'.3	08'.4	259° 59'.4	24'.9	81° 58'.0	28'.3
14	303° 44'.4	354° 56'.7	34'.7	133° 19'.1	08'.1	275° 01'.8	24'.9	97° 00'.3	28'.3
15	318° 46'.9	9° 56'.0	33'.9	148° 20'.9	07'.9	290° 04'.3	24'.9	112° 02'.6	28'.4
16	333° 49'.3	24° 55'.3	33'.1	163° 22'.6	07'.7	305° 06'.8	25'.0	127° 04'.9	28'.4
17	348° 51'.8	39° 54'.6	32'.4	178° 24'.4	07'.5	320° 09'.2	25'.0	142° 07'.2	28'.5
18	3° 54'.3	54° 53'.9	31'.6	193° 26'.1	07'.2	335° 11'.7	25'.0	157° 09'.5	28'.5
19	18° 56'.7	69° 53'.1	30'.8	208° 27'.9	07'.0	350° 14'.2	25'.0	172° 11'.7	28'.6
20	33° 59'.2	84° 52'.4	30'.1	223° 29'.7	06'.8	5° 16'.7	25'.0	187° 14'.0	28'.7
21	49° 01'.6	99° 51'.7	29'.3	238° 31'.4	06'.6	20° 19'.1	25'.0	202° 16'.3	28'.7
22	64° 04'.1	114° 51'.0	28'.5	253° 33'.2	06'.3	35° 21'.6	25'.0	217° 18'.6	28'.8
23	79° 06'.6	129° 50'.3	27'.8	268° 35'.0	06'.1	50° 24'.1	25'.0	232° 20'.9	28'.8
26 Monday 00	94° 09'.0	144° 49'.6	20° 27'.0 S	283° 36'.7	7° 05'.9 N	65° 26'.5	10° 25'.1 N	247° 23'.2	8° 28'.9 S
01	109° 11'.5	159° 48'.9	26'.2	298° 38'.5	05'.7	80° 29'.0	25'.1	262° 25'.5	28'.9
02	124° 14'.0	174° 48'.1	25'.4	313° 40'.3	05'.5	95° 31'.5	25'.1	277° 27'.8	29'.0
03	139° 16'.4	189° 47'.4	24'.7	328° 42'.1	05'.2	110° 33'.9	25'.1	292° 30'.1	29'.0
04	154° 18'.9	204° 46'.7	23'.9	343° 43'.8	05'.0	125° 36'.4	25'.1	307° 32'.4	29'.1
05	169° 21'.4	219° 46'.0	23'.1	358° 45'.6	04'.8	140° 38'.9	25'.1	322° 34'.7	29'.1
06	184° 23'.8	234° 45'.3	22'.3	13° 47'.4	04'.6	155° 41'.3	25'.1	337° 37'.0	29'.2
07	199° 26'.3	249° 44'.6	21'.6	28° 49'.1	04'.3	170° 43'.8	25'.1	352° 39'.3	29'.3
08	214° 28'.8	264° 43'.9	20'.8	43° 50'.9	04'.1	185° 46'.3	25'.2	7° 41'.5	29'.3
09	229° 31'.2	279° 43'.2	20'.0	58° 52'.7	03'.9	200° 48'.7	25'.2	22° 43'.8	29'.4
10	244° 33'.7	294° 42'.5	19'.2	73° 54'.5	03'.7	215° 51'.2	25'.2	37° 46'.1	29'.4
11	259° 36'.1	309° 41'.8	18'.4	88° 56'.3	03'.5	230° 53'.7	25'.2	52° 48'.4	29'.5
12	274° 38'.6	324° 41'.1	20° 17'.7 S	103° 58'.0	7° 03'.2 N	245° 56'.1	10° 25'.2 N	67° 50'.7	8° 29'.5 S
13	289° 41'.1	339° 40'.3	16'.9	118° 59'.8	03'.0	260° 58'.6	25'.2	82° 53'.0	29'.6
14	304° 43'.5	354° 39'.6	16'.1	134° 01'.6	02'.8	276° 01'.1	25'.2	97° 55'.3	29'.6
15	319° 46'.0	9° 38'.9	15'.3	149° 03'.4	02'.6	291° 03'.5	25'.3	112° 57'.6	29'.7
16	334° 48'.5	24° 38'.2	14'.5	164° 05'.1	02'.4	306° 06'.0	25'.3	127° 59'.9	29'.7
17	349° 50'.9	39° 37'.5	13'.7	179° 06'.9	02'.2	321° 08'.4	25'.3	143° 02'.2	29'.8
18	4° 53'.4	54° 36'.8	12'.9	194° 08'.7	01'.9	336° 10'.9	25'.3	158° 04'.5	29'.9
19	19° 55'.9	69° 36'.1	12'.1	209° 10'.5	01'.7	351° 13'.4	25'.3	173° 06'.8	29'.9
20	34° 58'.3	84° 35'.4	11'.3	224° 12'.3	01'.5	6° 15'.8	25'.3	188° 09'.1	30'.0
21	50° 00'.8	99° 34'.7	10'.6	239° 14'.1	01'.3	21° 18'.3	25'.3	203° 11'.4	30'.0
22	65° 03'.3	114° 34'.0	09'.8	254° 15'.8	01'.1	36° 20'.7	25'.4	218° 13'.7	30'.1
23	80° 05'.7	129° 33'.3	09'.0	269° 17'.6	00'.9	51° 23'.2	25'.4	233° 16'.0	30'.1
	M.P. 17:44	v -0'.7	d 0'.8	v 1'.8	d 0'.2	v 2'.5	d 0'.0	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.6 S
Achernar	335° 27'.3	57° 10'.8 S
Acrux	173° 10'.6	63° 09'.7 S
Adhara	255° 13'.0	28° 59'.4 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.7	55° 53'.3 N
Alkaid	152° 59'.9	49° 14'.9 N
Alnair	27° 45'.3	46° 54'.2 S
Alnilam	275° 47'.1	1° 11'.8 S
Alphard	217° 56'.9	8° 42'.8 S
Alphecca	126° 12'.2	26° 40'.4 N
Alpheratz	357° 44'.6	29° 09'.7 N
Altair	62° 09'.6	8° 54'.2 N
Ankaa	353° 16'.7	42° 14'.6 S
Antares	112° 27'.9	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.1 N
Atria	107° 31'.2	69° 02'.8 S
Avior	234° 17'.9	59° 32'.9 S
Bellatrix	278° 32'.8	6° 21'.5 N
Betelgeuse	271° 02'.1	7° 24'.4 N
Canopus	263° 56'.0	52° 42'.2 S
Capella	280° 35'.5	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.7 N
Denebola	182° 34'.7	14° 30'.1 N
Diphda	348° 56'.9	17° 55'.3 S
Dubhe	193° 52'.7	61° 40'.8 N
Elnath	278° 13'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.3 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.1	57° 10'.6 S
Gienah	175° 53'.4	17° 36'.5 S
Hadar	148° 49'.7	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.7	74° 06'.1 N
Markab	13° 39'.5	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.0	36° 25'.6 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 41'.4	49° 54'.4 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.8 S
Polaris	317° 58'.2	89° 19'.2 N
Pollux	243° 28'.6	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.8	12° 33'.1 N
Regulus	207° 44'.4	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.4 S
Rigil Kent	139° 53'.5	60° 52'.8 S
Sabik	102° 14'.1	15° 44'.3 S
Schedar	349° 41'.6	56° 36'.6 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.1 S
Spica	158° 32'.5	11° 13'.4 S
Suhail	222° 52'.9	43° 28'.8 S
Vega	80° 40'.1	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	51° 57'.0	14:20
Mars	189° 44'.6	05:08
Jupiter	331° 17'.3	19:39
Saturn	153° 18'.3	07:33

SUN

GHA	Dec
180° 12'.6	23° 25'.5 S
195° 12'.3	25'.4
210° 12'.0	25'.4
225° 11'.7	25'.4
240° 11'.4	25'.3
255° 11'.1	25'.3
270° 10'.7	25'.2
285° 10'.4	25'.2
300° 10'.1	25'.2
315° 09'.8	25'.1
330° 09'.5	25'.1
345° 09'.2	25'.0
0° 08'.9	23° 25'.0 S
15° 08'.6	24'.9
30° 08'.2	24'.9
45° 07'.9	24'.8
60° 07'.6	24'.8
75° 07'.3	24'.8
90° 07'.0	24'.7
105° 06'.7	24'.7
120° 06'.4	24'.6
135° 06'.1	24'.6
150° 05'.8	24'.5
165° 05'.4	24'.4
180° 05'.1	23° 24'.4 S
195° 04'.8	24'.3
210° 04'.5	24'.3
225° 04'.2	24'.2
240° 03'.9	24'.2
255° 03'.6	24'.1
270° 03'.3	24'.0
285° 03'.0	24'.0
300° 02'.6	23'.9
315° 02'.3	23'.9
330° 02'.0	23'.8
345° 01'.7	23'.7
0° 01'.4	23° 23'.7 S
15° 01'.1	23'.6
30° 00'.8	23'.5
45° 00'.5	23'.5
60° 00'.2	23'.4
74° 59'.8	23'.3
89° 59'.5	23'.3
104° 59'.2	23'.2
119° 58'.9	23'.1
134° 58'.6	23'.1
149° 58'.3	23'.0
164° 58'.0	22'.9
179° 57'.7	23° 22'.8 S
194° 57'.4	22'.8
209° 57'.0	22'.7
224° 56'.7	22'.6
239° 56'.4	22'.5
254° 56'.1	22'.5
269° 55'.8	22'.4
284° 55'.5	22'.3
299° 55'.2	22'.2
314° 54'.9	22'.1
329° 54'.6	22'.1
344° 54'.3	22'.0
359° 53'.9	23° 21'.9 S
14° 53'.6	21'.8
29° 53'.3	21'.7
44° 53'.0	21'.6
59° 52'.7	21'.6
74° 52'.4	21'.5
89° 52'.1	21'.4
104° 51'.8	21'.3
119° 51'.5	21'.2
134° 51'.2	21'.1
149° 50'.8	21'.0
164° 50'.5	20'.9

SD 16'.3 d 0'.1

MOON

GHA	v	Dec	d	HP
191° 06'.7	4'.3	22° 29'.7 S	1'.1	59'.7
205° 30'.0	4'.4	28'.6	1'.3	
219° 53'.4	4'.3	27'.3	1'.5	
234° 16'.7	4'.5	25'.8	1'.6	
248° 40'.2	4'.4	24'.2	1'.8	
263° 03'.6	4'.5	22'.4	1'.9	59'.6
277° 27'.1	4'.6	20'.5	2'.1	
291° 50'.7	4'.6	18'.4	2'.2	
306° 14'.3	4'.6	16'.2	2'.4	
320° 37'.9	4'.7	13'.8	2'.5	
335° 01'.6	4'.7	11'.3	2'.7	59'.5
349° 25'.3	4'.8	08'.6	2'.8	
3° 49'.1	4'.8	22° 05'.8 S	3'.0	59'.5
18° 12'.9	4'.9	02'.8	3'.1	
32° 36'.8	5'.0	21° 59'.7 S	3'.3	
47° 00'.8	5'.0	56'.4	3'.4	59'.4
61° 24'.8	5'.1	53'.0	3'.6	
75° 48'.9	5'.1	49'.4	3'.7	
90° 13'.0	5'.2	45'.7	3'.8	
104° 37'.2	5'.3	41'.9	4'.0	59'.3
119° 01'.5	5'.3	37'.9	4'.2	
133° 25'.8	5'.4	33'.7	4'.2	
147° 50'.2	5'.5	29'.5	4'.5	
162° 14'.7	5'.5	25'.0	4'.5	59'.2
176° 39'.2	5'.6	21° 20'.5 S	4'.7	59'.2
191° 03'.8	5'.7	15'.8	4'.9	
205° 28'.5	5'.7	10'.9	4'.9	
219° 53'.2	5'.9	06'.0	5'.1	59'.1
234° 18'.1	5'.9	00'.9	5'.3	
248° 43'.0	6'.0	20° 55'.6 S	5'.3	
263° 08'.0	6'.0	50'.3	5'.5	
277° 33'.0	6'.2	44'.8	5'.7	59'.0
291° 58'.2	6'.2	39'.1	5'.7	
306° 23'.4	6'.3	33'.4	5'.9	
320° 48'.7	6'.4	27'.5	6'.0	
335° 14'.1	6'.5	21'.5	6'.1	58'.9
349° 39'.6	6'.6	20° 15'.4 S	6'.3	58'.9
4° 05'.2	6'.6	09'.1	6'.4	
18° 30'.8	6'.8	02'.7	6'.4	58'.8
32° 56'.6	6'.8	19° 56'.3 S	6'.7	
47° 22'.4	6'.9	49'.6	6'.7	
61° 48'.3	7'.0	42'.9	6'.8	
76° 14'.3	7'.1	36'.1	7'.0	58'.7
90° 40'.4	7'.2	29'.1	7'.1	
105° 06'.6	7'.3	22'.0	7'.2	
119° 32'.9	7'.3	14'.8	7'.2	58'.6
133° 59'.2	7'.5	07'.6	7'.5	
148° 25'.7	7'.6	00'.1	7'.5	
162° 52'.3	7'.6	18° 52'.6 S	7'.6	58'.5
177° 18'.9	7'.7	45'.0	7'.7	
191° 45'.6	7'.9	37'.3	7'.8	
206° 12'.5	7'.9	29'.5	8'.0	
220° 39'.4	8'.0	21'.5	8'.0	58'.4
235° 06'.4	8'.1	13'.5	8'.1	
249° 33'.5	8'.3	05'.4	8'.2	
264° 00'.8	8'.3	17° 57'.2 S	8'.4	58'.3
278° 28'.1	8'.4	48'.8	8'.4	
292° 55'.5	8'.5	40'.4	8'.5	
307° 23'.0	8'.6	31'.9	8'.6	58'.2
321° 50'.6	8'.6	23'.3	8'.7	
336° 18'.2	8'.8	17° 14'.6 S	8'.8	58'.2
350° 46'.0	8'.9	05'.8	8'.8	58'.1
5° 13'.9	9'.0	16° 57'.0 S	9'.0	
19° 41'.9	9'.1	48'.0	9'.0	
34° 10'.0	9'.1	39'.0	9'.1	58'.0
48° 38'.1	9'.3	29'.9	9'.2	
63° 06'.4	9'.3	20'.7	9'.3	
77° 34'.7	9'.5	11'.4	9'.4	57'.9
92° 03'.2	9'.5	02'.0	9'.4	
106° 31'.7	9'.7	15° 52'.6 S	9'.5	
121° 00'.4	9'.7	43'.1	9'.6	57'.8
135° 29'.1	9'.9	33'.5	9'.7	

SD 16'.2 16'.0 15'.8

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 24	Moonrise 25	Moonrise 26
N 72°	08:27	10:57	-	-	-	12:30
N 70°	08:07	09:55	-	-	-	11:33
68°	07:51	09:20	-	-	11:10	10:58
66°	07:38	08:55	10:35	10:10	10:27	10:33
64°	07:27	08:35	09:53	09:29	09:59	10:14
62°	07:17	08:19	09:25	09:01	09:36	09:58
60°	07:09	08:06	09:03	08:39	09:19	09:44
N 58°	07:01	07:54	08:46	08:21	09:04	09:33
56°	06:54	07:44	08:31	08:06	08:51	09:23
54°	06:48	07:35	08:18	07:53	08:39	09:14
52°	06:43	07:26	08:07	07:42	08:30	09:06
50°	06:37	07:19	07:57	07:32	08:21	08:59
45°	06:26	07:03	07:37	07:11	08:02	08:43
N 40°	06:15	06:49	07:20	06:54	07:46	08:30
35°	06:06	06:38	07:06	06:39	07:33	08:19
30°	05:57	06:27	06:53	06:27	07:22	08:10
20°	05:41	06:08	06:32	06:06	07:02	07:53
N 10°	05:24	05:51	06:14	05:47	06:45	07:39
0°	05:07	05:34	05:56	05:30	06:29	07:25
S 10°	04:48	05:15	05:39	05:12	06:13	07:12
20°	04:26	04:55	05:20	04:54	05:56	06:57
30°	03:57	04:30	04:58	04:32	05:36	06:41
35°	03:38	04:15	04:45	04:20	05:25	06:31
40°	03:15	03:57	04:29	04:06	05:12	06:20
45°	02:44	03:34	04:11	03:48	04:56	06:07
S 50°	01:59	03:04	03:49	03:27	04:37	05:51
52°	01:31	02:49	03:38	03:17	04:28	05:43
54°	00:44	02:31	03:26	03:06	04:17	05:35
56°	-	02:09	03:11	02:53	04:06	05:25
58°	-	01:39	02:55	02:38	03:52	05:14
S 60°	-	00:48	02:34	02:20	03:36	05:02
S 62°	-	-	02:08	01:59	03:17	04:47

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 24	Moonset 25	Moonset 26
N 72°	-	13:03	15:33	-	-	15:03
N 70°	-	14:05	15:53	-	-	15:59
68°	-	14:40	16:09	-	14:26	16:33
66°	13:25	15:05	16:22	13:23	15:08	16:57
64°	14:07	15:25	16:33	14:03	15:36	17:15
62°	14:35	15:41	16:43	14:31	15:58	17:30
60°	14:57	15:54	16:51	14:53	16:15	17:43
N 58°	15:14	16:06	16:59	15:10	16:30	17:54
56°	15:29	16:16	17:05	15:25	16:42	18:04
54°	15:41	16:25	17:12	15:38	16:53	18:12
52°	15:53	16:33	17:17	15:49	17:03	18:19
50°	16:02	16:41	17:22	15:59	17:11	18:26
45°	16:23	16:57	17:34	16:19	17:29	18:40
N 40°	16:40	17:11	17:45	16:36	17:44	18:52
35°	16:54	17:22	17:54	16:50	17:56	19:02
30°	17:06	17:33	18:03	17:03	18:07	19:11
20°	17:28	17:52	18:19	17:23	18:26	19:26
N 10°	17:46	18:09	18:35	17:42	18:42	19:39
0°	18:04	18:26	18:52	17:58	18:57	19:51
S 10°	18:21	18:44	19:11	18:15	19:11	20:03
20°	18:40	19:05	19:34	18:33	19:27	20:16
30°	19:02	19:30	20:03	18:54	19:45	20:30
35°	19:15	19:45	20:22	19:06	19:56	20:39
40°	19:30	20:03	20:45	19:19	20:08	20:48
45°	19:48	20:26	21:15	19:36	20:22	20:59
S 50°	20:11	20:55	22:01	19:55	20:39	21:12
52°	20:22	21:10	22:29	20:05	20:47	21:19
54°	20:34	21:28	23:15	20:15	20:55	21:25
56°	20:48	21:51	-	20:27	21:05	21:33
58°	21:05	22:20	-	20:41	21:17	21:42
S 60°	21:25	23:10	-	20:57	21:30	21:51
S 62°	21:52	-	-	21:17	21:45	22:02

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
24	0 51	0 36	11:59	11:44	24:14	29d 0%
25	0 21	0 06	12:00	12:43	00:14	1d 1%
26	0 09	0 24	12:00	13:38	01:11	2d 4%

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2011 December 27, 28, 29 (Tue, Wed, Thur)

GMT	ARIES	VENUS -4.0		MARS +0.3		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
27 Tuesday 00	95° 08'.2	144° 32'.6	20° 08'.2 S	284° 19'.4	7° 00'.6 N	66° 25'.7	10° 25'.4 N	248° 18'.3	8° 30'.2 S
01	110° 10'.6	159° 31'.9	07'.4	299° 21'.2	00'.4	81° 28'.1	25'.4	263° 20'.5	30'.2
02	125° 13'.1	174° 31'.2	06'.6	314° 23'.0	00'.2	96° 30'.6	25'.4	278° 22'.8	30'.3
03	140° 15'.6	189° 30'.5	05'.8	329° 24'.8	00'.0	111° 33'.0	25'.4	293° 25'.1	30'.3
04	155° 18'.0	204° 29'.8	05'.0	344° 26'.6	6° 59'.8 N	126° 35'.5	25'.4	308° 27'.4	30'.4
05	170° 20'.5	219° 29'.1	04'.2	359° 28'.4	59'.6	141° 38'.0	25'.5	323° 29'.7	30'.4
06	185° 23'.0	234° 28'.4	03'.4	14° 30'.1	59'.4	156° 40'.4	25'.5	338° 32'.0	30'.5
07	200° 25'.4	249° 27'.7	02'.6	29° 31'.9	59'.1	171° 42'.9	25'.5	353° 34'.3	30'.5
08	215° 27'.9	264° 27'.0	01'.8	44° 33'.7	58'.9	186° 45'.3	25'.5	8° 36'.6	30'.6
09	230° 30'.4	279° 26'.4	01'.0	59° 35'.5	58'.7	201° 47'.8	25'.5	23° 38'.9	30'.7
10	245° 32'.8	294° 25'.7	00'.2	74° 37'.3	58'.5	216° 50'.2	25'.5	38° 41'.2	30'.7
11	260° 35'.3	309° 25'.0	19° 59'.4 S	89° 39'.1	58'.3	231° 52'.7	25'.6	53° 43'.5	30'.8
12	275° 37'.7	324° 24'.3	19° 58'.5 S	104° 40'.9	6° 58'.1 N	246° 55'.2	10° 25'.6 N	68° 45'.8	8° 30'.8 S
13	290° 40'.2	339° 23'.6	57'.7	119° 42'.7	57'.9	261° 57'.6	25'.6	83° 48'.1	30'.9
14	305° 42'.7	354° 22'.9	56'.9	134° 44'.5	57'.7	277° 00'.1	25'.6	98° 50'.4	30'.9
15	320° 45'.1	9° 22'.2	56'.1	149° 46'.3	57'.4	292° 02'.5	25'.6	113° 52'.7	31'.0
16	335° 47'.6	24° 21'.5	55'.3	164° 48'.1	57'.2	307° 05'.0	25'.7	128° 55'.0	31'.0
17	350° 50'.1	39° 20'.8	54'.5	179° 49'.9	57'.0	322° 07'.4	25'.7	143° 57'.3	31'.1
18	5° 52'.5	54° 20'.1	53'.7	194° 51'.7	56'.8	337° 09'.9	25'.7	158° 59'.6	31'.1
19	20° 55'.0	69° 19'.5	52'.9	209° 53'.5	56'.6	352° 12'.3	25'.7	174° 01'.9	31'.2
20	35° 57'.5	84° 18'.8	52'.1	224° 55'.3	56'.4	7° 14'.8	25'.7	189° 04'.2	31'.2
21	50° 59'.9	99° 18'.1	51'.2	239° 57'.1	56'.2	22° 17'.2	25'.7	204° 06'.5	31'.3
22	66° 02'.4	114° 17'.4	50'.4	254° 58'.9	56'.0	37° 19'.7	25'.8	219° 08'.8	31'.3
23	81° 04'.9	129° 16'.7	49'.6	270° 00'.7	55'.8	52° 22'.2	25'.8	234° 11'.1	31'.4
28 Wednesday 00	96° 07'.3	144° 16'.0	19° 48'.8 S	285° 02'.5	6° 55'.6 N	67° 24'.6	10° 25'.8 N	249° 13'.4	8° 31'.4 S
01	111° 09'.8	159° 15'.3	48'.0	300° 04'.3	55'.4	82° 27'.1	25'.8	264° 15'.7	31'.5
02	126° 12'.2	174° 14'.7	47'.1	315° 06'.1	55'.1	97° 29'.5	25'.8	279° 18'.0	31'.5
03	141° 14'.7	189° 14'.0	46'.3	330° 07'.9	54'.9	112° 32'.0	25'.9	294° 20'.3	31'.6
04	156° 17'.2	204° 13'.3	45'.5	345° 09'.7	54'.7	127° 34'.4	25'.9	309° 22'.6	31'.6
05	171° 19'.6	219° 12'.6	44'.7	0° 11'.5	54'.5	142° 36'.9	25'.9	324° 24'.9	31'.7
06	186° 22'.1	234° 11'.9	43'.8	15° 13'.3	54'.3	157° 39'.3	25'.9	339° 27'.2	31'.8
07	201° 24'.6	249° 11'.2	43'.0	30° 15'.1	54'.1	172° 41'.8	25'.9	354° 29'.5	31'.8
08	216° 27'.0	264° 10'.6	42'.2	45° 17'.0	53'.9	187° 44'.2	25'.9	9° 31'.8	31'.9
09	231° 29'.5	279° 09'.9	41'.4	60° 18'.8	53'.7	202° 46'.7	26'.0	24° 34'.1	31'.9
10	246° 32'.0	294° 09'.2	40'.5	75° 20'.6	53'.5	217° 49'.1	26'.0	39° 36'.4	32'.0
11	261° 34'.4	309° 08'.5	39'.7	90° 22'.4	53'.3	232° 51'.5	26'.0	54° 38'.7	32'.0
12	276° 36'.9	324° 07'.9	19° 38'.9 S	105° 24'.2	6° 53'.1 N	247° 54'.0	10° 26'.0 N	69° 41'.0	8° 32'.1 S
13	291° 39'.4	339° 07'.2	38'.0	120° 26'.0	52'.9	262° 56'.4	26'.0	84° 43'.3	32'.1
14	306° 41'.8	354° 06'.5	37'.2	135° 27'.8	52'.7	277° 58'.9	26'.1	99° 45'.6	32'.2
15	321° 44'.3	9° 05'.8	36'.4	150° 29'.6	52'.5	293° 01'.3	26'.1	114° 47'.9	32'.2
16	336° 46'.7	24° 05'.2	35'.5	165° 31'.5	52'.3	308° 03'.8	26'.1	129° 50'.2	32'.3
17	351° 49'.2	39° 04'.5	34'.7	180° 33'.3	52'.1	323° 06'.2	26'.1	144° 52'.5	32'.3
18	6° 51'.7	54° 03'.8	33'.9	195° 35'.1	51'.9	338° 08'.7	26'.1	159° 54'.8	32'.4
19	21° 54'.1	69° 03'.1	33'.0	210° 36'.9	51'.7	353° 11'.1	26'.2	174° 57'.1	32'.4
20	36° 56'.6	84° 02'.5	32'.2	225° 38'.7	51'.5	8° 13'.6	26'.2	189° 59'.4	32'.5
21	51° 59'.1	99° 01'.8	31'.4	240° 40'.6	51'.3	23° 16'.0	26'.2	205° 01'.7	32'.5
22	67° 01'.5	114° 01'.1	30'.5	255° 42'.4	51'.1	38° 18'.5	26'.2	220° 04'.0	32'.6
23	82° 04'.0	129° 00'.5	29'.7	270° 44'.2	50'.9	53° 20'.9	26'.3	235° 06'.3	32'.6
29 Thursday 00	97° 06'.5	143° 59'.8	19° 28'.8 S	285° 46'.0	6° 50'.7 N	68° 23'.3	10° 26'.3 N	250° 08'.6	8° 32'.7 S
01	112° 08'.9	158° 59'.1	28'.0	300° 47'.8	50'.5	83° 25'.8	26'.3	265° 10'.9	32'.7
02	127° 11'.4	173° 58'.4	27'.2	315° 49'.7	50'.3	98° 28'.2	26'.3	280° 13'.2	32'.8
03	142° 13'.8	188° 57'.8	26'.3	330° 51'.5	50'.1	113° 30'.7	26'.3	295° 15'.5	32'.8
04	157° 16'.3	203° 57'.1	25'.5	345° 53'.3	49'.9	128° 33'.1	26'.4	310° 17'.8	32'.9
05	172° 18'.8	218° 56'.4	24'.6	0° 55'.1	49'.7	143° 35'.5	26'.4	325° 20'.1	32'.9
06	187° 21'.2	233° 55'.8	23'.8	15° 57'.0	49'.5	158° 38'.0	26'.4	340° 22'.4	33'.0
07	202° 23'.7	248° 55'.1	22'.9	30° 58'.8	49'.3	173° 40'.4	26'.4	355° 24'.7	33'.0
08	217° 26'.2	263° 54'.5	22'.1	46° 00'.6	49'.1	188° 42'.9	26'.5	10° 27'.0	33'.1
09	232° 28'.6	278° 53'.8	21'.2	61° 02'.4	48'.9	203° 45'.3	26'.5	25° 29'.3	33'.1
10	247° 31'.1	293° 53'.1	20'.4	76° 04'.3	48'.7	218° 47'.8	26'.5	40° 31'.6	33'.2
11	262° 33'.6	308° 52'.5	19'.5	91° 06'.1	48'.5	233° 50'.2	26'.5	55° 33'.9	33'.2
12	277° 36'.0	323° 51'.8	19° 18'.7 S	106° 07'.9	6° 48'.3 N	248° 52'.6	10° 26'.5 N	70° 36'.2	8° 33'.3 S
13	292° 38'.5	338° 51'.1	17'.8	121° 09'.8	48'.1	263° 55'.1	26'.6	85° 38'.5	33'.3
14	307° 41'.0	353° 50'.5	17'.0	136° 11'.6	47'.9	278° 57'.5	26'.6	100° 40'.8	33'.4
15	322° 43'.4	8° 49'.8	16'.1	151° 13'.4	47'.7	293° 59'.9	26'.6	115° 43'.1	33'.4
16	337° 45'.9	23° 49'.2	15'.3	166° 15'.3	47'.5	309° 02'.4	26'.6	130° 45'.4	33'.5
17	352° 48'.3	38° 48'.5	14'.4	181° 17'.1	47'.3	324° 04'.8	26'.7	145° 47'.7	33'.5
18	7° 50'.8	53° 47'.8	13'.5	196° 18'.9	47'.1	339° 07'.3	26'.7	160° 50'.0	33'.6
19	22° 53'.3	68° 47'.2	12'.7	211° 20'.8	46'.9	354° 09'.7	26'.7	175° 52'.3	33'.6
20	37° 55'.7	83° 46'.5	11'.8	226° 22'.6	46'.7	9° 12'.1	26'.7	190° 54'.7	33'.7
21	52° 58'.2	98° 45'.9	11'.0	241° 24'.5	46'.6	24° 14'.6	26'.8	205° 57'.0	33'.7
22	68° 00'.7	113° 45'.2	10'.1	256° 26'.3	46'.4	39° 17'.0	26'.8	220° 59'.3	33'.8
23	83° 03'.1	128° 44'.6	09'.2	271° 28'.1	46'.2	54° 19'.4	26'.8	236° 01'.6	33'.8
	M.P. 17:33	v -0'.7	d 0'.8	v 1'.8	d 0'.2	v 2'.4	d 0'.0	v 2'.3	d 0'.1

STARS

Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.6 S
Achernar	335° 27'.3	57° 10'.8 S
Acrux	173° 10'.5	63° 09'.7 S
Adhara	255° 12'.9	28° 59'.4 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.6	55° 53'.3 N
Alkaid	152° 59'.9	49° 14'.9 N
Alnair	27° 45'.3	46° 54'.2 S
Alnilam	275° 47'.1	1° 11'.8 S
Alphard	217° 56'.9	8° 42'.8 S
Alphecca	126° 12'.2	26° 40'.4 N
Alpheratz	357° 44'.6	29° 09'.7 N
Altair	62° 09'.6	8° 54'.1 N
Ankaa	353° 16'.7	42° 14'.6 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.0 N
Atria	107° 31'.1	69° 02'.7 S
Avior	234° 17'.9	59° 32'.9 S
Bellatrix	278° 32'.8	6° 21'.5 N
Betelgeuse	271° 02'.1	7° 24'.4 N
Canopus	263° 56'.0	52° 42'.2 S
Capella	280° 35'.5	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.7 N
Denebola	182° 34'.6	14° 30'.1 N
Diphda	348° 56'.9	17° 55'.3 S
Dubhe	193° 52'.7	61° 40'.8 N
Elnath	278° 13'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.3 N
Enif	33° 48'.3	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.1	57° 10'.6 S
Gienah	175° 53'.3	17° 36'.5 S
Hadar	148° 49'.7	60° 25'.6 S
Hamal	328° 01'.7	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.7	74° 06'.1 N
Markab	13° 39'.5	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 09'.0	36° 25'.6 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 41'.4	49° 54'.4 N
Nunki	76° 00'.0	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.8 S
Polaris	317° 59'.2	89° 19'.3 N
Pollux	243° 28'.6	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.7	12° 33'.1 N
Regulus	207° 44'.4	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.4 S
Rigil Kent	139° 53'.5	60° 52'.8 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.7	56° 36'.6 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.1 S
Spica	158° 32'.4	11° 13'.5 S
Suhail	222° 52'.9	43° 28'.9 S
Vega	80° 40'.1	38° 47'.8 N
Zuben'ubi	137° 06'.8	16° 05'.4 S

	SHA	Mer.Pass.
Venus	48° 08'.7	14:24
Mars	188° 55'.2	04:59
Jupiter	331° 17'.3	19:27
Saturn	153° 06'.1	07:22

SUN

GHA	Dec
179° 50'.2	23° 20'.8 S
194° 49'.9	20'.7
209° 49'.6	20'.6
224° 49'.3	20'.6
239° 49'.0	20'.5
254° 48'.7	20'.4
269° 48'.4	20'.3
284° 48'.1	20'.2
299° 47'.8	20'.1
314° 47'.4	20'.0
329° 47'.1	19'.9
344° 46'.8	19'.8
359° 46'.5	23° 19'.7 S
14° 46'.2	19'.6
29° 45'.9	19'.4
44° 45'.6	19'.3
59° 45'.3	19'.2
74° 45'.0	19'.1
89° 44'.7	19'.0
104° 44'.4	18'.9
119° 44'.0	18'.8
134° 43'.7	18'.7
149° 43'.4	18'.6
164° 43'.1	18'.5
179° 42'.8	23° 18'.4 S
194° 42'.5	18'.2
209° 42'.2	18'.1
224° 41'.9	18'.0
239° 41'.6	17'.9
254° 41'.3	17'.8
269° 41'.0	17'.7
284° 40'.7	17'.5
299° 40'.4	17'.4
314° 40'.1	17'.3
329° 39'.7	17'.2
344° 39'.4	17'.1
359° 39'.1	23° 16'.9 S
14° 38'.8	16'.8
29° 38'.5	16'.7
44° 38'.2	16'.6
59° 37'.9	16'.4
74° 37'.6	16'.3
89° 37'.3	16'.2
104° 37'.0	16'.1
119° 36'.7	15'.9
134° 36'.4	15'.8
149° 36'.1	15'.7
164° 35'.8	15'.5
179° 35'.5	23° 15'.4 S
194° 35'.1	15'.3
209° 34'.8	15'.1
224° 34'.5	15'.0
239° 34'.2	14'.9
254° 33'.9	14'.7
269° 33'.6	14'.6
284° 33'.3	14'.5
299° 33'.0	14'.3
314° 32'.7	14'.2
329° 32'.4	14'.0
344° 32'.1	13'.9
359° 31'.8	23° 13'.8 S
14° 31'.5	13'.6
29° 31'.2	13'.5
44° 30'.9	13'.3
59° 30'.6	13'.2
74° 30'.3	13'.0
89° 30'.0	12'.9
104° 29'.7	12'.7
119° 29'.4	12'.6
134° 29'.1	12'.4
149° 28'.8	12'.3
164° 28'.4	12'.1
SD 16'.3	d 0'.1

MOON

GHA	v	Dec	d	HP
149° 58'.0	9'.9	15° 23'.8 S	9'.7	57'.8
164° 26'.9	10'.0	14'.1	9'.8	57'.7
178° 55'.9	10'.1	04'.3	9'.9	
193° 25'.0	10'.2	14° 54'.4 S	10'.0	
207° 54'.2	10'.3	44'.4	10'.0	57'.6
222° 23'.5	10'.4	34'.4	10'.0	
236° 52'.9	10'.5	24'.4	10'.2	
251° 22'.4	10'.5	14'.2	10'.2	57'.5
265° 51'.9	10'.7	04'.0	10'.2	
280° 21'.6	10'.8	13° 53'.8 S	10'.3	
294° 51'.4	10'.8	43'.5	10'.4	57'.4
309° 21'.2	10'.9	33'.1	10'.5	
323° 51'.1	11'.0	13° 22'.6 S	10'.5	57'.4
338° 21'.1	11'.1	12'.1	10'.5	57'.3
352° 51'.2	11'.2	01'.6	10'.6	
7° 21'.4	11'.3	12° 51'.0 S	10'.6	
21° 51'.7	11'.4	40'.4	10'.8	57'.2
36° 22'.1	11'.4	29'.6	10'.7	
50° 52'.5	11'.5	18'.9	10'.8	
65° 23'.0	11'.7	08'.1	10'.8	57'.1
79° 53'.7	11'.7	11° 57'.3 S	10'.9	
94° 24'.4	11'.7	46'.4	11'.0	
108° 55'.1	11'.9	35'.4	11'.0	57'.0
123° 26'.0	11'.9	24'.4	11'.0	
137° 56'.9	12'.1	11° 13'.4 S	11'.0	57'.0
152° 28'.0	12'.1	02'.4	11'.1	56'.9
166° 59'.1	12'.1	10° 51'.3 S	11'.2	
181° 30'.2	12'.3	40'.1	11'.2	
196° 01'.5	12'.3	28'.9	11'.2	56'.8
210° 32'.8	12'.5	17'.7	11'.2	
225° 04'.3	12'.4	06'.5	11'.3	
239° 35'.7	12'.6	9° 55'.2 S	11'.3	56'.7
254° 07'.3	12'.6	43'.9	11'.4	
268° 38'.9	12'.7	32'.5	11'.3	
283° 10'.6	12'.8	21'.2	11'.5	56'.6
297° 42'.4	12'.9	09'.7	11'.4	
312° 14'.3	12'.9	8° 58'.3 S	11'.5	56'.6
326° 46'.2	13'.0	46'.8	11'.4	56'.5
341° 18'.2	13'.0	35'.4	11'.6	
355° 50'.2	13'.2	23'.8	11'.5	
10° 22'.4	13'.2	12'.3	11'.6	56'.4
24° 54'.6	13'.2	00'.7	11'.6	
39° 26'.8	13'.3	7° 49'.1 S	11'.6	
53° 59'.1	13'.4	37'.5	11'.6	56'.3
68° 31'.5	13'.5	25'.9	11'.6	
83° 04'.0	13'.5	14'.3	11'.7	
97° 36'.5	13'.6	02'.6	11'.7	56'.2
112° 09'.1	13'.6	6° 50'.9 S	11'.7	
126° 41'.7	13'.7	6° 39'.2 S	11'.7	56'.2
141° 14'.4	13'.7	27'.5	11'.7	56'.1
155° 47'.1	13'.9	15'.8	11'.8	
170° 20'.0	13'.8	04'.0	11'.7	
184° 52'.8	13'.9	5° 52'.3 S	11'.8	56'.0
199° 25'.7	14'.0	40'.5	11'.8	
213° 58'.7	14'.0	28'.7	11'.8	
228° 31'.7	14'.1	16'.9	11'.8	
243° 04'.8	14'.2	05'.1	11'.8	55'.9
257° 38'.0	14'.1	4° 53'.3 S	11'.8	
272° 11'.1	14'.3	41'.5	11'.8	
286° 44'.4	14'.3	29'.7	11'.8	55'.8
301° 17'.7	14'.3	4° 17'.9 S	11'.9	55'.8
315° 51'.0	14'.4	06'.0	11'.8	
330° 24'.4	14'.4	3° 54'.2 S	11'.9	55'.7
344° 57'.8	14'.5	42'.3	11'.8	
359° 31'.3	14'.5	30'.5	11'.8	
14° 04'.8	14'.5	18'.7	11'.9	
28° 38'.3	14'.6	06'.8	11'.8	55'.6
43° 11'.9	14'.6	2° 55'.0 S	11'.9	
57° 45'.5	14'.7	43'.1	11'.8	
72° 19'.2	14'.7	31'.3	11'.9	
86° 52'.9	14'.8	19'.4	11'.8	55'.5
101° 26'.7	14'.8	07'.6	11'.9	
SD 15'.6		15'.4		15'.2

Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 27	Moonrise 28	Moonrise 29
N 72°	08:27	10:53	-	11:36	11:10	10:51
N 70°	08:07	09:54	-	11:10	10:56	10:44
68°	07:51	09:20	-	10:51	10:45	10:39
66°	07:38	08:55	10:34	10:35	10:35	10:35
64°	07:27	08:35	09:53	10:22	10:27	10:31
62°	07:18	08:20	09:25	10:11	10:21	10:28
60°	07:09	08:06	09:04	10:02	10:15	10:25
N 58°	07:02	07:55	08:46	09:54	10:09	10:22
56°	06:55	07:44	08:32	09:46	10:05	10:20
54°	06:49	07:35	08:19	09:40	10:01	10:18
52°	06:44	07:27	08:08	09:34	09:57	10:16
50°	06:38	07:20	07:58	09:29	09:53	10:15
45°	06:27	07:04	07:38	09:17	09:46	10:11
N 40°	06:16	06:50	07:21	09:07	09:39	10:08
35°	06:07	06:39	07:07	08:59	09:34	10:05
30°	05:58	06:28	06:55	08:52	09:29	10:03
20°	05:42	06:09	06:33	08:39	09:21	09:59
N 10°	05:26	05:52	06:15	08:28	09:13	09:55
0°	05:09	05:35	05:58	08:18	09:06	09:51
S 10°	04:50	05:17	05:40	08:07	08:59	09:48
20°	04:28	04:57	05:21	07:56	08:52	09:44
30°	03:59	04:32	04:59	07:43	08:43	09:40
35°	03:40	04:17	04:46	07:36	08:38	09:38
40°	03:17	03:59	04:31	07:27	08:32	09:35
45°	02:47	03:36	04:13	07:17	08:26	09:32
S 50°	02:01	03:07	03:51	07:05	08:18	09:28
52°	01:34	02:52	03:40	07:00	08:14	09:26
54°	00:49	02:34	03:28	06:53	08:10	09:24
56°	-	02:12	03:14	06:46	08:06	09:22
58°	-	01:42	02:57	06:39	08:01	09:20
S 60°	-	00:54	02:37	06:30	07:55	09:17
S 62°	-	-	02:11	06:19	07:49	09:14

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 27	Moonset 28	Moonset 29
N 72°	-	13:10	15:36	17:44	19:49	21:41
N 70°	-	14:09	15:56	18:08	20:00	21:45
68°	-	14:43	16:12	18:26	20:10	21:47
66°	13:29	15:08	16:25	18:40	20:18	21:50
64°	14:10	15:27	16:36	18:52	20:24	21:52
62°	14:38	15:43	16:45	19:02	20:30	21:54
60°	14:59	15:57	16:54	19:10	20:35	21:55
N 58°	15:17	16:08	17:01	19:18	20:39	21:57
56°	15:31	16:19	17:08	19:24	20:43	21:58
54°	15:44	16:28	17:14	19:30	20:46	21:59
52°	15:55	16:36	17:19	19:35	20:49	22:00
50°	16:05	16:43	17:25	19:40	20:52	22:01
45°	16:25	16:59	17:36	19:50	20:58	22:03
N 40°	16:42	17:12	17:46	19:59	21:03	22:04
35°	16:56	17:24	17:56	20:06	21:07	22:06
30°	17:08	17:35	18:04	20:12	21:11	22:07
20°	17:29	17:53	18:21	20:23	21:17	22:09
N 10°	17:48	18:11	18:37	20:32	21:23	22:11
0°	18:05	18:28	18:54	20:41	21:28	22:12
S 10°	18:23	18:46	19:13	20:50	21:33	22:14
20°	18:41	19:06	19:35	20:59	21:39	22:16
30°	19:03	19:31	20:04	21:10	21:45	22:18
35°	19:16	19:46	20:23	21:16	21:49	22:19
40°	19:31	20:04	20:46	21:22	21:53	22:20
45°	19:49	20:26	21:16	21:30	21:57	22:22
S 50°	20:11	20:56	22:01	21:40	22:03	22:23
52°	20:22	21:11	22:28	21:44	22:05	22:24
54°	20:34	21:29	23:12	21:49	22:08	22:25
56°	20:49	21:50	-	21:54	22:11	22:26
58°	21:05	22:20	-	22:00	22:14	22:27
S 60°	21:25	23:07	-	22:07	22:18	22:28
S 62°	21:51	-	-	22:14	22:22	22:29

Day	SUN Eqn. of Time 00h	SUN Eqn. of Time 12h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age/ Vis
27	0 38	0 53	12:01	14:30	02:04	3d 9%
28	1 08	1 23	12:01	15:17	02:54	4d 16%
29	1 38	1 52	12:02	16:02	03:40	5d 25%

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2011 Dec 30, 31, Jan. 1 (Fri, Sat, Sun)

GMT	ARIES	VENUS -4.0		MARS +0.2		JUPITER -2.6		SATURN +0.8	
	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
30 00	98° 05'.6	143° 43'.9	19° 08'.4 S	286° 30'.0	6° 46'.0 N	69° 21'.9	10° 26'.8 N	251° 03'.9	8° 33'.9 S
01	113° 08'.1	158° 43'.3	07'.5	301° 31'.8	45'.8	84° 24'.3	26'.9	266° 06'.2	33'.9
02	128° 10'.5	173° 42'.6	06'.6	316° 33'.7	45'.6	99° 26'.7	26'.9	281° 08'.5	34'.0
03	143° 13'.0	188° 41'.9	05'.8	331° 35'.5	45'.4	114° 29'.2	26'.9	296° 10'.8	34'.0
04	158° 15'.5	203° 41'.3	04'.9	346° 37'.3	45'.2	129° 31'.6	26'.9	311° 13'.1	34'.1
Friday 05	173° 17'.9	218° 40'.6	04'.0	1° 39'.2	45'.0	144° 34'.0	27'.0	326° 15'.4	34'.1
06	188° 20'.4	233° 40'.0	03'.2	16° 41'.0	44'.8	159° 36'.5	27'.0	341° 17'.7	34'.2
07	203° 22'.8	248° 39'.3	02'.3	31° 42'.9	44'.6	174° 38'.9	27'.0	356° 20'.0	34'.2
08	218° 25'.3	263° 38'.7	01'.4	46° 44'.7	44'.5	189° 41'.3	27'.0	11° 22'.3	34'.3
09	233° 27'.8	278° 38'.0	00'.6	61° 46'.6	44'.3	204° 43'.8	27'.1	26° 24'.6	34'.3
10	248° 30'.2	293° 37'.4	18° 59'.7 S	76° 48'.4	44'.1	219° 46'.2	27'.1	41° 26'.9	34'.4
11	263° 32'.7	308° 36'.7	58'.8	91° 50'.3	43'.9	234° 48'.6	27'.1	56° 29'.2	34'.4
12	278° 35'.2	323° 36'.1	18° 57'.9 S	106° 52'.1	6° 43'.7 N	249° 51'.1	10° 27'.1 N	71° 31'.5	8° 34'.5 S
13	293° 37'.6	338° 35'.5	57'.1	121° 54'.0	43'.5	264° 53'.5	27'.2	86° 33'.8	34'.5
14	308° 40'.1	353° 34'.8	56'.2	136° 55'.8	43'.3	279° 55'.9	27'.2	101° 36'.2	34'.6
15	323° 42'.6	8° 34'.2	55'.3	151° 57'.7	43'.1	294° 58'.4	27'.2	116° 38'.5	34'.6
16	338° 45'.0	23° 33'.5	54'.4	166° 59'.5	43'.0	310° 00'.8	27'.2	131° 40'.8	34'.7
17	353° 47'.5	38° 32'.9	53'.5	182° 01'.4	42'.8	325° 03'.2	27'.3	146° 43'.1	34'.7
18	8° 49'.9	53° 32'.2	52'.7	197° 03'.2	42'.6	340° 05'.6	27'.3	161° 45'.4	34'.7
19	23° 52'.4	68° 31'.6	51'.8	212° 05'.1	42'.4	355° 08'.1	27'.3	176° 47'.7	34'.8
20	38° 54'.9	83° 30'.9	50'.9	227° 06'.9	42'.2	10° 10'.5	27'.3	191° 50'.0	34'.8
21	53° 57'.3	98° 30'.3	50'.0	242° 08'.8	42'.0	25° 12'.9	27'.4	206° 52'.3	34'.9
22	68° 59'.8	113° 29'.7	49'.1	257° 10'.7	41'.8	40° 15'.4	27'.4	221° 54'.6	34'.9
23	84° 02'.3	128° 29'.0	48'.2	272° 12'.5	41'.7	55° 17'.8	27'.4	236° 56'.9	35'.0
31 00	99° 04'.7	143° 28'.4	18° 47'.4 S	287° 14'.4	6° 41'.5 N	70° 20'.2	10° 27'.5 N	251° 59'.2	8° 35'.0 S
01	114° 07'.2	158° 27'.8	46'.5	302° 16'.2	41'.3	85° 22'.6	27'.5	267° 01'.5	35'.1
02	129° 09'.7	173° 27'.1	45'.6	317° 18'.1	41'.1	100° 25'.1	27'.5	282° 03'.9	35'.1
03	144° 12'.1	188° 26'.5	44'.7	332° 20'.0	40'.9	115° 27'.5	27'.5	297° 06'.2	35'.2
Saturday 04	159° 14'.6	203° 25'.8	43'.8	347° 21'.8	40'.7	130° 29'.9	27'.6	312° 08'.5	35'.2
05	174° 17'.1	218° 25'.2	42'.9	2° 23'.7	40'.6	145° 32'.3	27'.6	327° 10'.8	35'.3
06	189° 19'.5	233° 24'.6	42'.0	17° 25'.5	40'.4	160° 34'.8	27'.6	342° 13'.1	35'.3
07	204° 22'.0	248° 23'.9	41'.1	32° 27'.4	40'.2	175° 37'.2	27'.7	357° 15'.4	35'.4
08	219° 24'.4	263° 23'.3	40'.2	47° 29'.3	40'.0	190° 39'.6	27'.7	12° 17'.7	35'.4
09	234° 26'.9	278° 22'.7	39'.4	62° 31'.1	39'.8	205° 42'.0	27'.7	27° 20'.0	35'.5
10	249° 29'.4	293° 22'.0	38'.5	77° 33'.0	39'.7	220° 44'.5	27'.7	42° 22'.3	35'.5
11	264° 31'.8	308° 21'.4	37'.6	92° 34'.9	39'.5	235° 46'.9	27'.8	57° 24'.6	35'.6
12	279° 34'.3	323° 20'.8	18° 36'.7 S	107° 36'.7	6° 39'.3 N	250° 49'.3	10° 27'.8 N	72° 26'.9	8° 35'.6 S
13	294° 36'.8	338° 20'.1	35'.8	122° 38'.6	39'.1	265° 51'.7	27'.8	87° 29'.3	35'.7
14	309° 39'.2	353° 19'.5	34'.9	137° 40'.5	38'.9	280° 54'.1	27'.9	102° 31'.6	35'.7
15	324° 41'.7	8° 18'.9	34'.0	152° 42'.4	38'.8	295° 56'.6	27'.9	117° 33'.9	35'.7
16	339° 44'.2	23° 18'.2	33'.1	167° 44'.2	38'.6	310° 59'.0	27'.9	132° 36'.2	35'.8
17	354° 46'.6	38° 17'.6	32'.2	182° 46'.1	38'.4	326° 01'.4	27'.9	147° 38'.5	35'.8
18	9° 49'.1	53° 17'.0	31'.3	197° 48'.0	38'.2	341° 03'.8	28'.0	162° 40'.8	35'.9
19	24° 51'.6	68° 16'.4	30'.4	212° 49'.9	38'.1	356° 06'.2	28'.0	177° 43'.1	35'.9
20	39° 54'.0	83° 15'.7	29'.5	227° 51'.7	37'.9	11° 08'.7	28'.0	192° 45'.4	36'.0
21	54° 56'.5	98° 15'.1	28'.6	242° 53'.6	37'.7	26° 11'.1	28'.1	207° 47'.7	36'.0
22	69° 58'.9	113° 14'.5	27'.7	257° 55'.5	37'.5	41° 13'.5	28'.1	222° 50'.1	36'.1
23	85° 01'.4	128° 13'.9	26'.8	272° 57'.4	37'.4	56° 15'.9	28'.1	237° 52'.4	36'.1
1 00	100° 03'.9	143° 13'.2	18° 25'.8 S	287° 59'.2	6° 37'.2 N	71° 18'.3	10° 28'.2 N	252° 54'.7	8° 36'.2 S
01	115° 06'.3	158° 12'.6	24'.9	303° 01'.1	37'.0	86° 20'.8	28'.2	267° 57'.0	36'.2
02	130° 08'.8	173° 12'.0	24'.0	318° 03'.0	36'.8	101° 23'.2	28'.2	282° 59'.3	36'.3
03	145° 11'.3	188° 11'.4	23'.1	333° 04'.9	36'.7	116° 25'.6	28'.2	298° 01'.6	36'.3
Sunday 04	160° 13'.7	203° 10'.8	22'.2	348° 06'.8	36'.5	131° 28'.0	28'.3	313° 03'.9	36'.4
05	175° 16'.2	218° 10'.1	21'.3	3° 08'.6	36'.3	146° 30'.4	28'.3	328° 06'.2	36'.4
06	190° 18'.7	233° 09'.5	20'.4	18° 10'.5	36'.1	161° 32'.8	28'.3	343° 08'.6	36'.4
07	205° 21'.1	248° 08'.9	19'.5	33° 12'.4	36'.0	176° 35'.3	28'.4	358° 10'.9	36'.5
08	220° 23'.6	263° 08'.3	18'.6	48° 14'.3	35'.8	191° 37'.7	28'.4	13° 13'.2	36'.5
09	235° 26'.0	278° 07'.7	17'.6	63° 16'.2	35'.6	206° 40'.1	28'.4	28° 15'.5	36'.6
10	250° 28'.5	293° 07'.0	16'.7	78° 18'.1	35'.4	221° 42'.5	28'.5	43° 17'.8	36'.6
11	265° 31'.0	308° 06'.4	15'.8	93° 19'.9	35'.3	236° 44'.9	28'.5	58° 20'.1	36'.7
12	280° 33'.4	323° 05'.8	18° 14'.9 S	108° 21'.8	6° 35'.1 N	251° 47'.3	10° 28'.5 N	73° 22'.4	8° 36'.7 S
13	295° 35'.9	338° 05'.2	14'.0	123° 23'.7	34'.9	266° 49'.8	28'.6	88° 24'.8	36'.8
14	310° 38'.4	353° 04'.6	13'.1	138° 25'.6	34'.8	281° 52'.2	28'.6	103° 27'.1	36'.8
15	325° 40'.8	8° 04'.0	12'.1	153° 27'.5	34'.6	296° 54'.6	28'.6	118° 29'.4	36'.9
16	340° 43'.3	23° 03'.3	11'.2	168° 29'.4	34'.4	311° 57'.0	28'.7	133° 31'.7	36'.9
17	355° 45'.8	38° 02'.7	10'.3	183° 31'.3	34'.3	326° 59'.4	28'.7	148° 34'.0	36'.9
18	10° 48'.2	53° 02'.1	09'.4	198° 33'.2	34'.1	342° 01'.8	28'.7	163° 36'.3	37'.0
19	25° 50'.7	68° 01'.5	08'.5	213° 35'.1	33'.9	357° 04'.2	28'.8	178° 38'.6	37'.0
20	40° 53'.2	83° 00'.9	07'.5	228° 37'.0	33'.7	12° 06'.6	28'.8	193° 41'.0	37'.1
21	55° 55'.6	98° 00'.3	06'.6	243° 38'.9	33'.6	27° 09'.1	28'.8	208° 43'.3	37'.1
22	70° 58'.1	112° 59'.7	05'.7	258° 40'.8	33'.4	42° 11'.5	28'.9	223° 45'.6	37'.2
23	86° 00'.5	127° 59'.1	04'.8	273° 42'.7	33'.2	57° 13'.9	28'.9	238° 47'.9	37'.2
	M.P. 17:21	v -0'.6	d 0'.9	v 1'.9	d 0'.2	v 2'.4	d 0'.0	v 2'.3	d 0'.0

STARS		
Name	SHA	Dec
Acamar	315° 18'.8	40° 15'.6 S
Achernar	335° 27'.3	57° 10'.8 S
Acrux	173° 10'.5	63° 09'.7 S
Adhara	255° 12'.9	28° 59'.4 S
Aldebaran	290° 50'.2	16° 32'.0 N
Alioth	166° 21'.6	55° 53'.3 N
Alkaid	152° 59'.8	49° 14'.9 N
Alnair	27° 45'.3	46° 54'.2 S
Alnilam	275° 47'.1	1° 11'.8 S
Alphard	217° 56'.8	8° 42'.8 S
Alphecca	126° 12'.1	26° 40'.3 N
Alpheratz	357° 44'.6	29° 09'.7 N
Altair	62° 09'.6	8° 54'.1 N
Ankaa	353° 16'.7	42° 14'.6 S
Antares	112° 27'.8	26° 27'.4 S
Arcturus	145° 56'.8	19° 07'.0 N
Atria	107° 31'.1	69° 02'.7 S
Avior	234° 17'.8	59° 32'.9 S
Bellatrix	278° 32'.8	6° 21'.5 N
Betelgeuse	271° 02'.1	7° 24'.4 N
Canopus	263° 56'.0	52° 42'.2 S
Capella	280° 35'.5	46° 00'.6 N
Deneb	49° 32'.6	45° 19'.6 N
Denebola	182° 34'.6	14° 30'.1 N
Diphda	348° 56'.9	17° 55'.3 S
Dubhe	193° 52'.6	61° 40'.8 N
Elnath	278° 13'.5	28° 37'.0 N
Eltanin	90° 47'.2	51° 29'.3 N
Enif	33° 48'.4	9° 56'.0 N
Fomalhaut	15° 25'.2	29° 33'.6 S
Gacrux	172° 02'.1	57° 10'.6 S
Gienah	175° 53'.3	17° 36'.5 S
Hadar	148° 49'.6	60° 25'.6 S
Hamal	328° 01'.8	23° 31'.3 N
Kaus Aust.	83° 45'.6	34° 22'.6 S
Kochab	137° 20'.6	74° 06'.1 N
Markab	13° 39'.5	15° 16'.4 N
Menkar	314° 15'.9	4° 08'.2 N
Menkent	148° 08'.9	36° 25'.6 S
Miaplacidus	221° 39'.2	69° 45'.9 S
Mirfak	308° 41'.5	49° 54'.4 N
Nunki	75° 59'.9	26° 16'.8 S
Peacock	53° 21'.4	56° 41'.8 S
Polaris	318° 00'.3	89° 19'.3 N
Pollux	243° 28'.6	27° 59'.6 N
Procyon	245° 00'.5	5° 11'.5 N
Rasalhague	96° 07'.7	12° 33'.1 N
Regulus	207° 44'.4	11° 54'.3 N
Rigel	281° 12'.7	8° 11'.4 S
Rigil Kent	139° 53'.5	60° 52'.8 S
Sabik	102° 14'.0	15° 44'.3 S
Schedar	349° 41'.7	56° 36'.6 N
Shaula	96° 23'.7	37° 06'.6 S
Sirius	258° 34'.3	16° 44'.1 S
Spica	158° 32'.4	11° 13'.5 S
Suhail	222° 52'.8	43° 28'.9 S
Vega	80° 40'.1	38° 47'.8 N
Zuben'ubi	137° 06'.7	16° 05'.5 S

	SHA	Mer.Pass.
Venus	44° 23'.7	14:27
Mars	188° 09'.6	04:50
Jupiter	331° 15'.5	19:16
Saturn	152° 54'.5	07:11

SUN						
GHA		Dec				
179° 28'.1	23° 12'.0 S	116° 00'.5	14'.8	1° 55'.7 S	11'.8	55'.5
194° 27'.8	11'.8	130° 34'.3	14'.9	43'.9	11'.8	55'.4
209° 27'.5	11'.7	145° 08'.2	14'.9	32'.1	11'.8	
224° 27'.2	11'.5	159° 42'.1	14'.9	20'.3	11'.9	
239° 26'.9	11'.4	174° 16'.0	15'.0	08'.4	11'.8	
254° 26'.6	11'.2	188° 50'.0	14'.9	0° 56'.6 S	11'.8	55'.3
269° 26'.3	11'.1	203° 23'.9	15'.1	44'.8	11'.8	
284° 26'.0	10'.9	217° 58'.0	15'.0	33'.0	11'.7	
299° 25'.7	10'.8	232° 32'.0	15'.1	21'.3	11'.8	
314° 25'.4	10'.6	247° 06'.1	15'.1	09'.5	11'.8	55'.2
329° 25'.1	10'.4	261° 40'.2	15'.1	0° 02'.3 N	11'.7	
344° 24'.8	10'.3	276° 14'.3	15'.2	14'.0	11'.8	
359° 24'.5	23° 10'.1 S	290° 48'.5	15'.2	0° 25'.8 N	11'.7	55'.2
14° 24'.2	10'.0	305° 22'.7	15'.2	37'.5	11'.7	55'.1
29° 23'.9	09'.8	319° 56'.9	15'.2	49'.2	11'.7	
44° 23'.6	09'.6	334° 31'.1	15'.3	1° 00'.9 N	11'.7	
59° 23'.3	09'.5	349° 05'.4	15'.2	12'.6	11'.7	
74° 23'.0	09'.3	3° 39'.6	15'.3	24'.3	11'.6	
89° 22'.7	09'.1	18° 13'.9	15'.3	35'.9	11'.7	55'.0
104° 22'.4	09'.0	32° 48'.2	15'.4	47'.6	11'.6	
119° 22'.1	08'.8	47° 22'.6	15'.3	59'.2	11'.6	
134° 21'.8	08'.6	61° 56'.9	15'.4	2° 10'.8 N	11'.6	
149° 21'.5	08'.5	76° 31'.3	15'.3	22'.4	11'.6	54'.9
164° 21'.2	08'.3	91° 05'.6	15'.4	34'.0	11'.5	
179° 20'.9	23° 08'.1 S	105° 40'.0	15'.4	2° 45'.5 N	11'.5	54'.9
194° 20'.6	07'.9	120° 14'.4	15'.4	57'.0	11'.5	
209° 20'.3	07'.8	134° 48'.8	15'.5	3° 08'.5 N	11'.5	
224° 20'.0	07'.6	149° 23'.3	15'.4	20'.0	11'.5	54'.8
239° 19'.7	07'.4	163° 57'.7	15'.5	31'.5	11'.4	
254° 19'.4	07'.2	178° 32'.2	15'.4	42'.9	11'.4	
269° 19'.1	07'.1	193° 06'.6	15'.5	54'.3	11'.4	
284° 18'.8	06'.9	207° 41'.1	15'.4	4° 05'.7 N	11'.4	
299° 18'.5	06'.7	222° 15'.5	15'.5	17'.1	11'.3	54'.7
314° 18'.2	06'.5	236° 50'.0	15'.5	28'.4	11'.4	
329° 17'.9	06'.4	251° 24'.5	15'.5	39'.8	11'.3	
344° 17'.6	06'.2	265° 59'.0	15'.4	51'.1	11'.2	
359° 17'.3	23° 06'.0 S	280° 33'.4	15'.5	5° 02'.3 N	11'.3	54'.7
14° 17'.0	05'.8	295° 07'.9	15'.5	13'.6	11'.2	
29° 16'.7	05'.6	309° 42'.4	15'.5	24'.8	11'.2	54'.6
44° 16'.4	05'.5	324° 16'.9	15'.5	36'.0	11'.1	
59° 16'.1	05'.3	338° 51'.4	15'.5	47'.1	11'.1	
74° 15'.8	05'.1	353° 25'.9	15'.5	58'.2	11'.1	
89° 15'.5	04'.9	8° 00'.4	15'.4	6° 09'.3 N	11'.1	
104° 15'.2	04'.7	22° 34'.8	15'.5	20'.4	11'.0	
119° 14'.9	04'.5	37° 09'.3	15'.5	31'.4	11'.0	
134° 14'.6	04'.3	51° 43'.8	15'.4	42'.4	11'.0	54'.5
149° 14'.3	04'.2	66° 18'.2	15'.5	53'.4	10'.9	
164° 14'.0	04'.0	80° 52'.7	15'.5	7° 04'.3 N	10'.9	
179° 13'.7	23° 03'.8 S	95° 27'.2	15'.4	7° 15'.2 N	10'.9	54'.5
194° 13'.4	03'.6	110° 01'.6	15'.4	26'.1	10'.8	
209° 13'.1	03'.4	124° 36'.0	15'.5	36'.9	10'.8	
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239° 12'.5	03'.0	153° 44'.9	15'.4	58'.5	10'.7	54'.4
254° 12'.2	02'.8	168° 19'.3	15'.3	8° 09'.2 N	10'.7	
269° 11'.9	02'.6	182° 53'.6	15'.4	19'.9	10'.7	
284° 11'.6	02'.4	197° 28'.0	15'.4	30'.6	10'.6	
299° 11'.3	02'.2	212° 02'.4	15'.3	41'.2	10'.5	
314° 11'.0	02'.0	226° 36'.7	15'.3	51'.7	10'.6	
329° 10'.8	01'.8	241° 11'.0	15'.4	9° 02'.3 N	10'.5	
344° 10'.5	01'.6	255° 45'.4	15'.2	12'.8	10'.4	
359° 10'.2	23° 01'.4 S	270° 19'.6	15'.3	9° 23'.2 N	10'.4	54'.4
14° 09'.9	01'.2	284° 53'.9	15'.3	33'.6	10'.4	54'.3
29° 09'.6	01'.0	299° 28'.2	15'.2	44'.0	10'.3	
44° 09'.3	00'.8	314° 02'.4	15'.2	54'.3	10'.3	
59° 09'.0	00'.6	328° 36'.6	15'.2	10° 04'.6 N	10'.3	
74° 08'.7	00'.4	343° 10'.8	15'.2	14'.9	10'.2	
89° 08'.4	00'.2	357° 45'.0	15'.1	25'.1	10'.1	
104° 08'.1	00'.0	12° 19'.1	15'.2	35'.2	10'.2	
119° 07'.8	22° 59'.8 S	26° 53'.3	15'.1	45'.4	10'.0	
134° 07'.5	59'.6	41° 27'.4	15'.0	55'.4	10'.0	
149° 07'.2	59'.4	56° 01'.4	15'.1	11° 05'.4 N	10'.0	
164° 06'.9	59'.2	70° 35'.5	15'.0	15'.4	9'.9	
SD 16'.3	d 0'.2	SD	15'.0	14'.9	14'.8	

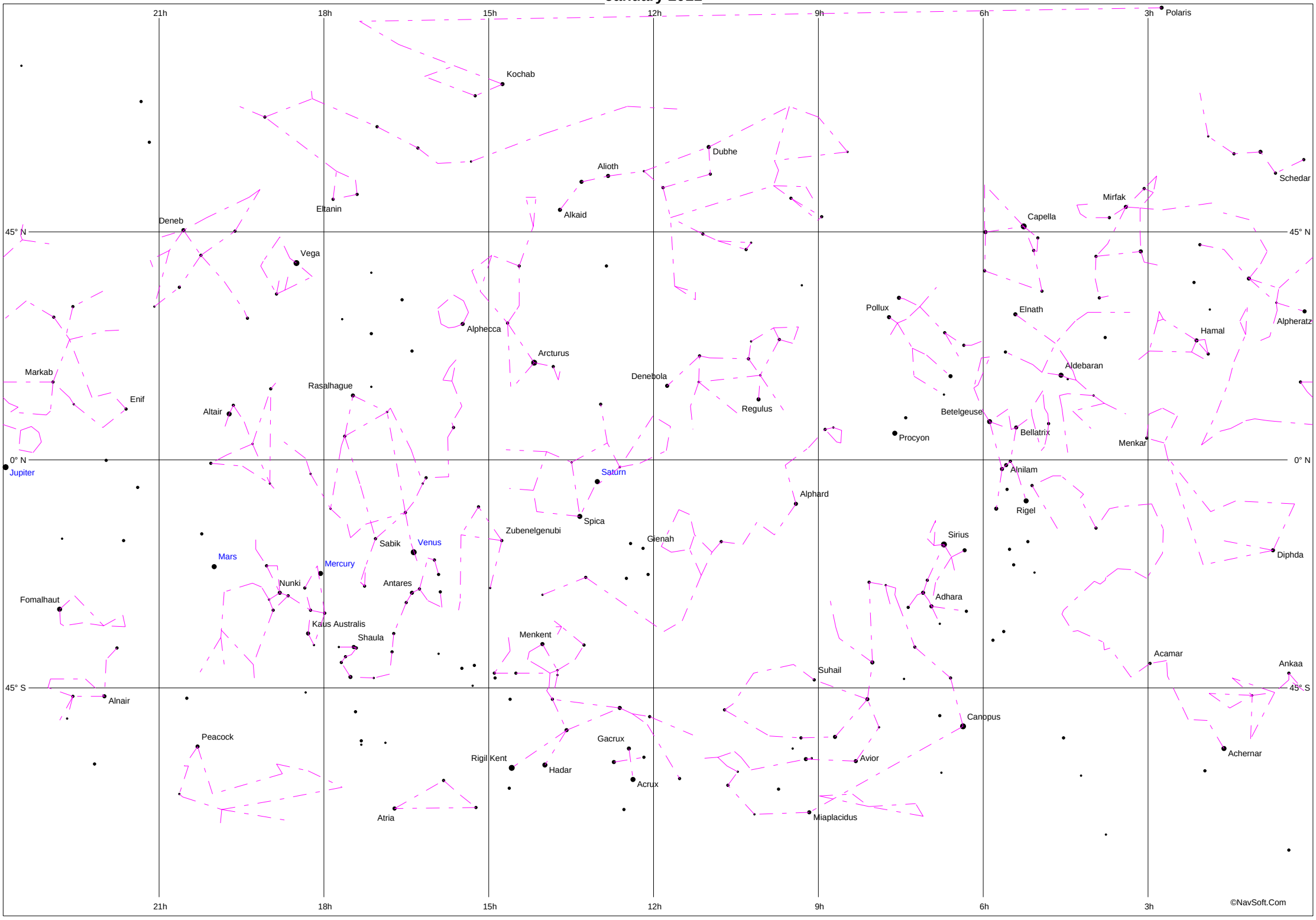
Lat	Twilight Nautical	Twilight Civil	Sunrise	Moonrise 30	Moonrise 31	Moonrise 1
N 72°	08:25	10:47	-	10:34	10:17	09:59
N 70°	08:06	09:51	-	10:34	10:24	10:13
68°	07:50	09:18	-	10:34	10:29	10:24
66°	07:38	08:54	10:30	10:34	10:33	10:33
64°	07:27	08:35	09:51	10:34	10:37	10:40
62°	07:18	08:19	09:24	10:34	10:40	10:47
60°	07:09	08:06	09:03	10:34	10:43	10:52
N 58°	07:02	07:55	08:46	10:34	10:45	10:58
56°	06:56	07:44	08:32	10:34	10:48	11:02
54°	06:50	07:36	08:19	10:34	10:50	11:06
52°	06:44	07:28	08:08	10:34	10:52	11:10
50°	06:39	07:20	07:59	10:34	10:53	11:13
45°	06:27	07:04	07:38	10:34	10:57	11:21
N 40°	06:17	06:51	07:22	10:34	11:00	11:27
35°	06:08	06:40	07:08	10:34	11:03	11:32
30°	05:59	06:29	06:55	10:34	11:05	11:37
20°	05:43	06:11	06:35	10:35	11:10	11:45
N 10°	05:27	05:54	06:16	10:35	11:13	11:52
0°	05:10	05:37	05:59	10:35	11:17	11:59
S 10°	04:52	05:19	05:42	10:35	11:21	12:06
20°	04:29	04:59	05:23	10:35	11:24	12:13
30°	04:01	04:34	05:01	10:35	11:29	12:22
35°	03:42	04:19	04:48	10:35	11:31	12:27
40°	03:19	04:01	04:34	10:35	11:34	12:32
45°	02:49	03:39	04:16	10:36	11:38	12:39
S 50°	02:05	03:09	03:54	10:36	11:42	12:47
52°	01:38	02:55	03:43	10:36	11:44	12:50
54°	00:56	02:37	03:31	10:36	11:46	12:54
56°	-	02:16	03:17	10:36	11:48	12:59
58°	-	01:47	03:01	10:36	11:50	13:04
S 60°	-	01:01	02:41	10:36	11:53	13:10
S 62°	-	-	02:15	10:36	11:57	13:16

Lat	Sunset	Twilight Civil	Twilight Nautical	Moonset 30	Moonset 31	Moonset 1
N 72°	-	13:19	15:41	23:28	-	01:14
N 70°	-	14:15	16:00	23:24	-	01:03
68°	-	14:48	16:16	23:21	-	00:54
66°	13:36	15:12	16:28	23:19	-	00:46
64°	14:15	15:31	16:39	23:17	-	00:40
62°	14:42	15:47	16:48	23:15	-	00:35
60°	15:03	16:00	16:56	23:13	-	00:30
N 58°	15:20	16:11	17:04	23:12	-	00:26
56°	15:34	16:21	17:10	23:11	-	00:22
54°	15:47	16:30	17:16	23:10	-	00:19
52°	15:58	16:38	17:22	23:09	-	00:16
50°	16:07	16:46	17:27	23:08	-	00:13
45°	16:28	17:01	17:38	23:06	-	00:07
N 40°	16:44	17:15	17:49	23:04	-	00:02
35°	16:58	17:26	17:58	23:02	23:58	24:53
30°	17:10	17:37	18:06	23:01	23:54	24:47
20°	17:31	17:55	18:23	22:59	23:48	24:37
N 10°	17:49	18:12	18:38	22:57	23:42	24:28
0°	18:07	18:29	18:55	22:55	23:37	24:20
S 10°	18:24	18:47	19:14	22:53	23:32	24:11
20°	18:43	19:07	19:36	22:51	23:26	24:02
30°	19:04	19:32	20:05	22:49	23:20	23:52
35°	19:17	19:47	20:23	22:48	23:16	23:46
40°	19:32	20:05	20:46	22:46	23:12	23:39
45°	19:50	20:27	21:16	22:45	23:08	23:32
S 50°	20:12	20:56	22:00	22:43	23:02	23:22
52°	20:22	21:10	22:26	22:42	22:59	23:18
54°	20:34	21:28	23:07	22:41	22:56	23:14
56°	20:48	21:49	-	22:39	22:53	23:08
58°	21:04	22:18	-	22:38	22:50	23:03
S 60°	21:24	23:02	-	22:37	22:46	22:56
S 62°	21:49	-	-	22:35	22:42	22:49

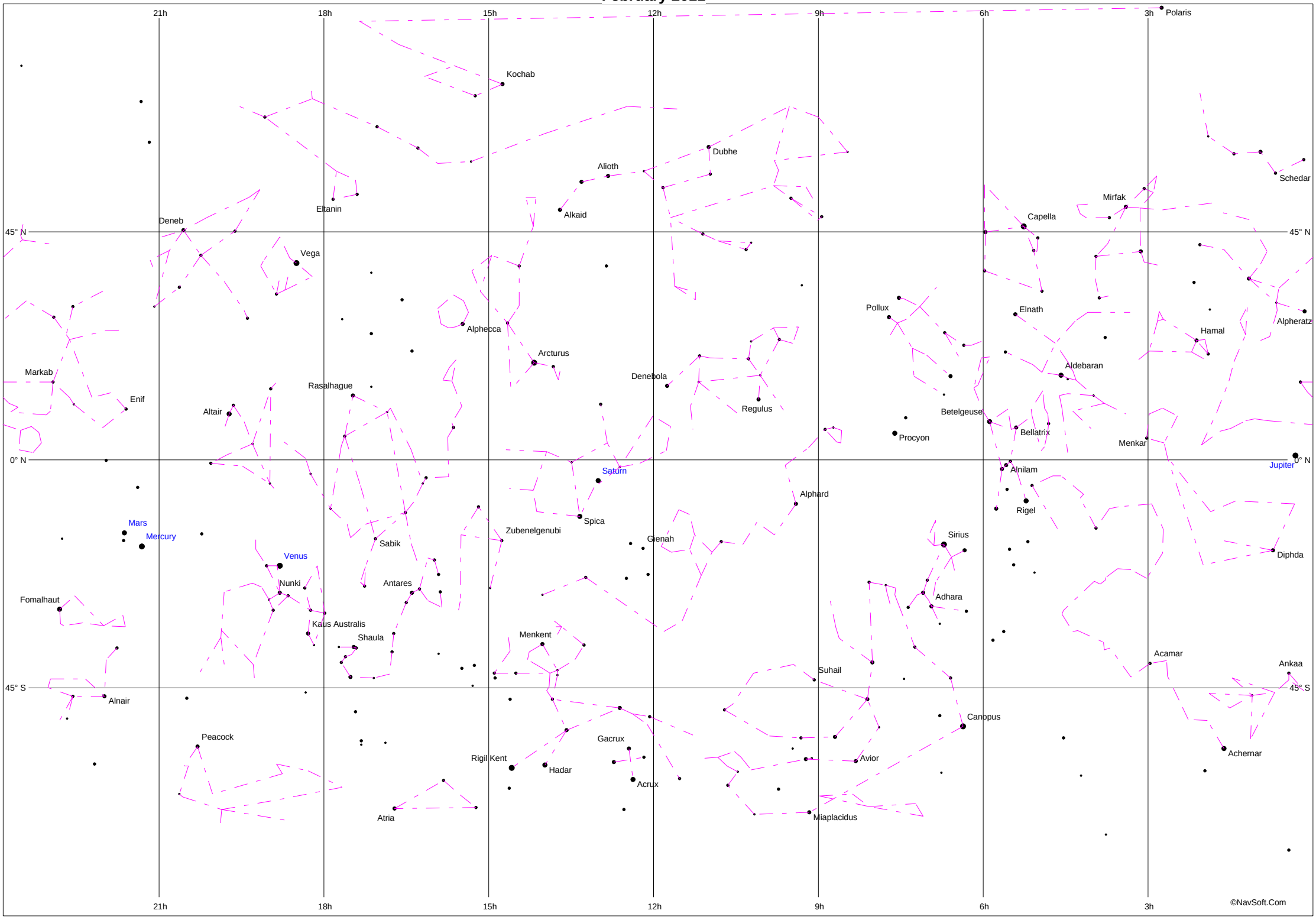
	SUN Eqn. of Time		SUN Mer.	MOON Mer. Pass.		MOON
Day	00h	12h	Pass.	Upper	Lower	Age/ Vis
30	2 07	2 21	12:02	16:45	04:24	6d 33%
31	2 36	2 50	12:03	17:27	05:06	7d 43%
1	3 05	3 19	12:03	18:09	05:48	8d 52%

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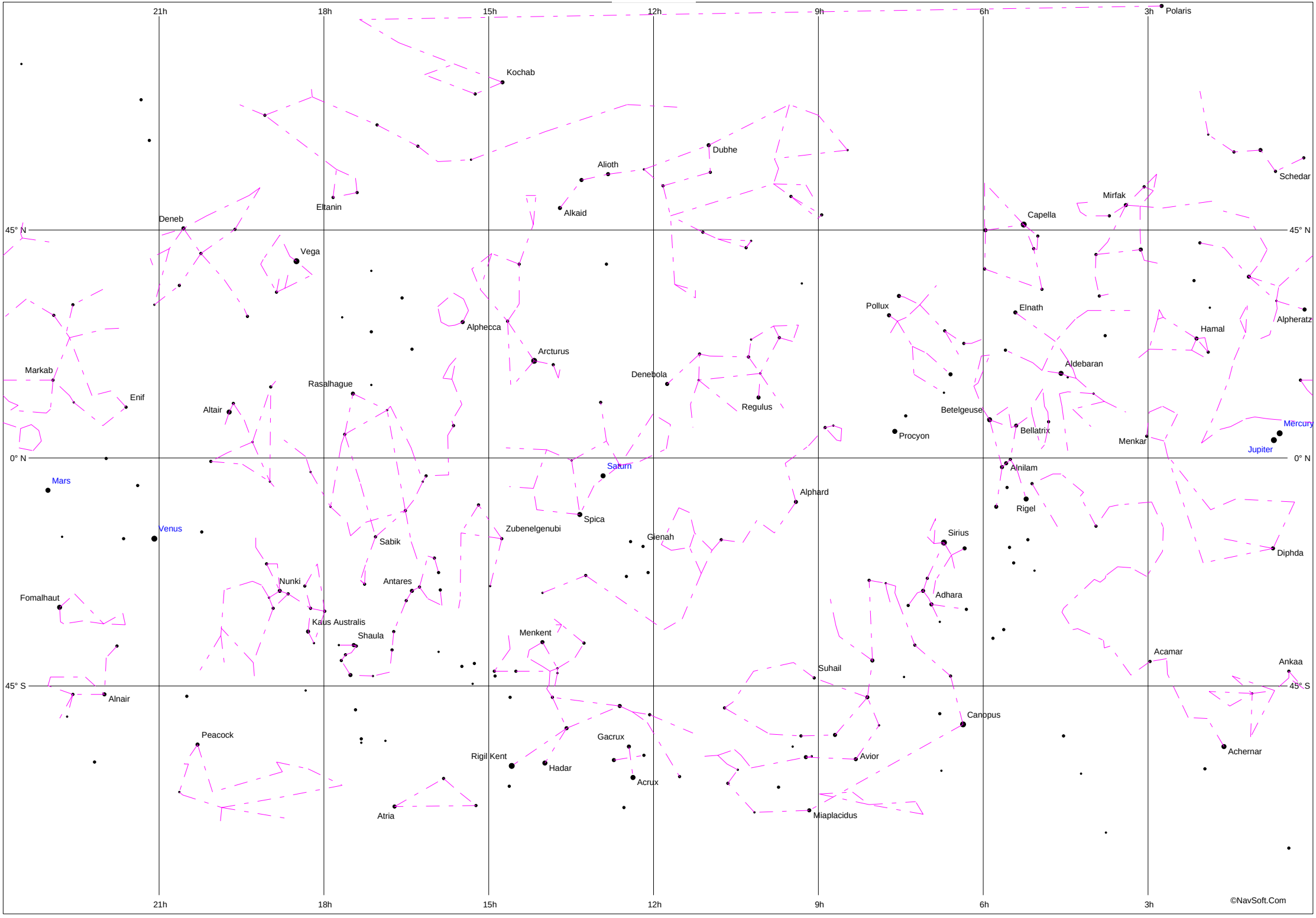
January 2011



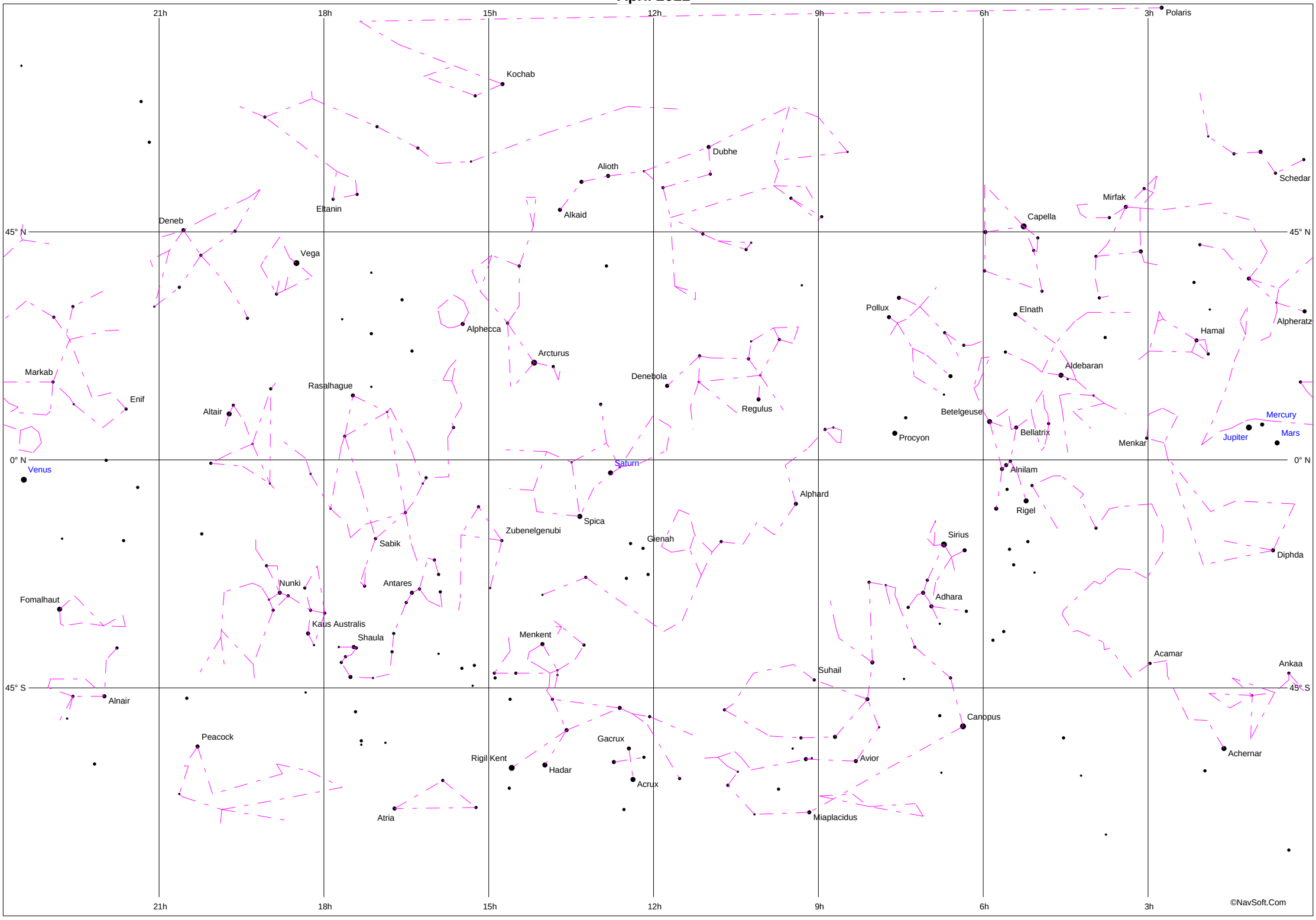
February 2011



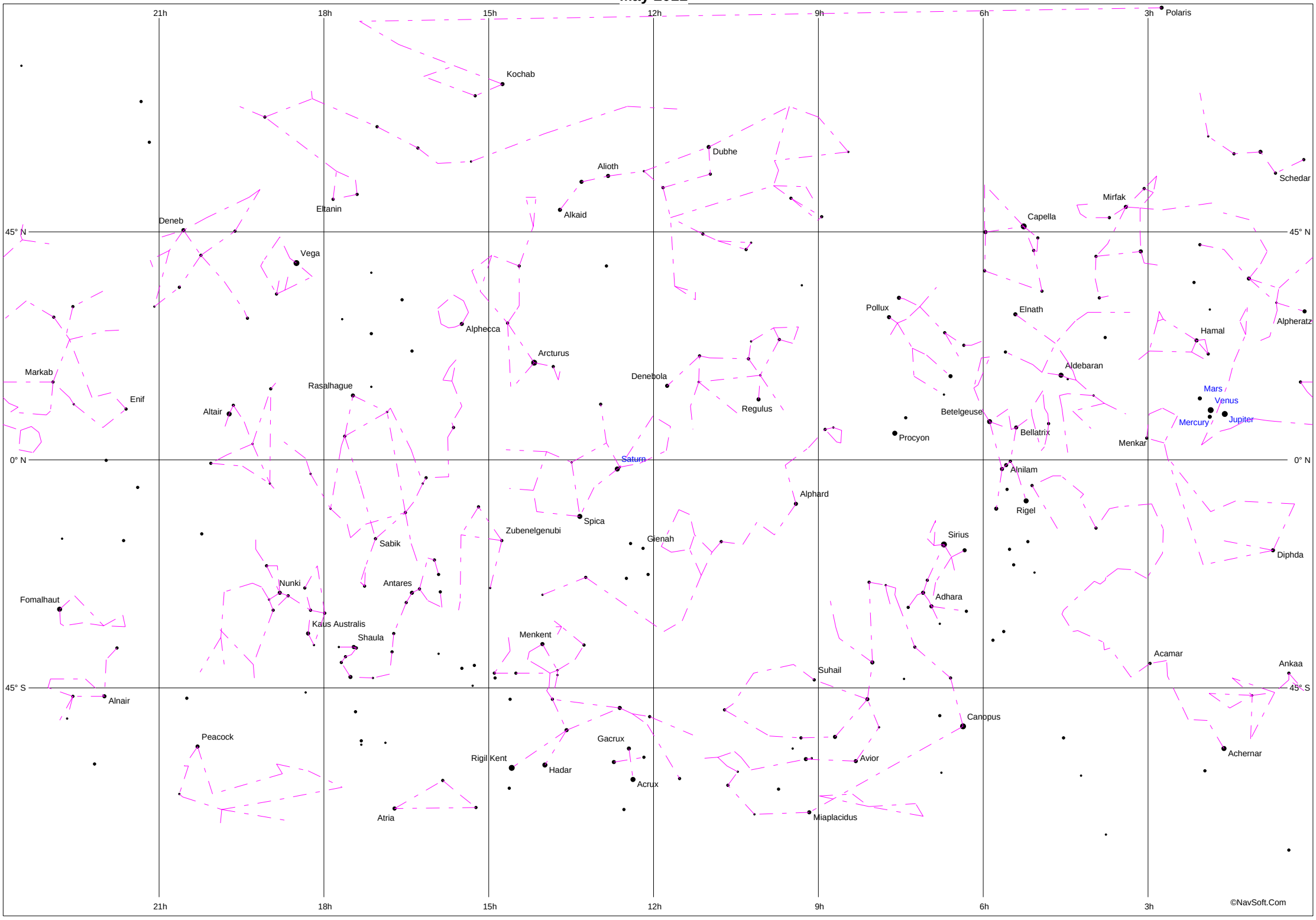
March 2011


21h
18h
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9h
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3h
Polaris
Kochab
Dubhe
Alioth
Schedar
Mirfak
Eltanin
Alkaid
Capella
Deneb
45° N
45° N
Vega
Pollux
Elnath
Alpheratz
Alphecca
Hamal
Arcturus
Aldebaran
Markab
Denebola
Rasalhague
Enif
Altair
Regulus
Betelgeuse
Bellatrix
Procyon
Mercury
Menkar
Jupiter
0° N
0° N
Alnilam
Saturn
Mars
Alphard
Rigel
Spica
Venus
Zubenelgenubi
Sirius
Sabik
Gienah
Diphda
Nunki
Antares
Adhara
Fomalhaut
Kaus Australis
Shaula
Menkent
Acamar
Ankaa
Suhail
45° S
45° S
Alnair
Canopus
Peacock
Gacrux
Achernar
Rigil Kent
Hadar
Avior
Acrux
Atria
Miaplacidus
©NavSoft.Com

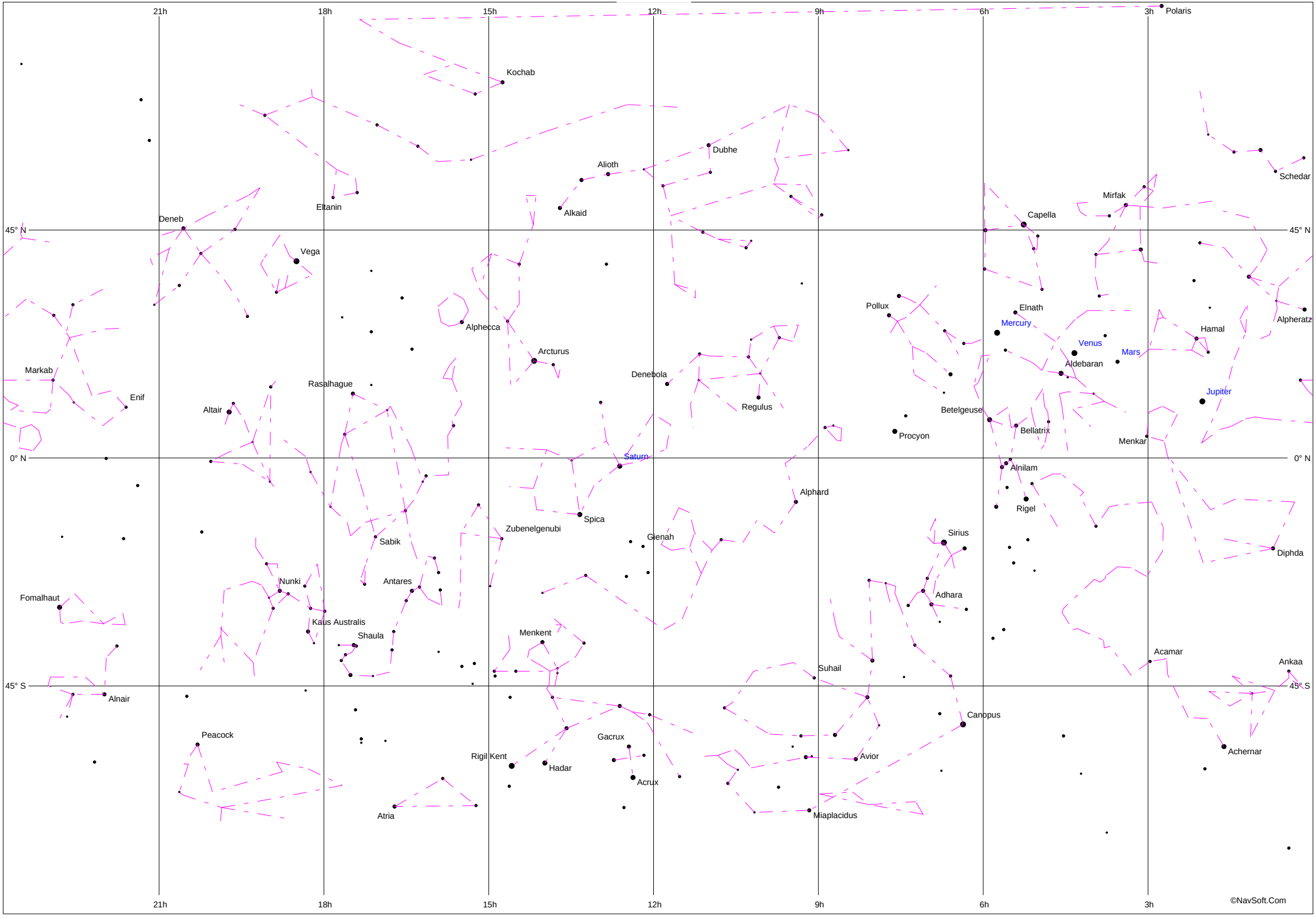
April 2011


21h
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3h
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Kochab
Dubhe
Alioth
Schedar
Mirfak
Eltanin
Alkaid
Capella
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Alpheratz
Alphecca
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Markab
Aldebaran
Denebola
Rasalhague
Enif
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Betelgeuse
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Zubenelgenubi
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Adhara
Fomalhaut
Kaus Australis
Shaula
Menkent
Acamar
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Peacock
Gacrux
Achernar
Rigil Kent
Avior
Hadar
Acrux
Atria
Miaplacidus
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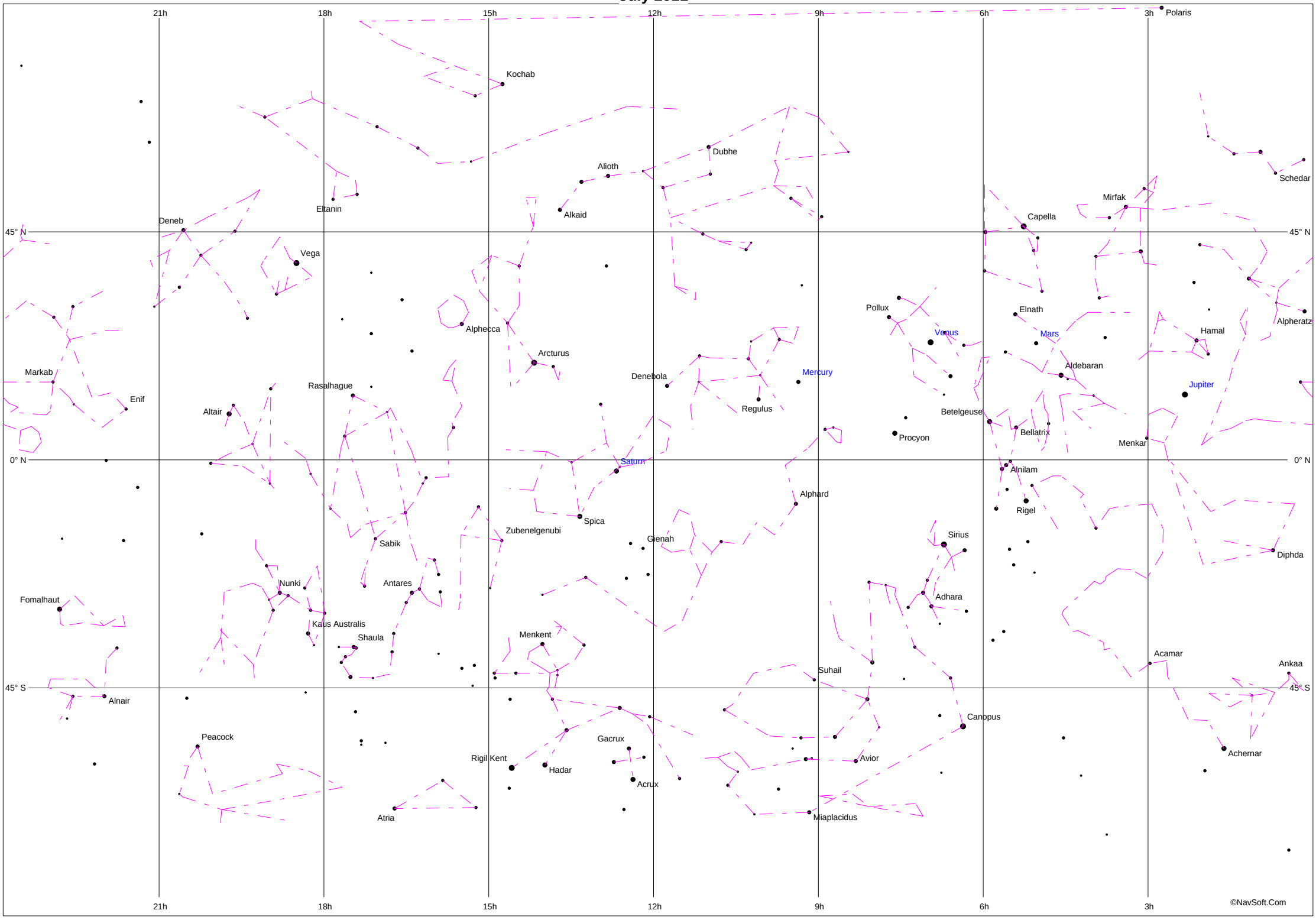
May 2011


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Fomalhaut
Kaus Australis
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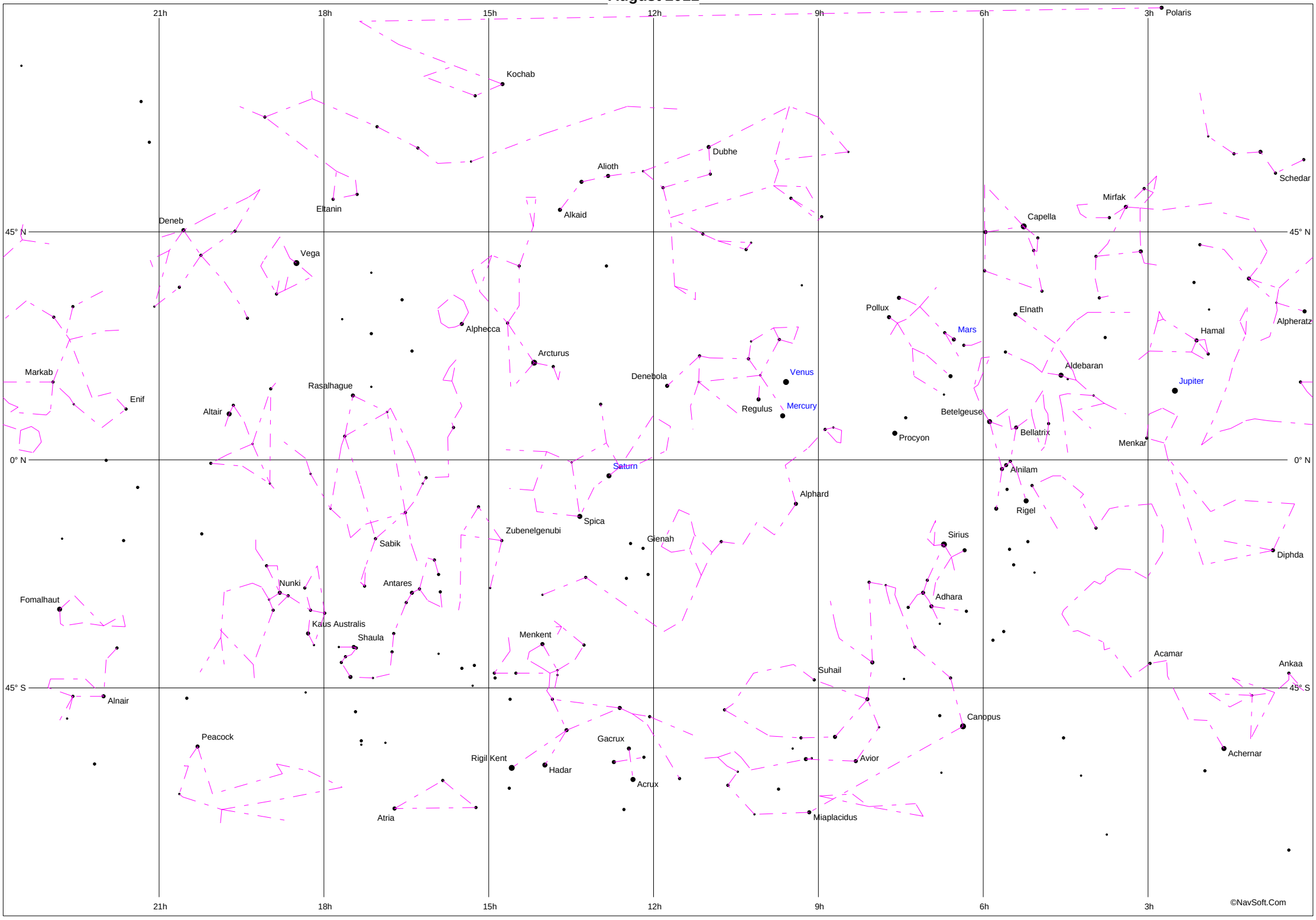
June 2011


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Kochab
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Venus
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Regulus
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Kaus Australis
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Miaplacidus
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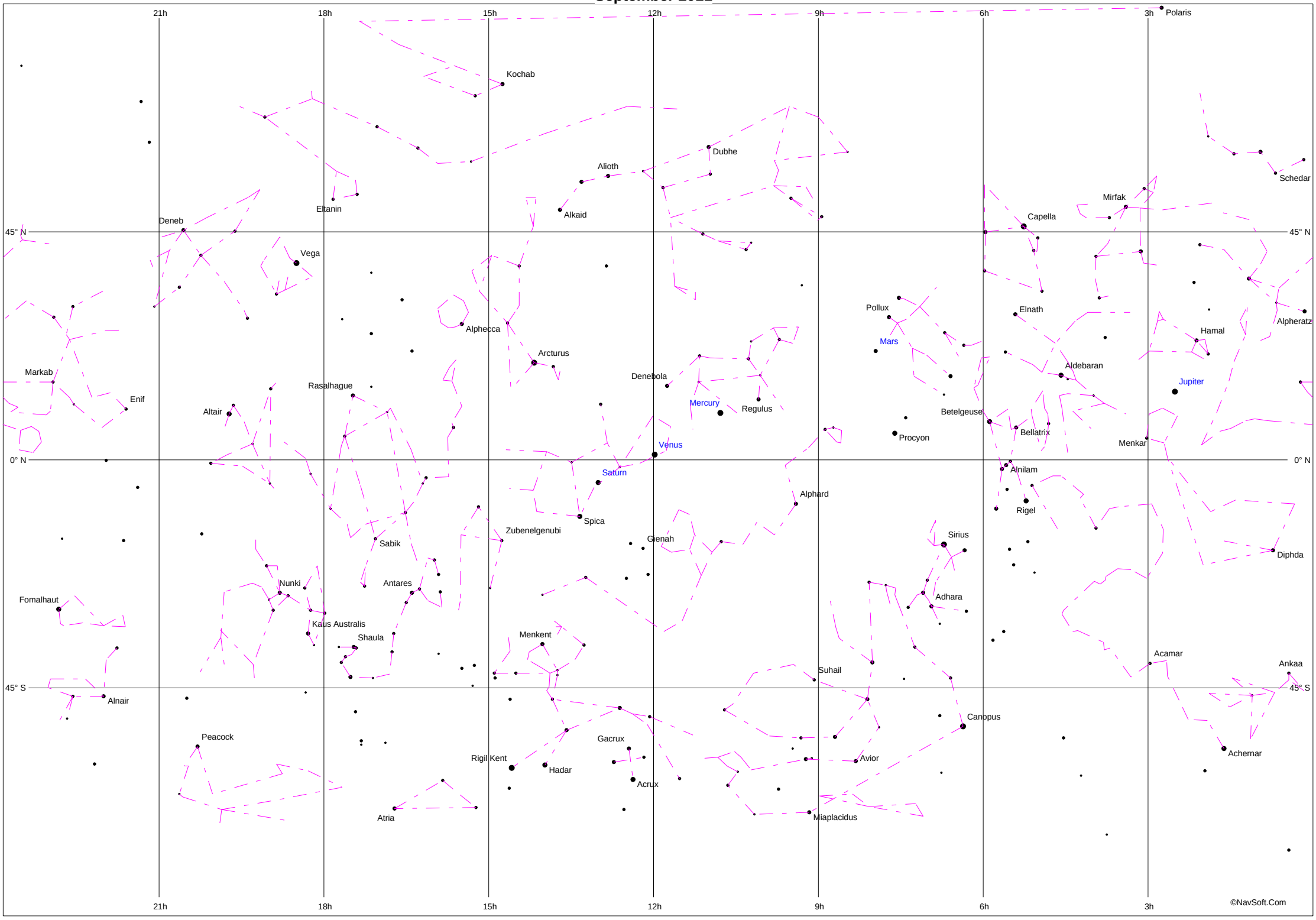
July 2011


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Polaris
Kochab
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Fomalhaut
Kaus Australis
Shaula
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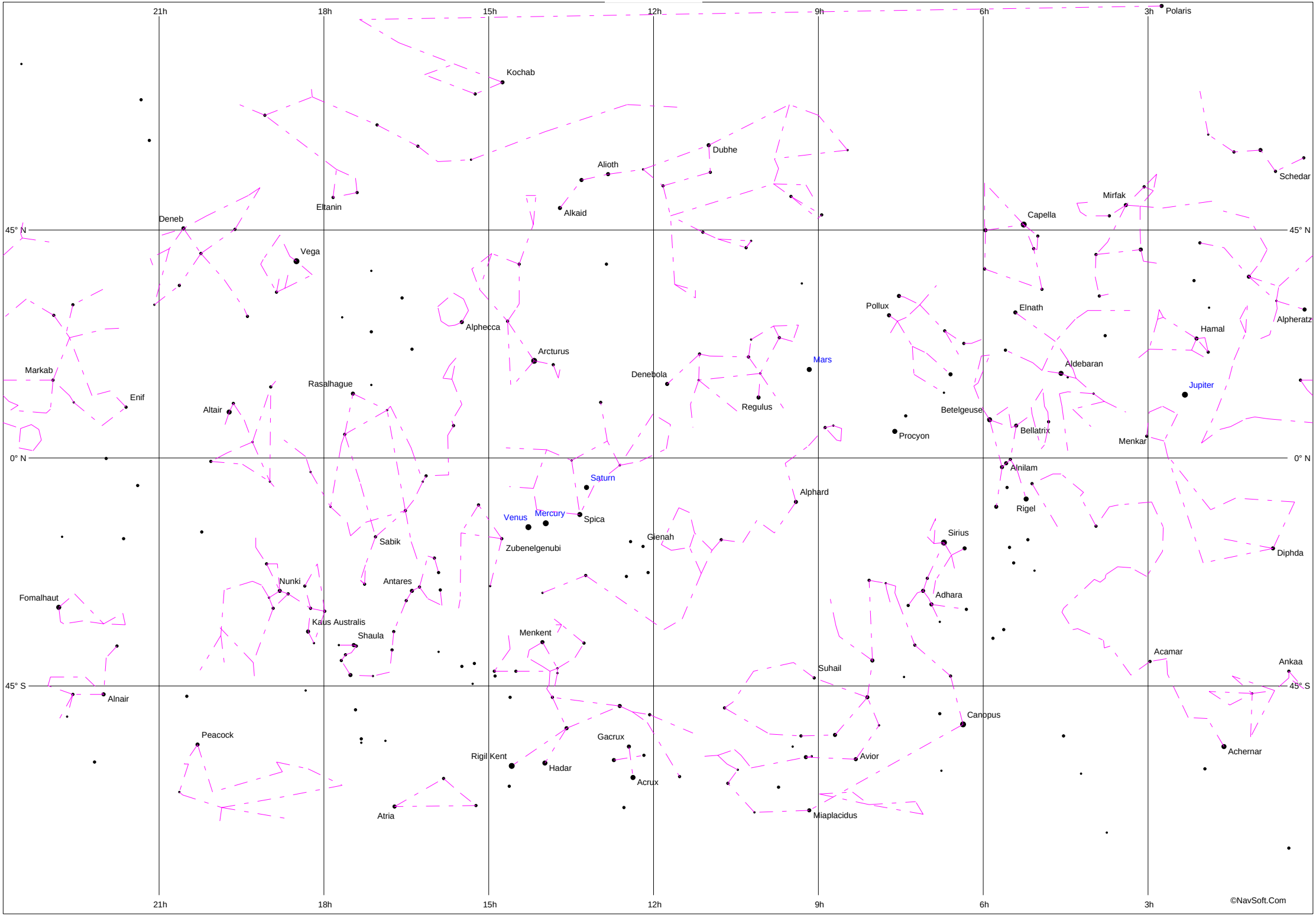
August 2011


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3h
Polaris
Kochab
Dubhe
Alioth
Schedar
Eltanin
Alkaid
Mirfak
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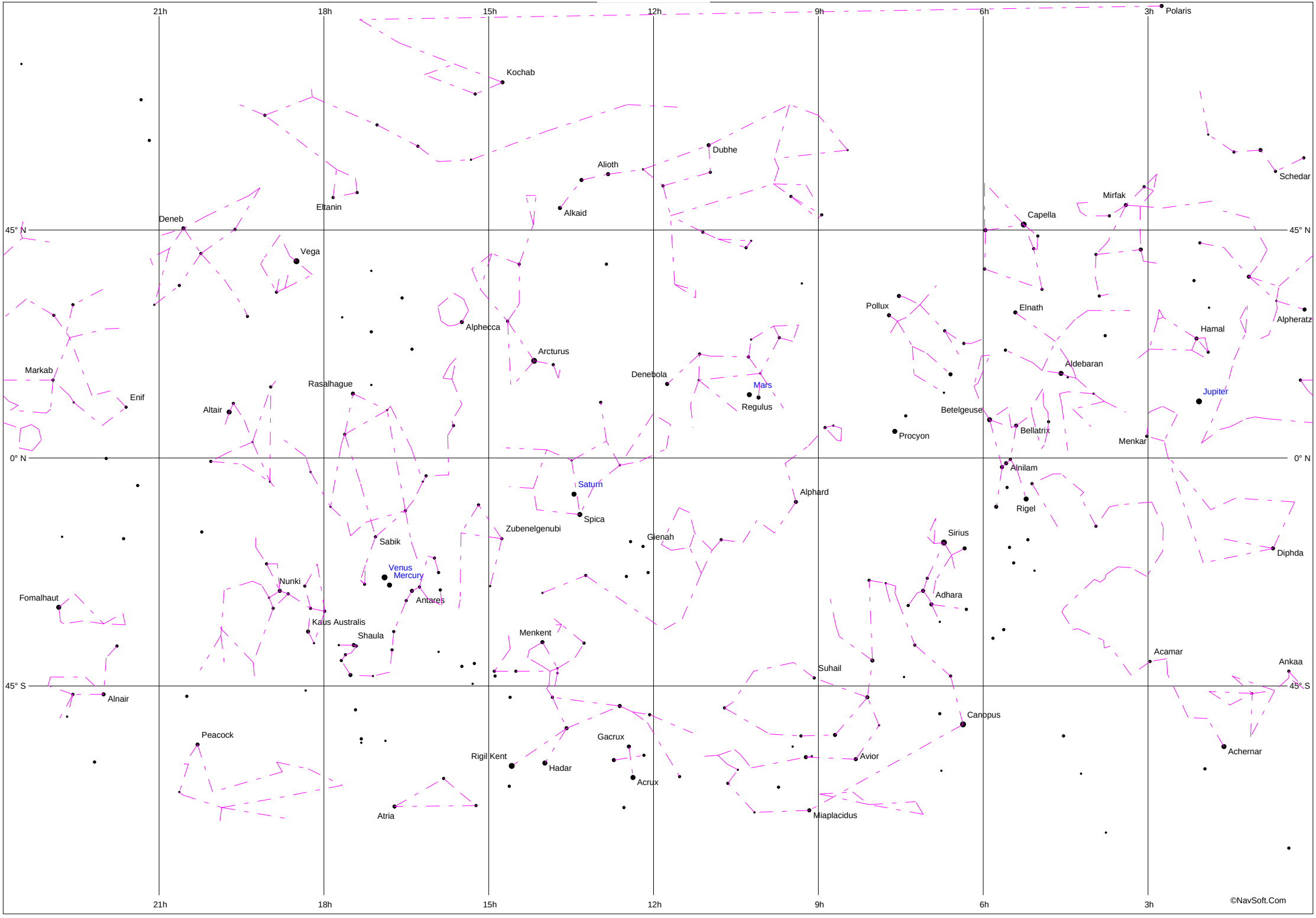
September 2011



October 2011



November 2011



December 2011

