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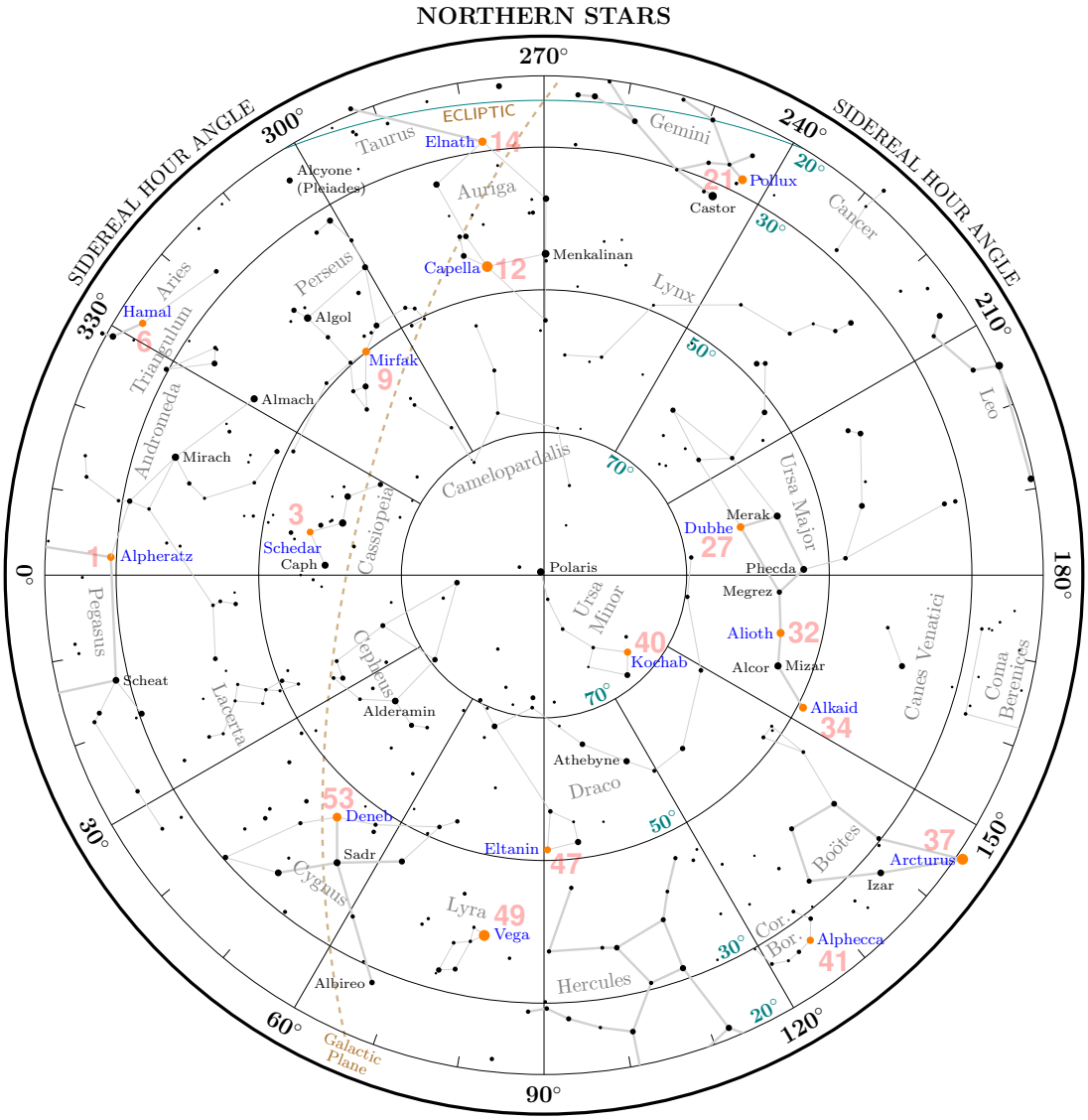

The Nautical Almanac

27.06.2021 - 02.07.2021

Author: Andrew Bauer
Original concept from: Enno Rodegerdts

November 15, 2021

June 27, 28, 29 (Sun., Mon., Tue.)

h	Aries	Venus		Mars		Jupiter		Saturn	
Sun	**GHA**	**GHA**	**Dec**	**GHA**	**Dec**	**GHA**	**Dec**	**GHA**	**Dec**
0	275°19.5	153°01.2	N21°44.4	143°00.0	N19°04.8	300°51.2	S11°38.7	320°03.5	S17°42.6
1	290°21.9	168°00.5	43.8	158°00.9	04.3	315°53.7	38.7	335°06.1	42.7
2	305°24.4	182°59.7	43.2	173°01.8	03.9	330°56.2	38.8	350°08.7	42.7
3	320°26.9	197°59.0	·· 42.6	188°02.7	·· 03.5	345°58.7	·· 38.8	5°11.3	·· 42.7
4	335°29.3	212°58.3	42.0	203°03.6	03.1	1°01.2	38.8	20°13.9	42.8
5	350°31.8	227°57.5	41.4	218°04.5	02.6	16°03.7	38.8	35°16.5	42.8
6	5°34.3	242°56.8	N21°40.8	233°05.4	N19°02.2	31°06.2	S11°38.9	50°19.1	S17°42.9
7	20°36.7	257°56.1	40.1	248°06.2	01.8	46°08.8	38.9	65°21.6	42.9
8	35°39.2	272°55.3	39.5	263°07.1	01.4	61°11.3	38.9	80°24.2	43.0
9	50°41.6	287°54.6	·· 38.9	278°08.0	·· 00.9	76°13.8	·· 39.0	95°26.8	·· 43.0
10	65°44.1	302°53.9	38.3	293°08.9	00.5	91°16.3	39.0	110°29.4	43.0
11	80°46.6	317°53.1	37.7	308°09.8	19°00.1	106°18.8	39.0	125°32.0	43.1
12	95°49.0	332°52.4	N21°37.0	323°10.7	N18°59.6	121°21.3	S11°39.1	140°34.6	S17°43.1
13	110°51.5	347°51.7	36.4	338°11.6	59.2	136°23.8	39.1	155°37.2	43.2
14	125°54.0	2°51.0	35.8	353°12.5	58.8	151°26.3	39.1	170°39.8	43.2
15	140°56.4	17°50.2	·· 35.2	8°13.4	·· 58.4	166°28.9	·· 39.1	185°42.4	·· 43.2
16	155°58.9	32°49.5	34.5	23°14.3	57.9	181°31.4	39.2	200°45.0	43.3
17	171°01.4	47°48.8	33.9	38°15.2	57.5	196°33.9	39.2	215°47.6	43.3
18	186°03.8	62°48.1	N21°33.3	53°16.1	N18°57.1	211°36.4	S11°39.2	230°50.2	S17°43.4
19	201°06.3	77°47.3	32.7	68°16.9	56.6	226°38.9	39.3	245°52.8	43.4
20	216°08.7	92°46.6	32.0	83°17.8	56.2	241°41.4	39.3	260°55.4	43.5
21	231°11.2	107°45.9	·· 31.4	98°18.7	·· 55.8	256°43.9	·· 39.3	275°57.9	·· 43.5
22	246°13.7	122°45.2	30.8	113°19.6	55.4	271°46.5	39.4	291°00.5	43.5
23	261°16.1	137°44.5	30.1	128°20.5	54.9	286°49.0	39.4	306°03.1	43.6
Mer.pass.	05:37	ν-0.7′	d-0.6′ m-3.8	ν0.9′	d-0.4′ m1.8	ν2.5′	d-0.0′ m-2.5	ν2.6′	d-0.0′ m0.4

Mon	**GHA**	**GHA**	**Dec**	**GHA**	**Dec**	**GHA**	**Dec**	**GHA**	**Dec**
0	276°18.6	152°43.7	N21°29.5	143°21.4	N18°54.5	301°51.5	S11°39.4	321°05.7	S17°43.6
1	291°21.1	167°43.0	28.9	158°22.3	54.1	316°54.0	39.5	336°08.3	43.7
2	306°23.5	182°42.3	28.2	173°23.2	53.6	331°56.5	39.5	351°10.9	43.7
3	321°26.0	197°41.6	·· 27.6	188°24.1	·· 53.2	346°59.0	·· 39.5	6°13.5	·· 43.8
4	336°28.5	212°40.8	27.0	203°25.0	52.8	2°01.6	39.6	21°16.1	43.8
5	351°30.9	227°40.1	26.3	218°25.9	52.3	17°04.1	39.6	36°18.7	43.8
6	6°33.4	242°39.4	N21°25.7	233°26.8	N18°51.9	32°06.6	S11°39.6	51°21.3	S17°43.9
7	21°35.9	257°38.7	25.0	248°27.7	51.5	47°09.1	39.7	66°23.9	43.9
8	36°38.3	272°38.0	24.4	263°28.6	51.1	62°11.6	39.7	81°26.5	44.0
9	51°40.8	287°37.3	·· 23.7	278°29.5	·· 50.6	77°14.1	·· 39.7	96°29.1	·· 44.0
10	66°43.2	302°36.5	23.1	293°30.3	50.2	92°16.7	39.8	111°31.7	44.0
11	81°45.7	317°35.8	22.5	308°31.2	49.8	107°19.2	39.8	126°34.3	44.1
12	96°48.2	332°35.1	N21°21.8	323°32.1	N18°49.3	122°21.7	S11°39.8	141°36.9	S17°44.1
13	111°50.6	347°34.4	21.2	338°33.0	48.9	137°24.2	39.9	156°39.5	44.2
14	126°53.1	2°33.7	20.5	353°33.9	48.5	152°26.7	39.9	171°42.1	44.2
15	141°55.6	17°33.0	·· 19.9	8°34.8	·· 48.0	167°29.3	·· 39.9	186°44.7	·· 44.3
16	156°58.0	32°32.3	19.2	23°35.7	47.6	182°31.8	40.0	201°47.2	44.3
17	172°00.5	47°31.5	18.6	38°36.6	47.2	197°34.3	40.0	216°49.8	44.3
18	187°03.0	62°30.8	N21°17.9	53°37.5	N18°46.7	212°36.8	S11°40.0	231°52.4	S17°44.4
19	202°05.4	77°30.1	17.3	68°38.4	46.3	227°39.3	40.1	246°55.0	44.4
20	217°07.9	92°29.4	16.6	83°39.3	45.9	242°41.9	40.1	261°57.6	44.5
21	232°10.4	107°28.7	·· 15.9	98°40.2	·· 45.4	257°44.4	·· 40.1	277°00.2	·· 44.5
22	247°12.8	122°28.0	15.3	113°41.1	45.0	272°46.9	40.2	292°02.8	44.6
23	262°15.3	137°27.3	14.6	128°42.0	44.6	287°49.4	40.2	307°05.4	44.6
Mer.pass.	05:33	ν-0.7′	d-0.6′ m-3.8	ν0.9′	d-0.4′ m1.8	ν2.5′	d-0.0′ m-2.5	ν2.6′	d-0.0′ m0.4

Tue	**GHA**	**GHA**	**Dec**	**GHA**	**Dec**	**GHA**	**Dec**	**GHA**	**Dec**
0	277°17.7	152°26.6	N21°14.0	143°42.9	N18°44.1	302°52.0	S11°40.2	322°08.0	S17°44.6
1	292°20.2	167°25.9	13.3	158°43.8	43.7	317°54.5	40.3	337°10.6	44.7
2	307°22.7	182°25.2	12.6	173°44.7	43.3	332°57.0	40.3	352°13.2	44.7
3	322°25.1	197°24.4	·· 12.0	188°45.6	·· 42.8	347°59.5	·· 40.3	7°15.8	·· 44.8
4	337°27.6	212°23.7	11.3	203°46.5	42.4	3°02.1	40.4	22°18.4	44.8
5	352°30.1	227°23.0	10.7	218°47.4	41.9	18°04.6	40.4	37°21.0	44.9
6	7°32.5	242°22.3	N21°10.0	233°48.2	N18°41.5	33°07.1	S11°40.4	52°23.6	S17°44.9
7	22°35.0	257°21.6	09.3	248°49.1	41.1	48°09.6	40.5	67°26.2	44.9
8	37°37.5	272°20.9	08.7	263°50.0	40.6	63°12.2	40.5	82°28.8	45.0
9	52°39.9	287°20.2	·· 08.0	278°50.9	·· 40.2	78°14.7	·· 40.5	97°31.4	·· 45.0
10	67°42.4	302°19.5	07.3	293°51.8	39.8	93°17.2	40.6	112°34.0	45.1
11	82°44.8	317°18.8	06.6	308°52.7	39.3	108°19.7	40.6	127°36.6	45.1
12	97°47.3	332°18.1	N21°06.0	323°53.6	N18°38.9	123°22.3	S11°40.7	142°39.2	S17°45.2
13	112°49.8	347°17.4	05.3	338°54.5	38.4	138°24.8	40.7	157°41.8	45.2
14	127°52.2	2°16.7	04.6	353°55.4	38.0	153°27.3	40.7	172°44.4	45.2
15	142°54.7	17°16.0	·· 04.0	8°56.3	·· 37.6	168°29.9	·· 40.8	187°47.0	·· 45.3
16	157°57.2	32°15.3	03.3	23°57.2	37.1	183°32.4	40.8	202°49.6	45.3
17	172°59.6	47°14.6	02.6	38°58.1	36.7	198°34.9	40.8	217°52.2	45.4
18	188°02.1	62°13.9	N21°01.9	53°59.0	N18°36.3	213°37.4	S11°40.9	232°54.8	S17°45.4
19	203°04.6	77°13.2	01.2	68°59.9	35.8	228°40.0	40.9	247°57.4	45.5
20	218°07.0	92°12.5	21°00.6	84°00.8	35.4	243°42.5	40.9	263°00.0	45.5
21	233°09.5	107°11.8	20°59.9	99°01.7	·· 34.9	258°45.0	·· 41.0	278°02.6	·· 45.5
22	248°12.0	122°11.1	59.2	114°02.6	34.5	273°47.6	41.0	293°05.2	45.6
23	263°14.4	137°10.4	58.5	129°03.5	34.1	288°50.1	41.1	308°07.8	45.6
Mer.pass.	05:29	ν-0.7′	d-0.7′ m-3.8	ν0.9′	d-0.4′ m1.8	ν2.5′	d-0.0′ m-2.5	ν2.6′	d-0.0′ m0.4

Stars

	SHA	Dec
Alpheratz	357°37.7	29°12.3
Ankaa	353°10.1	-42°11.2
Schedar	349°34.3	56°38.9
Diphda	348°50.2	-17°52.1
Achernar	335°22.6	-57°07.5
Hamal	327°54.6	23°33.6
Polaris	315°39.5	89°20.9
Acamar	315°14.3	-40°13.0
Menkar	314°09.4	4°10.3
Mirfak	308°32.7	49°56.0
Aldebaran	290°43.2	16°33.0
Rigel	281°07.0	-8°10.6
Capella	280°26.6	46°01.0
Bellatrix	278°26.3	6°22.1
Elnath	278°05.9	28°37.4
Alnilam	275°41.0	-1°11.3
Betelgeuse	270°55.5	7°24.6
Canopus	263°54.2	-52°42.4
Sirius	258°29.1	-16°44.8
Adhara	255°08.5	-29°00.1
Procyon	244°54.2	5°10.2
Pollux	243°21.2	27°58.5
Avior	234°16.4	-59°34.8
Suhail	222°48.7	-43°31.2
Miaplacidus	221°39.5	-69°48.5
Alphard	217°50.8	-8°45.1
Regulus	207°37.7	11°51.9
Dubhe	193°44.9	61°38.5
Denebola	182°28.0	14°27.3
Gienah	175°46.5	-17°39.7
Acrux	173°03.2	-63°13.3
Gacrux	171°54.7	-57°14.2
Alioth	166°15.5	55°51.0
Spica	158°25.2	-11°16.3
Alkaid	152°54.2	49°12.7
Hadar	148°39.7	-60°28.7
Menkent	148°00.8	-36°28.6
Arcturus	145°50.4	19°04.5
Rigil Kent.	139°43.8	-60°55.6
Kochab	137°19.2	74°04.4
Zuben'ubi	136°59.0	-16°07.8
Alphecca	126°05.9	26°38.7
Antares	112°19.0	-26°28.7
Atria	107°15.3	-69°04.0
Sabik	102°05.7	-15°45.0
Shaula	96°13.9	-37°07.1
Rasalhague	96°00.9	12°32.7
Eltanin	90°43.0	51°29.2
Kaus Aust.	83°35.9	-34°22.4
Vega	80°34.7	38°48.2
Nunki	75°51.0	-26°16.1
Altair	62°02.4	8°55.5
Peacock	53°09.8	-56°39.8
Deneb	49°27.3	45°21.2
Enif	33°41.4	9°58.3
Al Na'ir	27°36.3	-46°51.3
Fomalhaut	15°17.6	-29°30.4
Scheat	13°47.8	28°11.7
Markab	13°32.6	15°19.1

Jun 27 Sun	**SHA**	**Mer.pass**
Venus	237°41.7	13:49
Mars	227°40.5	14:27
Jupiter	25°31.7	03:56
Saturn	44°44.0	02:39

Jun 28 Mon	**SHA**	**Mer.pass**
Venus	236°25.1	13:50
Mars	227°02.8	14:26
Jupiter	25°32.9	03:52
Saturn	44°47.1	02:35

Jun 29 Tue	**SHA**	**Mer.pass**
Venus	235°08.8	13:51
Mars	226°25.1	14:24
Jupiter	25°34.2	03:48
Saturn	44°50.3	02:31

Horizontal parallax	
Venus:	0.1
Mars:	0.1

h	Sun		Moon				
Sun	**GHA**	**Dec**	**GHA**	ν	**Dec**	d	**HP**
0	179°14.7	N23°19.2	325°55.8	5.8′	S22°58.6	7.3′	59.2′
1	194°14.6	19.1	340°20.6	5.9′	22°51.3	7.4′	59.2′
2	209°14.4	19.0	354°45.5	6.0′	22°43.9	7.5′	59.1′
3	224°14.3	·· 18.9	9°10.6	6.1′	22°36.4	7.7′	59.1′
4	239°14.2	18.8	23°35.7	6.3′	22°28.7	7.8′	59.1′
5	254°14.1	18.7	38°01.0	6.4′	22°20.9	7.9′	59.0′
6	269°13.9	N23°18.6	52°26.3	6.5′	S22°13.0	8.1′	59.0′
7	284°13.8	18.4	66°51.8	6.6′	22°05.0	8.2′	59.0′
8	299°13.7	18.3	81°17.4	6.7′	21°56.8	8.3′	58.9′
9	314°13.5	·· 18.2	95°43.2	6.9′	21°48.5	8.4′	58.9′
10	329°13.4	18.1	110°09.0	7.0′	21°40.0	8.6′	58.8′
11	344°13.3	18.0	124°35.0	7.1′	21°31.5	8.7′	58.8′
12	359°13.2	N23°17.9	139°01.1	7.2′	S21°22.8	8.8′	58.8′
13	14°13.0	17.8	153°27.3	7.3′	21°14.0	8.9′	58.7′
14	29°12.9	17.7	167°53.6	7.5′	21°05.1	9.0′	58.7′
15	44°12.8	·· 17.6	182°20.1	7.6′	20°56.1	9.1′	58.7′
16	59°12.7	17.5	196°46.7	7.7′	20°46.9	9.3′	58.6′
17	74°12.5	17.4	211°13.4	7.8′	20°37.7	9.4′	58.6′
18	89°12.4	N23°17.2	225°40.2	7.9′	S20°28.3	9.5′	58.5′
19	104°12.3	17.1	240°07.1	8.1′	20°18.8	9.6′	58.5′
20	119°12.1	17.0	254°34.2	8.2′	20°09.3	9.7′	58.5′
21	134°12.0	·· 16.9	269°01.4	8.3′	19°59.6	9.8′	58.4′
22	149°11.9	16.8	283°28.7	8.4′	19°49.8	9.9′	58.4′
23	164°11.8	16.7	297°56.1	8.5′	19°39.9	10.0′	58.4′
	SD = 15.7′	d = -0.1′	SD = 16.2′				
Mon	**GHA**	**Dec**	**GHA**	ν	**Dec**	d	**HP**
0	179°11.6	N23°16.6	312°23.6	8.7′	S19°29.9	10.1′	58.3′
1	194°11.5	16.4	326°51.3	8.8′	19°19.9	10.2′	58.3′
2	209°11.4	16.3	341°19.1	8.9′	19°09.7	10.3′	58.2′
3	224°11.2	·· 16.2	355°47.0	9.0′	18°59.4	10.4′	58.2′
4	239°11.1	16.1	10°15.0	9.1′	18°49.1	10.5′	58.2′
5	254°11.0	16.0	24°43.1	9.3′	18°38.6	10.5′	58.1′
6	269°10.9	N23°15.8	39°11.4	9.4′	S18°28.1	10.6′	58.1′
7	284°10.7	15.7	53°39.8	9.5′	18°17.4	10.7′	58.0′
8	299°10.6	15.6	68°08.3	9.6′	18°06.7	10.8′	58.0′
9	314°10.5	·· 15.5	82°36.9	9.7′	17°55.9	10.9′	58.0′
10	329°10.4	15.3	97°05.6	9.8′	17°45.0	11.0′	57.9′
11	344°10.2	15.2	111°34.5	10.0′	17°34.1	11.0′	57.9′
12	359°10.1	N23°15.1	126°03.4	10.1′	S17°23.0	11.1′	57.9′
13	14°10.0	15.0	140°32.5	10.2′	17°11.9	11.2′	57.8′
14	29°09.9	14.8	155°01.7	10.3′	17°00.7	11.3′	57.8′
15	44°09.7	·· 14.7	169°31.0	10.4′	16°49.4	11.3′	57.7′
16	59°09.6	14.6	184°00.4	10.5′	16°38.1	11.4′	57.7′
17	74°09.5	14.5	198°29.9	10.6′	16°26.7	11.5′	57.7′
18	89°09.4	N23°14.3	212°59.6	10.7′	S16°15.2	11.5′	57.6′
19	104°09.2	14.2	227°29.3	10.9′	16°03.7	11.6′	57.6′
20	119°09.1	14.1	241°59.2	11.0′	15°52.0	11.7′	57.6′
21	134°09.0	·· 13.9	256°29.1	11.1′	15°40.4	11.7′	57.5′
22	149°08.9	13.8	270°59.2	11.2′	15°28.6	11.8′	57.5′
23	164°08.7	13.7	285°29.4	11.3′	15°16.8	11.9′	57.4′
	SD = 15.7′	d = -0.1′	SD = 15.9′				
Tue	**GHA**	**Dec**	**GHA**	ν	**Dec**	d	**HP**
0	179°08.6	N23°13.5	299°59.6	11.4′	S15°04.9	11.9′	57.4′
1	194°08.5	13.4	314°30.0	11.5′	14°53.0	12.0′	57.4′
2	209°08.4	13.3	329°00.5	11.6′	14°41.0	12.0′	57.3′
3	224°08.2	·· 13.1	343°31.1	11.7′	14°29.0	12.1′	57.3′
4	239°08.1	13.0	358°01.8	11.8′	14°16.9	12.1′	57.2′
5	254°08.0	12.9	12°32.6	11.9′	14°04.7	12.2′	57.2′
6	269°07.9	N23°12.7	27°03.5	12.0′	S13°52.5	12.3′	57.2′
7	284°07.7	12.6	41°34.5	12.1′	13°40.3	12.3′	57.1′
8	299°07.6	12.4	56°05.6	12.2′	13°28.0	12.3′	57.1′
9	314°07.5	·· 12.3	70°36.8	12.3′	13°15.6	12.4′	57.1′
10	329°07.4	12.2	85°08.1	12.4′	13°03.3	12.4′	57.0′
11	344°07.2	12.0	99°39.4	12.5′	12°50.8	12.5′	57.0′
12	359°07.1	N23°11.9	114°10.9	12.6′	S12°38.3	12.5′	57.0′
13	14°07.0	11.7	128°42.5	12.7′	12°25.8	12.6′	56.9′
14	29°06.9	11.6	143°14.1	12.7′	12°13.2	12.6′	56.9′
15	44°06.7	·· 11.4	157°45.9	12.8′	12°00.6	12.6′	56.8′
16	59°06.6	11.3	172°17.7	12.9′	11°48.0	12.7′	56.8′
17	74°06.5	11.1	186°49.6	13.0′	11°35.3	12.7′	56.8′
18	89°06.4	N23°11.0	201°21.6	13.1′	S11°22.6	12.8′	56.7′
19	104°06.2	10.9	215°53.7	13.2′	11°09.8	12.8′	56.7′
20	119°06.1	10.7	230°25.9	13.3′	10°57.0	12.8′	56.7′
21	134°06.0	·· 10.6	244°58.2	13.3′	10°44.2	12.9′	56.6′
22	149°05.9	10.4	259°30.5	13.4′	10°31.4	12.9′	56.6′
23	164°05.7	10.3	274°02.9	13.5′	10°18.5	12.9′	56.6′
	SD = 15.7′	d = -0.1′	SD = 15.7′				

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

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

Day	**Sun**			**Moon**		
	Eqn.of Time		Mer.	Mer.Pass.		
	00^h	12^h	Pass	Upper	Lower	Age
	mm:ss	mm:ss	hh:mm	hh:mm	hh:mm	
27	03:01	03:07	12:03	02:22	14:50	17(93%)
28	03:14	03:20	12:03	03:17	15:43	18(86%)
29	03:26	03:32	12:04	04:08	16:32	19(78%)

June 30, 01, 02 (Wed., Thu., Fri.)

h	Aries	Venus		Mars		Jupiter		Saturn	
Wed	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	278°16.9	152°09.7	N20°57.8	144°04.4	N18°33.6	303°52.6	S11°41.1	323°10.4	S17°45.7
1	293°19.3	167°09.0	57.2	159°05.3	33.2	318°55.1	41.1	338°13.0	45.7
2	308°21.8	182°08.3	56.5	174°06.2	32.7	333°57.7	41.2	353°15.6	45.8
3	323°24.3	197°07.6	·· 55.8	189°07.1	·· 32.3	349°00.2	·· 41.2	8°18.2	·· 45.8
4	338°26.7	212°06.9	55.1	204°08.0	31.9	4°02.7	41.2	23°20.8	45.9
5	353°29.2	227°06.2	54.4	219°08.9	31.4	19°05.3	41.3	38°23.4	45.9
6	8°31.7	242°05.6	N20°53.7	234°09.8	N18°31.0	34°07.8	S11°41.3	53°26.0	S17°45.9
7	23°34.1	257°04.9	53.0	249°10.7	30.5	49°10.3	41.4	68°28.6	46.0
8	38°36.6	272°04.2	52.3	264°11.6	30.1	64°12.9	41.4	83°31.2	46.0
9	53°39.1	287°03.5	·· 51.6	279°12.5	·· 29.7	79°15.4	·· 41.4	98°33.8	·· 46.1
10	68°41.5	302°02.8	51.0	294°13.4	29.2	94°17.9	41.5	113°36.4	46.1
11	83°44.0	317°02.1	50.3	309°14.3	28.8	109°20.5	41.5	128°39.0	46.2
12	98°46.5	332°01.4	N20°49.6	324°15.2	N18°28.3	124°23.0	S11°41.6	143°41.6	S17°46.2
13	113°48.9	347°00.7	48.9	339°16.1	27.9	139°25.6	41.6	158°44.2	46.2
14	128°51.4	2°00.0	48.2	354°17.0	27.4	154°28.1	41.6	173°46.8	46.3
15	143°53.8	16°59.3	·· 47.5	9°17.9	·· 27.0	169°30.6	·· 41.7	188°49.4	·· 46.3
16	158°56.3	31°58.7	46.8	24°18.8	26.6	184°33.2	41.7	203°52.0	46.4
17	173°58.8	46°58.0	46.1	39°19.7	26.1	199°35.7	41.8	218°54.6	46.4
18	189°01.2	61°57.3	N20°45.4	54°20.6	N18°25.7	214°38.2	S11°41.8	233°57.2	S17°46.5
19	204°03.7	76°56.6	44.7	69°21.5	25.2	229°40.8	41.8	248°59.8	46.5
20	219°06.2	91°55.9	44.0	84°22.4	24.8	244°43.3	41.9	264°02.4	46.6
21	234°08.6	106°55.2	·· 43.3	99°23.3	·· 24.3	259°45.8	·· 41.9	279°05.0	·· 46.6
22	249°11.1	121°54.5	42.6	114°24.2	23.9	274°48.4	42.0	294°07.6	46.6
23	264°13.6	136°53.9	41.8	129°25.1	23.4	289°50.9	42.0	309°10.2	46.7
Mer.pass.	05:25	ν-0.7′	d-0.7′ m-3.8	ν0.9′	d-0.4′ m1.8	ν2.5′	d-0.0′ m-2.5	ν2.6′	d-0.0′ m0.4
Thu	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	279°16.0	151°53.2	N20°41.1	144°26.0	N18°23.0	304°53.5	S11°42.0	324°12.8	S17°46.7
1	294°18.5	166°52.5	40.4	159°26.9	22.6	319°56.0	42.1	339°15.4	46.8
2	309°20.9	181°51.8	39.7	174°27.8	22.1	334°58.5	42.1	354°18.0	46.8
3	324°23.4	196°51.1	·· 39.0	189°28.7	·· 21.7	350°01.1	·· 42.2	9°20.6	·· 46.9
4	339°25.9	211°50.4	38.3	204°29.6	21.2	5°03.6	42.2	24°23.2	46.9
5	354°28.3	226°49.8	37.6	219°30.5	20.8	20°06.2	42.2	39°25.8	47.0
6	9°30.8	241°49.1	N20°36.9	234°31.4	N18°20.3	35°08.7	S11°42.3	54°28.4	S17°47.0
7	24°33.3	256°48.4	36.2	249°32.3	19.9	50°11.2	42.3	69°31.0	47.0
8	39°35.7	271°47.7	35.4	264°33.2	19.4	65°13.8	42.4	84°33.6	47.1
9	54°38.2	286°47.0	·· 34.7	279°34.1	·· 19.0	80°16.3	·· 42.4	99°36.2	·· 47.1
10	69°40.7	301°46.4	34.0	294°35.0	18.5	95°18.9	42.4	114°38.8	47.2
11	84°43.1	316°45.7	33.3	309°35.9	18.1	110°21.4	42.5	129°41.4	47.2
12	99°45.6	331°45.0	N20°32.6	324°36.8	N18°17.6	125°23.9	S11°42.5	144°44.1	S17°47.3
13	114°48.1	346°44.3	31.9	339°37.7	17.2	140°26.5	42.6	159°46.7	47.3
14	129°50.5	1°43.7	31.1	354°38.6	16.7	155°29.0	42.6	174°49.3	47.4
15	144°53.0	16°43.0	·· 30.4	9°39.5	·· 16.3	170°31.6	·· 42.6	189°51.9	·· 47.4
16	159°55.4	31°42.3	29.7	24°40.4	15.8	185°34.1	42.7	204°54.5	47.4
17	174°57.9	46°41.6	29.0	39°41.3	15.4	200°36.7	42.7	219°57.1	47.5
18	190°00.4	61°41.0	N20°28.2	54°42.2	N18°15.0	215°39.2	S11°42.8	234°59.7	S17°47.5
19	205°02.8	76°40.3	27.5	69°43.1	14.5	230°41.8	42.8	250°02.3	47.6
20	220°05.3	91°39.6	26.8	84°44.0	14.1	245°44.3	42.9	265°04.9	47.6
21	235°07.8	106°39.0	·· 26.1	99°44.9	·· 13.6	260°46.8	·· 42.9	280°07.5	·· 47.7
22	250°10.2	121°38.3	25.3	114°45.8	13.2	275°49.4	42.9	295°10.1	47.7
23	265°12.7	136°37.6	24.6	129°46.7	12.7	290°51.9	43.0	310°12.7	47.8
Mer.pass.	05:22	ν-0.7′	d-0.7′ m-3.8	ν0.9′	d-0.4′ m1.8	ν2.5′	d-0.0′ m-2.5	ν2.6′	d-0.0′ m0.4
Fri	GHA	GHA	Dec	GHA	Dec	GHA	Dec	GHA	Dec
0	280°15.2	151°36.9	N20°23.9	144°47.6	N18°12.3	305°54.5	S11°43.0	325°15.3	S17°47.8
1	295°17.6	166°36.3	23.1	159°48.5	11.8	320°57.0	43.1	340°17.9	47.8
2	310°20.1	181°35.6	22.4	174°49.4	11.4	335°59.6	43.1	355°20.5	47.9
3	325°22.6	196°34.9	·· 21.7	189°50.3	·· 10.9	351°02.1	·· 43.2	10°23.1	·· 47.9
4	340°25.0	211°34.3	20.9	204°51.2	10.5	6°04.7	43.2	25°25.7	48.0
5	355°27.5	226°33.6	20.2	219°52.1	10.0	21°07.2	43.2	40°28.3	48.0
6	10°29.9	241°32.9	N20°19.5	234°53.0	N18°09.6	36°09.8	S11°43.3	55°30.9	S17°48.1
7	25°32.4	256°32.3	18.7	249°53.9	09.1	51°12.3	43.3	70°33.6	48.1
8	40°34.9	271°31.6	18.0	264°54.9	08.6	66°14.9	43.4	85°36.2	48.2
9	55°37.3	286°30.9	·· 17.2	279°55.8	·· 08.2	81°17.4	·· 43.4	100°38.8	·· 48.2
10	70°39.8	301°30.3	16.5	294°56.7	07.7	96°20.0	43.5	115°41.4	48.3
11	85°42.3	316°29.6	15.8	309°57.6	07.3	111°22.5	43.5	130°44.0	48.3
12	100°44.7	331°28.9	N20°15.0	324°58.5	N18°06.8	126°25.1	S11°43.6	145°46.6	S17°48.3
13	115°47.2	346°28.3	14.3	339°59.4	06.4	141°27.6	43.6	160°49.2	48.4
14	130°49.7	1°27.6	13.5	355°00.3	05.9	156°30.2	43.6	175°51.8	48.4
15	145°52.1	16°27.0	·· 12.8	10°01.2	·· 05.5	171°32.7	·· 43.7	190°54.4	·· 48.5
16	160°54.6	31°26.3	12.0	25°02.1	05.0	186°35.3	43.7	205°57.0	48.5
17	175°57.0	46°25.6	11.3	40°03.0	04.6	201°37.8	43.8	220°59.6	48.6
18	190°59.5	61°25.0	N20°10.5	55°03.9	N18°04.1	216°40.4	S11°43.8	236°02.2	S17°48.6
19	206°02.0	76°24.3	09.8	70°04.8	03.7	231°42.9	43.9	251°04.8	48.7
20	221°04.4	91°23.7	09.0	85°05.7	03.2	246°45.5	43.9	266°07.4	48.7
21	236°06.9	106°23.0	·· 08.3	100°06.6	·· 02.8	261°48.0	·· 44.0	281°10.0	·· 48.8
22	251°09.4	121°22.3	07.5	115°07.5	02.3	276°50.6	44.0	296°12.7	48.8
23	266°11.8	136°21.7	06.8	130°08.4	01.8	291°53.1	44.1	311°15.3	48.8
Mer.pass.	05:18	ν-0.7′	d-0.7′ m-3.8	ν0.9′	d-0.5′ m1.8	ν2.5′	d-0.0′ m-2.5	ν2.6′	d-0.0′ m0.4

Stars

	SHA	Dec
Alpheratz	357°37.7	29°12.3
Ankaa	353°10.0	-42°11.2
Schedar	349°34.2	56°38.9
Diphda	348°50.2	-17°52.1
Achernar	335°22.6	-57°07.5
Hamal	327°54.6	23°33.6
Polaris	315°38.4	89°20.9
Acamar	315°14.3	-40°13.0
Menkar	314°09.4	4°10.3
Mirfak	308°32.7	49°56.0
Aldebaran	290°43.2	16°33.0
Rigel	281°07.0	-8°10.6
Capella	280°26.6	46°01.0
Bellatrix	278°26.3	6°22.1
Elnath	278°05.9	28°37.4
Alnilam	275°41.0	-1°11.3
Betelgeuse	270°55.5	7°24.6
Canopus	263°54.2	-52°42.4
Sirius	258°29.1	-16°44.7
Adhara	255°08.5	-29°00.1
Procyon	244°54.2	5°10.2
Pollux	243°21.2	27°58.5
Avior	234°16.4	-59°34.8
Suhail	222°48.8	-43°31.2
Miaplacidus	221°39.5	-69°48.4
Alphard	217°50.8	-8°45.1
Regulus	207°37.7	11°51.9
Dubhe	193°44.9	61°38.5
Denebola	182°28.0	14°27.3
Gienah	175°46.6	-17°39.7
Acrux	173°03.2	-63°13.3
Gacrux	171°54.8	-57°14.2
Alioth	166°15.5	55°51.0
Spica	158°25.2	-11°16.3
Alkaid	152°54.2	49°12.7
Hadar	148°39.7	-60°28.7
Menkent	148°00.8	-36°28.6
Arcturus	145°50.4	19°04.5
Rigil Kent.	139°43.8	-60°55.6
Kochab	137°19.2	74°04.4
Zuben'ubi	136°59.0	-16°07.8
Alphecca	126°05.9	26°38.8
Antares	112°19.0	-26°28.7
Atria	107°15.3	-69°04.0
Sabik	102°05.7	-15°45.0
Shaula	96°13.9	-37°07.1
Rasalhague	96°00.9	12°32.8
Eltanin	90°43.0	51°29.2
Kaus Aust.	83°35.9	-34°22.4
Vega	80°34.7	38°48.2
Nunki	75°50.9	-26°16.1
Altair	62°02.4	8°55.5
Peacock	53°09.8	-56°39.8
Deneb	49°27.3	45°21.3
Enif	33°41.4	9°58.3
Al Na'ir	27°36.3	-46°51.3
Fomalhaut	15°17.6	-29°30.4
Scheat	13°47.8	28°11.7
Markab	13°32.6	15°19.1

Jun 30 Wed	SHA	Mer.pass
Venus	233°52.8	13:52
Mars	225°47.5	14:23
Jupiter	25°35.7	03:44
Saturn	44°53.5	02:27

Jul 01 Thu	SHA	Mer.pass
Venus	232°37.2	13:53
Mars	225°10.0	14:21
Jupiter	25°37.4	03:40
Saturn	44°56.8	02:23

Jul 02 Fri	SHA	Mer.pass
Venus	231°21.8	13:54
Mars	224°32.5	14:20
Jupiter	25°39.3	03:36
Saturn	45°00.2	02:19

Horizontal parallax	
Venus:	0.1
Mars:	0.1

h	Sun		Moon				
Wed	GHA	Dec	GHA	ν	Dec	d	HP
0	179°05.6	N23°10.1	288°35.5	13.6′	S10°05.6	12.9′	56.5′
1	194°05.5	10.0	303°08.0	13.7′	09°52.6	13.0′	56.5′
2	209°05.4	09.8	317°40.7	13.7′	09°39.6	13.0′	56.5′
3	224°05.3	·· 09.6	332°13.4	13.8′	09°26.6	13.0′	56.4′
4	239°05.1	09.5	346°46.2	13.9′	09°13.6	13.0′	56.4′
5	254°05.0	09.3	1°19.1	14.0′	09°00.6	13.1′	56.3′
6	269°04.9	N23°09.2	15°52.1	14.0′	S08°47.5	13.1′	56.3′
7	284°04.8	09.0	30°25.1	14.1′	08°34.4	13.1′	56.3′
8	299°04.6	08.9	44°58.2	14.2′	08°21.3	13.1′	56.2′
9	314°04.5	·· 08.7	59°31.4	14.2′	08°08.2	13.2′	56.2′
10	329°04.4	08.6	74°04.6	14.3′	07°55.0	13.2′	56.2′
11	344°04.3	08.4	88°37.9	14.4′	07°41.9	13.2′	56.1′
12	359°04.2	N23°08.2	103°11.3	14.4′	S07°28.7	13.2′	56.1′
13	14°04.0	08.1	117°44.7	14.5′	07°15.5	13.2′	56.1′
14	29°03.9	07.9	132°18.2	14.6′	07°02.3	13.2′	56.1′
15	44°03.8	·· 07.8	146°51.8	14.6′	06°49.0	13.2′	56.0′
16	59°03.7	07.6	161°25.4	14.7′	06°35.8	13.3′	56.0′
17	74°03.5	07.4	175°59.1	14.7′	06°22.5	13.3′	56.0′
18	89°03.4	N23°07.3	190°32.8	14.8′	S06°09.3	13.3′	55.9′
19	104°03.3	07.1	205°06.6	14.8′	05°56.0	13.3′	55.9′
20	119°03.2	06.9	219°40.5	14.9′	05°42.7	13.3′	55.9′
21	134°03.1	·· 06.8	234°14.4	15.0′	05°29.4	13.3′	55.8′
22	149°02.9	06.6	248°48.3	15.0′	05°16.1	13.3′	55.8′
23	164°02.8	06.4	263°22.3	15.1′	05°02.8	13.3′	55.8′
	SD = 15.7′	d = -0.2′	SD = 15.4′				
Thu	GHA	Dec	GHA	ν	Dec	d	HP
0	179°02.7	N23°06.3	277°56.4	15.1′	S04°49.5	13.3′	55.7′
1	194°02.6	06.1	292°30.5	15.2′	04°36.2	13.3′	55.7′
2	209°02.5	05.9	307°04.7	15.2′	04°22.8	13.3′	55.7′
3	224°02.3	·· 05.8	321°38.9	15.3′	04°09.5	13.3′	55.7′
4	239°02.2	05.6	336°13.1	15.3′	03°56.2	13.3′	55.6′
5	254°02.1	05.4	350°47.4	15.3′	03°42.9	13.3′	55.6′
6	269°02.0	N23°05.2	5°21.8	15.4′	S03°29.5	13.3′	55.6′
7	284°01.9	05.1	19°56.2	15.4′	03°16.2	13.3′	55.5′
8	299°01.7	04.9	34°30.6	15.5′	03°02.9	13.3′	55.5′
9	314°01.6	·· 04.7	49°05.1	15.5′	02°49.5	13.3′	55.5′
10	329°01.5	04.6	63°39.6	15.5′	02°36.2	13.3′	55.5′
11	344°01.4	04.4	78°14.1	15.6′	02°22.9	13.3′	55.4′
12	359°01.3	N23°04.2	92°48.7	15.6′	S02°09.6	13.3′	55.4′
13	14°01.1	04.0	107°23.3	15.6′	01°56.2	13.3′	55.4′
14	29°01.0	03.8	121°57.9	15.7′	01°42.9	13.3′	55.3′
15	44°00.9	·· 03.7	136°32.6	15.7′	01°29.6	13.3′	55.3′
16	59°00.8	03.5	151°07.3	15.7′	01°16.3	13.3′	55.3′
17	74°00.7	03.3	165°42.1	15.8′	01°03.0	13.3′	55.3′
18	89°00.5	N23°03.1	180°16.9	15.8′	S00°49.8	13.3′	55.2′
19	104°00.4	02.9	194°51.7	15.8′	00°36.5	13.3′	55.2′
20	119°00.3	02.8	209°26.5	15.9′	00°23.2	13.3′	55.2′
21	134°00.2	·· 02.6	224°01.4	15.9′	S00°10.0	13.2′	55.2′
22	149°00.1	02.4	238°36.2	15.9′	N00°03.3	13.2′	55.1′
23	163°59.9	02.2	253°11.1	15.9′	00°16.5	13.2′	55.1′
	SD = 15.7′	d = -0.2′	SD = 15.2′				
Fri	GHA	Dec	GHA	ν	Dec	d	HP
0	178°59.8	N23°02.0	267°46.1	16.0′	N00°29.7	13.2′	55.1′
1	193°59.7	01.8	282°21.0	16.0′	00°42.9	13.2′	55.1′
2	208°59.6	01.7	296°56.0	16.0′	00°56.1	13.2′	55.1′
3	223°59.5	·· 01.5	311°31.0	16.0′	01°09.3	13.2′	55.0′
4	238°59.4	01.3	326°06.0	16.0′	01°22.5	13.1′	55.0′
5	253°59.2	01.1	340°41.0	16.0′	01°35.6	13.1′	55.0′
6	268°59.1	N23°00.9	355°16.1	16.1′	N01°48.7	13.1′	55.0′
7	283°59.0	00.7	9°51.1	16.1′	02°01.8	13.1′	54.9′
8	298°58.9	00.5	24°26.2	16.1′	02°14.9	13.1′	54.9′
9	313°58.8	·· 00.3	39°01.3	16.1′	02°28.0	13.1′	54.9′
10	328°58.7	00.1	53°36.4	16.1′	02°41.1	13.0′	54.9′
11	343°58.5	23°00.0	68°11.5	16.1′	02°54.1	13.0′	54.9′
12	358°58.4	N22°59.8	82°46.6	16.1′	N03°07.1	13.0′	54.8′
13	13°58.3	59.6	97°21.7	16.1′	03°20.1	13.0′	54.8′
14	28°58.2	59.4	111°56.9	16.1′	03°33.1	12.9′	54.8′
15	43°58.1	·· 59.2	126°32.0	16.1′	03°46.0	12.9′	54.8′
16	58°58.0	59.0	141°07.1	16.1′	03°59.0	12.9′	54.8′
17	73°57.8	58.8	155°42.3	16.2′	04°11.9	12.9′	54.7′
18	88°57.7	N22°58.6	170°17.4	16.2′	N04°24.7	12.9′	54.7′
19	103°57.6	58.4	184°52.6	16.2′	04°37.6	12.8′	54.7′
20	118°57.5	58.2	199°27.7	16.2′	04°50.4	12.8′	54.7′
21	133°57.4	·· 58.0	214°02.9	16.2′	05°03.2	12.8′	54.7′
22	148°57.3	57.8	228°38.1	16.2′	05°16.0	12.7′	54.6′
23	163°57.1	57.6	243°13.2	16.1′	05°28.7	12.7′	54.6′
	SD = 15.7′	d = -0.2′	SD = 15.0′				

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

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

Day	Sun			Moon		
	Eqn.of Time		Mer.	Mer.Pass.		
	00^h	12^h	Pass	Upper	Lower	Age
	mm:ss	mm:ss	hh:mm	hh:mm	hh:mm	
30	03:38	03:43	12:04	04:55	17:17	20(69%)
01	03:49	03:55	12:04	05:38	17:59	21(59%)
02	04:01	04:06	12:04	06:19	18:40	22(49%)