Wednesday 01 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	70°04.3′	182°46.6′	S 21°47.8′	137°25.9′	S 24°47.4′	102°03.3′	S 14°02.7′	118°26.7′	S 18°48.0′	201°04.1′	S 17°55.3′
1	85°06.7′	197°46.4′	S 21°48.2′	152°26.8′	S 24°46.9′	117°05.5′	S 14°02.6′	133°28.9′	S 18°48.0′	216°04.8′	S 17°55.8′
2	100°09.2′	212°46.1′	S 21°48.6′	167°27.7′	S 24°46.5′	132°07.6′	S 14°02.5′	148°31.2′	S 18°47.9′	231°05.5′	S 17°56.3′
3	115°11.6′	227°45.9′	S 21°49.0′	182°28.6′	S 24°46.0′	147°09.7′	S 14°02.4′	163°33.5′	S 18°47.9′	246°06.3′	S 17°56.8′
4	130°14.1′	242°45.7′	S 21°49.4′	197°29.5′	S 24°45.6′	162°11.9′	S 14°02.3′	178°35.7′	S 18°47.8′	261°07.0′	S 17°57.2′
5	145°16.6′	257°45.4′	S 21°49.8′	212°30.4′	S 24°45.1′	177°14.0′	S 14°02.1′	193°38.0′	S 18°47.8′	276°07.7′	S 17°57.7′
6	160°19.0′	272°45.2′	S 21°50.2′	227°31.3′	S 24°44.7′	192°16.2′	S 14°02.0′	208°40.3′	S 18°47.7′	291°08.4′	S 17°58.2′
7	175°21.5′	287°45.0′	S 21°50.6′	242°32.2′	S 24°44.2′	207°18.3′	S 14°01.9′	223°42.5′	S 18°47.7′	306°09.1′	S 17°58.6′
8	190°24.0′	302°44.7′	S 21°50.9′	257°33.2′	S 24°43.8′	222°20.5′	S 14°01.8′	238°44.8′	S 18°47.6′	321°09.9′	S 17°59.1′
9	205°26.4′	317°44.5′	S 21°51.3′	272°34.1′	S 24°43.3′	237°22.6′	S 14°01.7′	253°47.0′	S 18°47.6′	336°10.6′	S 17°59.6′
10	220°28.9′	332°44.2′	S 21°51.7′	287°35.0′	S 24°42.8′	252°24.7′	S 14°01.6′	268°49.3′	S 18°47.5′	351°11.3′	S 18°00.1′
11	235°31.4′	347°44.0′	S 21°52.1′	302°35.9′	S 24°42.4′	267°26.9′	S 14°01.4′	283°51.6′	S 18°47.5′	6°12.0′	S 18°00.5′
12	250°33.8′	2°43.8′	S 21°52.5′	317°36.8′	S 24°41.9′	282°29.0′	S 14°01.3′	298°53.8′	S 18°47.4′	21°12.7′	S 18°01.0′
13	265°36.3′	17°43.5′	S 21°52.8′	332°37.8′	S 24°41.5′	297°31.2′	S 14°01.2′	313°56.1′	S 18°47.4′	36°13.4′	S 18°01.5′
14	280°38.7′	32°43.3′	S 21°53.2′	347°38.7′	S 24°41.0′	312°33.3′	S 14°01.1′	328°58.4′	S 18°47.3′	51°14.1′	S 18°01.9′
15	295°41.2′	47°43.1′	S 21°53.6′	2°39.6′	S 24°40.6′	327°35.4′	S 14°01.0′	344°00.6′	S 18°47.3′	66°14.9′	S 18°02.4′
16	310°43.7′	62°42.8′	S 21°54.0′	17°40.6′	S 24°40.1′	342°37.6′	S 14°00.9′	359°02.9′	S 18°47.2′	81°15.6′	S 18°02.9′
17	325°46.1′	77°42.6′	S 21°54.4′	32°41.5′	S 24°39.7′	357°39.7′	S 14°00.7′	14°05.1′	S 18°47.2′	96°16.3′	S 18°03.4′
18	340°48.6′	92°42.4′	S 21°54.7′	47°42.5′	S 24°39.2′	12°41.9′	S 14°00.6′	29°07.4′	S 18°47.1′	111°17.0′	S 18°03.8′
19	355°51.1′	107°42.1′	S 21°55.1′	62°43.4′	S 24°38.7′	27°44.0′	S 14°00.5′	44°09.7′	S 18°47.1′	126°17.7′	S 18°04.3′
20	10°53.5′	122°41.9′	S 21°55.5′	77°44.4′	S 24°38.3′	42°46.1′	S 14°00.4′	59°11.9′	S 18°47.0′	141°18.4′	S 18°04.8′
21	25°56.0′	137°41.6′	S 21°55.9′	92°45.3′	S 24°37.8′	57°48.3′	S 14°00.3′	74°14.2′	S 18°46.9′	156°19.2′	S 18°05.2′
22	40°58.5′	152°41.4′	S 21°56.2′	107°46.3′	S 24°37.4′	72°50.4′	S 14°00.1′	89°16.5′	S 18°46.9′	171°19.9′	S 18°05.7′
23	56°00.9′	167°41.2′	S 21°56.6′	122°47.2′	S 24°36.9′	87°52.6′	S 14°00.0′	104°18.7′	S 18°46.8′	186°20.6′	S 18°06.2′
		SD 16.2′	*d* -0.4′	*v* 0.9′	*d* 0.5′	*v* 2.1′	*d* 0.1′	*v* 2.3′	*d* 0.1′	*v* 0.7′	*d* -0.5′
Mer. pass.		11 h 49 m 6 s		14 h 49 m		17 h 9 m		16 h 4 m		10 h 35 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Hadar	−Sun	−Mars	−Spica	+Arcturus	+Regulus	+Procyon	+Pollux
0	227°43.7′	S 5°46.4′	10.9′	-15.6′	59.6′	55°07.3′	46°16.8′	28°43.3′			52°43.3′	87°46.6′	88°54.6′
1	242°13.6′	S 6°02.0′	10.8′	-15.6′	59.7′	54°48.8′	45°43.4′	28°09.1′			53°19.0′	88°20.3′	89°30.6′
2	256°43.4′	S 6°17.6′	10.7′	-15.6′	59.7′	54°30.4′	45°09.9′	27°34.8′			53°54.9′	88°54.1′	90°06.6′
3	271°13.1′	S 6°33.2′	10.7′	-15.6′	59.7′	54°12.3′	44°36.4′	27°00.4′			54°30.7′	89°27.9′	90°42.6′
4	285°42.8′	S 6°48.8′	10.6′	-15.6′	59.8′	53°54.3′	44°02.8′	26°26.0′			55°06.7′	90°01.8′	91°18.7′
5	300°12.3′	S 7°04.3′	10.5′	-15.5′	59.8′	53°36.5′	43°29.1′	25°51.6′			55°42.6′	90°35.7′	91°54.8′
6	314°41.8′	S 7°19.9′	10.4′	-15.5′	59.8′	53°18.9′	42°55.5′	25°17.1′			56°18.7′	91°09.7′	92°31.0′
7	329°11.2′	S 7°35.4′	10.3′	-15.5′	59.9′	53°01.5′	42°21.7′	24°42.6′			56°54.7′	91°43.7′	93°07.2′
8	343°40.6′	S 7°50.9′	10.2′	-15.5′	59.9′	52°44.3′	41°48.0′	24°08.0′			57°30.9′	92°17.7′	93°43.5′
9	358°09.8′	S 8°06.3′	10.2′	-15.4′	59.9′	52°27.3′	41°14.2′	23°33.4′			58°07.0′	92°51.8′	94°19.8′
10	12°39.0′	S 8°21.8′	10.1′	-15.4′	60.0′	52°10.6′	40°40.3′	22°58.8′			58°43.3′	93°25.9′	94°56.1′
11	27°08.1′	S 8°37.2′	10.0′	-15.4′	60.0′	51°54.0′	40°06.4′	22°24.1′			59°19.5′	94°00.1′	95°32.6′
12	41°37.0′	S 8°52.6′	9.9′	-15.4′	60.0′	51°37.6′		21°49.3′			59°55.8′	94°34.3′	96°09.0′
13	56°06.0′	S 9°07.9′	9.8′	-15.3′	60.1′	51°21.5′		21°14.5′			60°32.2′	95°08.5′	96°45.5′
14	70°34.8′	S 9°23.3′	9.7′	-15.3′	60.1′	51°05.6′		20°39.7′			61°08.6′	95°42.8′	97°22.0′
15	85°03.5′	S 9°38.6′	9.6′	-15.3′	60.1′	50°50.0′		20°04.8′			61°45.0′	96°17.1′	97°58.6′
16	99°32.1′	S 9°53.8′	9.5′	-15.2′	60.2′	50°34.6′		19°29.9′	9°32.9′		62°21.5′	96°51.5′	98°35.2′
17	114°00.7′	S 10°09.0′	9.4′	-15.2′	60.2′			18°54.9′	10°03.8′		62°58.1′	97°25.9′	99°11.9′
18	128°29.1′	S 10°24.2′	9.4′	-15.1′	60.2′			18°19.9′	10°35.3′		63°34.7′	98°00.3′	99°48.6′
19	142°57.5′	S 10°39.3′	9.3′	-15.1′	60.3′			17°44.9′	11°07.4′		64°11.3′	98°34.7′	100°25.4′
20	157°25.7′	S 10°54.4′	9.2′	-15.0′	60.3′			17°09.8′	11°40.0′		64°48.0′	99°09.2′	101°02.2′
21	171°53.9′	S 11°09.4′	9.1′	-15.0′	60.3′			16°34.7′	12°13.0′	30°13.6′	65°24.7′	99°43.8′	101°39.0′
22	186°22.0′	S 11°24.4′	9.0′	-14.9′	60.4′			15°59.5′	12°46.4′	30°28.8′	66°01.4′	100°18.3′	102°15.9′
23	200°49.9′	S 11°39.4′	8.9′	-14.9′	60.4′			15°24.3′	13°20.2′	30°44.5′	66°38.2′	100°52.9′	102°52.8′
Mer. pass. 9 h 8 m SD 16.3′ phase 15%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.3′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.2′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.7′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.4′	Pollux	+1.2	243°20.2′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.4′	S 26°28.7′	Procyon	+0.4	244°53.3′	N 5°10.2′	Polaris	+2.0	314°45.9′	N 89°21.5′
Rigil Kent	−0.0	139°44.4′	S 60°55.2′	Adhara	+1.5	255°07.6′	S 28°60.0′	Achernar	+0.5	335°21.7′	S 57°07.8′
Arcturus	−0.1	145°50.6′	N 19°04.2′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Thursday 02 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	71°03.4′	182°40.9′	S 21°57.0′	137°48.2′	S 24°36.4′	102°54.7′	S 13°59.9′	119°21.0′	S 18°46.8′	201°21.3′	S 18°06.6′
1	86°05.9′	197°40.7′	S 21°57.3′	152°49.2′	S 24°36.0′	117°56.8′	S 13°59.8′	134°23.2′	S 18°46.7′	216°22.0′	S 18°07.1′
2	101°08.3′	212°40.4′	S 21°57.7′	167°50.1′	S 24°35.5′	132°59.0′	S 13°59.7′	149°25.5′	S 18°46.7′	231°22.7′	S 18°07.6′
3	116°10.8′	227°40.2′	S 21°58.1′	182°51.1′	S 24°35.1′	148°01.1′	S 13°59.5′	164°27.8′	S 18°46.6′	246°23.4′	S 18°08.0′
4	131°13.2′	242°40.0′	S 21°58.5′	197°52.1′	S 24°34.6′	163°03.2′	S 13°59.4′	179°30.0′	S 18°46.6′	261°24.1′	S 18°08.5′
5	146°15.7′	257°39.7′	S 21°58.8′	212°53.1′	S 24°34.1′	178°05.4′	S 13°59.3′	194°32.3′	S 18°46.5′	276°24.9′	S 18°09.0′
6	161°18.2′	272°39.5′	S 21°59.2′	227°54.0′	S 24°33.7′	193°07.5′	S 13°59.2′	209°34.6′	S 18°46.5′	291°25.6′	S 18°09.4′
7	176°20.6′	287°39.2′	S 21°59.6′	242°55.0′	S 24°33.2′	208°09.7′	S 13°59.1′	224°36.8′	S 18°46.4′	306°26.3′	S 18°09.9′
8	191°23.1′	302°39.0′	S 21°59.9′	257°56.0′	S 24°32.7′	223°11.8′	S 13°59.0′	239°39.1′	S 18°46.4′	321°27.0′	S 18°10.4′
9	206°25.6′	317°38.7′	S 22°00.3′	272°57.0′	S 24°32.3′	238°13.9′	S 13°58.8′	254°41.3′	S 18°46.3′	336°27.7′	S 18°10.8′
10	221°28.0′	332°38.5′	S 22°00.7′	287°58.0′	S 24°31.8′	253°16.1′	S 13°58.7′	269°43.6′	S 18°46.3′	351°28.4′	S 18°11.3′
11	236°30.5′	347°38.3′	S 22°01.0′	302°59.0′	S 24°31.3′	268°18.2′	S 13°58.6′	284°45.9′	S 18°46.2′	6°29.1′	S 18°11.8′
12	251°33.0′	2°38.0′	S 22°01.4′	317°60.0′	S 24°30.9′	283°20.3′	S 13°58.5′	299°48.1′	S 18°46.2′	21°29.8′	S 18°12.2′
13	266°35.4′	17°37.8′	S 22°01.7′	333°01.0′	S 24°30.4′	298°22.5′	S 13°58.4′	314°50.4′	S 18°46.1′	36°30.5′	S 18°12.7′
14	281°37.9′	32°37.5′	S 22°02.1′	348°02.0′	S 24°30.0′	313°24.6′	S 13°58.2′	329°52.6′	S 18°46.1′	51°31.3′	S 18°13.2′
15	296°40.4′	47°37.3′	S 22°02.5′	3°03.0′	S 24°29.5′	328°26.7′	S 13°58.1′	344°54.9′	S 18°46.0′	66°32.0′	S 18°13.6′
16	311°42.8′	62°37.0′	S 22°02.8′	18°04.0′	S 24°29.0′	343°28.9′	S 13°58.0′	359°57.2′	S 18°45.9′	81°32.7′	S 18°14.1′
17	326°45.3′	77°36.8′	S 22°03.2′	33°05.0′	S 24°28.5′	358°31.0′	S 13°57.9′	14°59.4′	S 18°45.9′	96°33.4′	S 18°14.6′
18	341°47.7′	92°36.6′	S 22°03.5′	48°06.0′	S 24°28.1′	13°33.1′	S 13°57.7′	30°01.7′	S 18°45.8′	111°34.1′	S 18°15.0′
19	356°50.2′	107°36.3′	S 22°03.9′	63°07.0′	S 24°27.6′	28°35.3′	S 13°57.6′	45°03.9′	S 18°45.8′	126°34.8′	S 18°15.5′
20	11°52.7′	122°36.1′	S 22°04.3′	78°08.1′	S 24°27.1′	43°37.4′	S 13°57.5′	60°06.2′	S 18°45.7′	141°35.5′	S 18°16.0′
21	26°55.1′	137°35.8′	S 22°04.6′	93°09.1′	S 24°26.7′	58°39.5′	S 13°57.4′	75°08.5′	S 18°45.7′	156°36.2′	S 18°16.4′
22	41°57.6′	152°35.6′	S 22°05.0′	108°10.1′	S 24°26.2′	73°41.7′	S 13°57.3′	90°10.7′	S 18°45.6′	171°36.9′	S 18°16.9′
23	57°00.1′	167°35.3′	S 22°05.3′	123°11.1′	S 24°25.7′	88°43.8′	S 13°57.1′	105°13.0′	S 18°45.6′	186°37.6′	S 18°17.3′
		SD 16.2′ *d* -0.4′		*v* 1.0′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.3′ *d* 0.1′		*v* 0.7′ *d* -0.5′	
Mer. pass.		11 h 49 m 29 s		14 h 48 m		17 h 6 m		16 h 0 m		10 h 34 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Rigil Kent	−Mars	+Spica	+Arcturus	+Regulus	+Procyon	+Adhara	+Pollux
0	215°17.8′	S 11°54.2′	8.8′	-14.8′	60.4′	49°07.7′	14°49.1′	13°54.3′	31°00.8′	67°15.1′	101°27.5′	101°50.1′	103°29.8′
1	229°45.6′	S 12°09.1′	8.7′	-14.8′	60.5′	48°51.2′	14°13.8′	14°28.6′	31°17.7′	67°51.9′	102°02.1′	102°10.2′	104°06.8′
2	244°13.2′	S 12°23.9′	8.6′	-14.7′	60.5′	48°35.1′	13°38.5′	15°03.2′	31°35.1′	68°28.9′	102°36.8′	102°30.3′	104°43.8′
3	258°40.8′	S 12°38.6′	8.5′	-14.7′	60.5′	48°19.2′	13°03.2′	15°38.0′	31°53.0′	69°05.8′	103°11.5′	102°50.3′	105°20.9′
4	273°08.2′	S 12°53.2′	8.4′	-14.6′	60.6′	48°03.6′	12°27.8′	16°13.0′	32°11.4′	69°42.8′	103°46.2′	103°10.3′	105°58.0′
5	287°35.6′	S 13°07.8′	8.3′	-14.5′	60.6′	47°48.3′	11°52.4′	16°48.1′	32°30.3′	70°19.9′	104°20.9′	103°30.2′	106°35.1′
6	302°02.9′	S 13°22.3′	8.1′	-14.5′	60.6′		11°16.9′	17°23.5′	32°49.7′	70°56.9′	104°55.6′	103°50.1′	107°12.3′
7	316°30.0′	S 13°36.8′	8.0′	-14.4′	60.6′		10°41.5′	17°59.0′	33°09.6′	71°34.1′	105°30.4′	104°10.0′	107°49.5′
8	330°57.0′	S 13°51.2′	7.9′	-14.3′	60.7′		10°05.9′	18°34.7′	33°29.9′	72°11.2′	106°05.2′	104°29.7′	108°26.8′
9	345°24.0′	S 14°05.5′	7.8′	-14.2′	60.7′		9°30.4′	19°10.5′	33°50.7′	72°48.4′	106°40.0′	104°49.5′	109°04.1′
10	359°50.8′	S 14°19.8′	7.7′	-14.2′	60.7′		8°54.9′	19°46.4′	34°11.9′	73°25.6′	107°14.8′	105°09.1′	109°41.4′
11	14°17.5′	S 14°33.9′	7.6′	-14.1′	60.7′		8°19.3′	20°22.4′	34°33.5′	74°02.9′	107°49.7′	105°28.7′	110°18.8′
12	28°44.1′	S 14°48.0′	7.5′	-14.0′	60.8′		7°43.7′	20°58.6′	34°55.5′	74°40.2′	108°24.5′	105°48.3′	110°56.2′
13	43°10.6′	S 15°02.0′	7.4′	-13.9′	60.8′		7°08.1′	21°34.8′	35°18.0′	75°17.5′	108°59.4′	106°07.8′	111°33.6′
14	57°37.0′	S 15°16.0′	7.3′	-13.8′	60.8′		6°32.5′	22°11.2′	35°40.8′	75°54.9′	109°34.3′	106°27.2′	112°11.1′
15	72°03.3′	S 15°29.8′	7.2′	-13.8′	60.8′		5°56.8′	22°47.6′	36°04.0′	76°32.3′	110°09.2′	106°46.5′	112°48.6′
16	86°29.4′	S 15°43.6′	7.1′	-13.7′	60.9′		5°21.2′	23°24.1′	36°27.6′	77°09.7′	110°44.1′	107°05.8′	113°26.1′
17	100°55.5′	S 15°57.2′	6.9′	-13.6′	60.9′		4°45.7′	24°00.7′	36°51.5′	77°47.2′	111°19.0′	107°24.9′	114°03.7′
18	115°21.4′	S 16°10.8′	6.8′	-13.5′	60.9′		4°10.1′	24°37.4′	37°15.7′	78°24.7′	111°53.9′	107°44.0′	114°41.3′
19	129°47.3′	S 16°24.3′	6.7′	-13.4′	60.9′		3°34.7′	25°14.2′	37°40.3′	79°02.2′	112°28.8′	108°03.1′	115°18.9′
20	144°13.0′	S 16°37.7′	6.6′	-13.3′	61.0′		2°59.5′	25°51.0′	38°05.3′	79°39.7′	113°03.8′	108°22.0′	115°56.5′
21	158°38.6′	S 16°51.0′	6.5′	-13.2′	61.0′		2°24.6′	26°27.9′	38°30.5′	80°17.3′	113°38.7′	108°40.8′	116°34.2′
22	173°04.1′	S 17°04.2′	6.4′	-13.1′	61.0′			27°04.8′	38°56.0′	80°54.9′	114°13.6′	108°59.6′	117°11.9′
23	187°29.4′	S 17°17.3′	6.3′	-13.0′	61.0′			27°41.9′	39°21.9′	81°32.6′	114°48.5′	109°18.2′	117°49.6′
Mer. pass. 10 h 1 m SD 16.5′ phase 8%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.2′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.7′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.4′	Pollux	+1.2	243°20.2′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.4′	S 26°28.7′	Procyon	+0.4	244°53.3′	N 5°10.2′	Polaris	+2.0	314°45.9′	N 89°21.5′
Rigil Kent	−0.0	139°44.4′	S 60°55.2′	Adhara	+1.5	255°07.6′	S 28°60.0′	Achernar	+0.5	335°21.7′	S 57°07.8′
Arcturus	−0.1	145°50.6′	N 19°04.2′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Friday 03 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	72°02.5′	182°35.1′	S 22°05.7′	138°12.2′	S 24°25.3′	103°45.9′	S 13°57.0′	120°15.2′	S 18°45.5′	201°38.3′	S 18°17.8′
1	87°05.0′	197°34.8′	S 22°06.0′	153°13.2′	S 24°24.8′	118°48.1′	S 13°56.9′	135°17.5′	S 18°45.5′	216°39.0′	S 18°18.3′
2	102°07.5′	212°34.6′	S 22°06.4′	168°14.2′	S 24°24.3′	133°50.2′	S 13°56.8′	150°19.7′	S 18°45.4′	231°39.8′	S 18°18.7′
3	117°09.9′	227°34.3′	S 22°06.7′	183°15.3′	S 24°23.9′	148°52.3′	S 13°56.7′	165°22.0′	S 18°45.4′	246°40.5′	S 18°19.2′
4	132°12.4′	242°34.1′	S 22°07.1′	198°16.3′	S 24°23.4′	163°54.5′	S 13°56.5′	180°24.3′	S 18°45.3′	261°41.2′	S 18°19.7′
5	147°14.9′	257°33.9′	S 22°07.4′	213°17.4′	S 24°22.9′	178°56.6′	S 13°56.4′	195°26.5′	S 18°45.3′	276°41.9′	S 18°20.1′
6	162°17.3′	272°33.6′	S 22°07.8′	228°18.4′	S 24°22.4′	193°58.7′	S 13°56.3′	210°28.8′	S 18°45.2′	291°42.6′	S 18°20.6′
7	177°19.8′	287°33.4′	S 22°08.1′	243°19.5′	S 24°22.0′	209°00.9′	S 13°56.2′	225°31.0′	S 18°45.1′	306°43.3′	S 18°21.0′
8	192°22.2′	302°33.1′	S 22°08.5′	258°20.5′	S 24°21.5′	224°03.0′	S 13°56.1′	240°33.3′	S 18°45.1′	321°44.0′	S 18°21.5′
9	207°24.7′	317°32.9′	S 22°08.8′	273°21.6′	S 24°21.0′	239°05.1′	S 13°55.9′	255°35.6′	S 18°45.0′	336°44.7′	S 18°22.0′
10	222°27.2′	332°32.6′	S 22°09.2′	288°22.7′	S 24°20.5′	254°07.2′	S 13°55.8′	270°37.8′	S 18°45.0′	351°45.4′	S 18°22.4′
11	237°29.6′	347°32.4′	S 22°09.5′	303°23.7′	S 24°20.1′	269°09.4′	S 13°55.7′	285°40.1′	S 18°44.9′	6°46.1′	S 18°22.9′
12	252°32.1′	2°32.1′	S 22°09.9′	318°24.8′	S 24°19.6′	284°11.5′	S 13°55.6′	300°42.3′	S 18°44.9′	21°46.8′	S 18°23.3′
13	267°34.6′	17°31.9′	S 22°10.2′	333°25.9′	S 24°19.1′	299°13.6′	S 13°55.4′	315°44.6′	S 18°44.8′	36°47.5′	S 18°23.8′
14	282°37.0′	32°31.6′	S 22°10.6′	348°27.0′	S 24°18.6′	314°15.8′	S 13°55.3′	330°46.8′	S 18°44.8′	51°48.2′	S 18°24.3′
15	297°39.5′	47°31.4′	S 22°10.9′	3°28.0′	S 24°18.2′	329°17.9′	S 13°55.2′	345°49.1′	S 18°44.7′	66°48.9′	S 18°24.7′
16	312°42.0′	62°31.1′	S 22°11.3′	18°29.1′	S 24°17.7′	344°20.0′	S 13°55.1′	0°51.4′	S 18°44.7′	81°49.6′	S 18°25.2′
17	327°44.4′	77°30.9′	S 22°11.6′	33°30.2′	S 24°17.2′	359°22.1′	S 13°54.9′	15°53.6′	S 18°44.6′	96°50.3′	S 18°25.6′
18	342°46.9′	92°30.6′	S 22°11.9′	48°31.3′	S 24°16.7′	14°24.3′	S 13°54.8′	30°55.9′	S 18°44.6′	111°51.0′	S 18°26.1′
19	357°49.3′	107°30.4′	S 22°12.3′	63°32.4′	S 24°16.3′	29°26.4′	S 13°54.7′	45°58.1′	S 18°44.5′	126°51.7′	S 18°26.5′
20	12°51.8′	122°30.1′	S 22°12.6′	78°33.5′	S 24°15.8′	44°28.5′	S 13°54.6′	61°00.4′	S 18°44.4′	141°52.4′	S 18°27.0′
21	27°54.3′	137°29.9′	S 22°13.0′	93°34.6′	S 24°15.3′	59°30.7′	S 13°54.5′	76°02.6′	S 18°44.4′	156°53.2′	S 18°27.5′
22	42°56.7′	152°29.6′	S 22°13.3′	108°35.7′	S 24°14.8′	74°32.8′	S 13°54.3′	91°04.9′	S 18°44.3′	171°53.9′	S 18°27.9′
23	57°59.2′	167°29.4′	S 22°13.6′	123°36.8′	S 24°14.3′	89°34.9′	S 13°54.2′	106°07.1′	S 18°44.3′	186°54.6′	S 18°28.4′
		SD 16.2′ *d* -0.3′		*v* 1.1′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.3′ *d* 0.1′		*v* 0.7′ *d* -0.5′	
Mer. pass.		11 h 49 m 53 s		14 h 46 m		17 h 3 m		15 h 57 m		10 h 33 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Mars	+Spica	+Arcturus	+Regulus	+Adhara	+Procyon	+Pollux	+Sirius
0	201°54.7′	S 17°30.3′	6.1′	-12.9′	61.0′		28°18.9′	39°48.0′	82°10.2′	109°36.8′	115°23.4′	118°27.4′	118°53.3′
1	216°19.8′	S 17°43.1′	6.0′	-12.8′	61.1′		28°56.0′	40°14.4′	82°47.9′	109°55.3′	115°58.4′	119°05.2′	119°16.9′
2	230°44.9′	S 17°55.9′	5.9′	-12.7′	61.1′		29°33.2′	40°41.0′	83°25.7′	110°13.6′	116°33.3′	119°43.0′	119°40.4′
3	245°09.8′	S 18°08.6′	5.8′	-12.5′	61.1′		30°10.5′	41°07.9′	84°03.4′	110°31.9′	117°08.2′		
4	259°34.6′	S 18°21.1′	5.7′	-12.4′	61.1′		30°47.7′	41°35.1′	84°41.2′	110°50.0′	117°43.1′		
5	273°59.3′	S 18°33.5′	5.6′	-12.3′	61.1′	2°34.8′	31°25.0′	42°02.5′	85°19.0′	111°08.1′	118°17.9′		
6	288°23.8′	S 18°45.8′	5.5′	-12.2′	61.2′	3°10.1′	32°02.4′	42°30.2′	85°56.8′	111°26.0′	118°52.8′		
7	302°48.3′	S 18°58.0′	5.3′	-12.1′	61.2′	3°45.7′	32°39.8′	42°58.1′	86°34.6′	111°43.8′	119°27.6′		
8	317°12.6′	S 19°10.1′	5.2′	-11.9′	61.2′	4°21.5′	33°17.3′	43°26.2′	87°12.5′	112°01.5′			
9	331°36.9′	S 19°22.0′	5.1′	-11.8′	61.2′	4°57.4′	33°54.7′	43°54.5′	87°50.3′	112°19.0′			
10	346°01.0′	S 19°33.8′	5.0′	-11.7′	61.2′	5°33.4′	34°32.3′	44°23.0′	88°28.2′	112°36.4′			
11	0°25.0′	S 19°45.5′	4.9′	-11.6′	61.2′	6°09.5′	35°09.8′	44°51.7′	89°06.2′	112°53.7′			
12	14°48.9′	S 19°57.1′	4.8′	-11.4′	61.2′	6°45.7′	35°47.4′	45°20.6′	89°44.1′	113°10.9′			
13	29°12.7′	S 20°08.5′	4.7′	-11.3′	61.3′	7°21.9′	36°25.0′	45°49.7′	90°22.0′	113°27.9′			
14	43°36.4′	S 20°19.8′	4.6′	-11.1′	61.3′	7°58.1′	37°02.7′	46°19.0′	91°00.0′	113°44.8′			
15	57°59.9′	S 20°30.9′	4.5′	-11.0′	61.3′								
16	72°23.4′	S 20°41.9′	4.3′	-10.9′	61.3′								
17	86°46.7′	S 20°52.8′	4.2′	-10.7′	61.3′								
18	101°10.0′	S 21°03.5′	4.1′	-10.6′	61.3′								
19	115°33.1′	S 21°14.0′	4.0′	-10.4′	61.3′								
20	129°56.1′	S 21°24.5′	3.9′	-10.3′	61.3′								
21	144°19.1′	S 21°34.7′	3.8′	-10.1′	61.3′								
22	158°41.9′	S 21°44.8′	3.7′	-10.0′	61.3′								
23	173°04.6′	S 21°54.8′	3.6′	-9.8′	61.3′								
Mer. pass. 10 h 58 m SD 16.6′ phase 3%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.2′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.7′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.4′	Pollux	+1.2	243°20.2′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.4′	S 26°28.7′	Procyon	+0.4	244°53.3′	N 5°10.2′	Polaris	+2.0	314°46.0′	N 89°21.5′
Rigil Kent	−0.0	139°44.4′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 28°60.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.6′	N 19°04.2′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Saturday 04 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	73°01.7′	182°29.1′	S 22°14.0′	138°37.9′	S 24°13.9′	104°37.0′	S 13°54.1′	121°09.4′	S 18°44.2′	201°55.3′	S 18°28.8′
1	88°04.1′	197°28.8′	S 22°14.3′	153°39.0′	S 24°13.4′	119°39.2′	S 13°54.0′	136°11.7′	S 18°44.2′	216°56.0′	S 18°29.3′
2	103°06.6′	212°28.6′	S 22°14.6′	168°40.1′	S 24°12.9′	134°41.3′	S 13°53.8′	151°13.9′	S 18°44.1′	231°56.7′	S 18°29.7′
3	118°09.1′	227°28.3′	S 22°15.0′	183°41.2′	S 24°12.4′	149°43.4′	S 13°53.7′	166°16.2′	S 18°44.1′	246°57.4′	S 18°30.2′
4	133°11.5′	242°28.1′	S 22°15.3′	198°42.3′	S 24°11.9′	164°45.5′	S 13°53.6′	181°18.4′	S 18°44.0′	261°58.1′	S 18°30.7′
5	148°14.0′	257°27.8′	S 22°15.6′	213°43.5′	S 24°11.5′	179°47.7′	S 13°53.5′	196°20.7′	S 18°44.0′	276°58.8′	S 18°31.1′
6	163°16.5′	272°27.6′	S 22°16.0′	228°44.6′	S 24°11.0′	194°49.8′	S 13°53.3′	211°22.9′	S 18°43.9′	291°59.5′	S 18°31.6′
7	178°18.9′	287°27.3′	S 22°16.3′	243°45.7′	S 24°10.5′	209°51.9′	S 13°53.2′	226°25.2′	S 18°43.9′	307°00.2′	S 18°32.0′
8	193°21.4′	302°27.1′	S 22°16.6′	258°46.8′	S 24°10.0′	224°54.0′	S 13°53.1′	241°27.4′	S 18°43.8′	322°00.9′	S 18°32.5′
9	208°23.8′	317°26.8′	S 22°17.0′	273°48.0′	S 24°09.5′	239°56.2′	S 13°53.0′	256°29.7′	S 18°43.7′	337°01.6′	S 18°32.9′
10	223°26.3′	332°26.6′	S 22°17.3′	288°49.1′	S 24°09.0′	254°58.3′	S 13°52.8′	271°31.9′	S 18°43.7′	352°02.3′	S 18°33.4′
11	238°28.8′	347°26.3′	S 22°17.6′	303°50.3′	S 24°08.6′	270°00.4′	S 13°52.7′	286°34.2′	S 18°43.6′	7°03.0′	S 18°33.8′
12	253°31.2′	2°26.1′	S 22°18.0′	318°51.4′	S 24°08.1′	285°02.5′	S 13°52.6′	301°36.5′	S 18°43.6′	22°03.7′	S 18°34.3′
13	268°33.7′	17°25.8′	S 22°18.3′	333°52.5′	S 24°07.6′	300°04.7′	S 13°52.5′	316°38.7′	S 18°43.5′	37°04.4′	S 18°34.7′
14	283°36.2′	32°25.5′	S 22°18.6′	348°53.7′	S 24°07.1′	315°06.8′	S 13°52.4′	331°41.0′	S 18°43.5′	52°05.1′	S 18°35.2′
15	298°38.6′	47°25.3′	S 22°18.9′	3°54.8′	S 24°06.6′	330°08.9′	S 13°52.2′	346°43.2′	S 18°43.4′	67°05.8′	S 18°35.6′
16	313°41.1′	62°25.0′	S 22°19.3′	18°56.0′	S 24°06.1′	345°11.0′	S 13°52.1′	1°45.5′	S 18°43.4′	82°06.5′	S 18°36.1′
17	328°43.6′	77°24.8′	S 22°19.6′	33°57.2′	S 24°05.7′	0°13.1′	S 13°52.0′	16°47.7′	S 18°43.3′	97°07.2′	S 18°36.6′
18	343°46.0′	92°24.5′	S 22°19.9′	48°58.3′	S 24°05.2′	15°15.3′	S 13°51.9′	31°50.0′	S 18°43.3′	112°07.9′	S 18°37.0′
19	358°48.5′	107°24.3′	S 22°20.2′	63°59.5′	S 24°04.7′	30°17.4′	S 13°51.7′	46°52.2′	S 18°43.2′	127°08.6′	S 18°37.5′
20	13°51.0′	122°24.0′	S 22°20.5′	79°00.7′	S 24°04.2′	45°19.5′	S 13°51.6′	61°54.5′	S 18°43.1′	142°09.3′	S 18°37.9′
21	28°53.4′	137°23.7′	S 22°20.9′	94°01.8′	S 24°03.7′	60°21.6′	S 13°51.5′	76°56.7′	S 18°43.1′	157°10.0′	S 18°38.4′
22	43°55.9′	152°23.5′	S 22°21.2′	109°03.0′	S 24°03.2′	75°23.8′	S 13°51.4′	91°59.0′	S 18°43.0′	172°10.7′	S 18°38.8′
23	58°58.3′	167°23.2′	S 22°21.5′	124°04.2′	S 24°02.7′	90°25.9′	S 13°51.2′	107°01.2′	S 18°43.0′	187°11.4′	S 18°39.3′
		SD 16.2′ *d* -0.3′		*v* 1.1′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.3′ *d* 0.1′		*v* 0.7′ *d* -0.5′	
Mer. pass.		11 h 50 m 17 s		14 h 44 m		16 h 59 m		15 h 53 m		10 h 32 m	

h	Moon				
	GHA	dec	*v*	*d*	HP
0	187°27.2′	S 22°04.6′	3.5′	-9.6′	61.4′
1	201°49.7′	S 22°14.2′	3.4′	-9.5′	61.4′
2	216°12.1′	S 22°23.7′	3.3′	-9.3′	61.4′
3	230°34.5′	S 22°33.0′	3.2′	-9.2′	61.4′
4	244°56.7′	S 22°42.2′	3.1′	-9.0′	61.4′
5	259°18.8′	S 22°51.2′	3.0′	-8.8′	61.4′
6	273°40.8′	S 22°60.0′	2.9′	-8.6′	61.4′
7	288°02.8′	S 23°08.6′	2.9′	-8.5′	61.4′
8	302°24.6′	S 23°17.1′	2.8′	-8.3′	61.4′
9	316°46.4′	S 23°25.4′	2.7′	-8.1′	61.4′
10	331°08.1′	S 23°33.5′	2.6′	-7.9′	61.4′
11	345°29.7′	S 23°41.5′	2.5′	-7.8′	61.4′
12	359°51.2′	S 23°49.2′	2.4′	-7.6′	61.4′
13	14°12.7′	S 23°56.8′	2.4′	-7.4′	61.4′
14	28°34.0′	S 24°04.2′	2.3′	-7.2′	61.4′
15	42°55.3′	S 24°11.4′	2.2′	-7.0′	61.4′
16	57°16.5′	S 24°18.5′	2.1′	-6.8′	61.4′
17	71°37.7′	S 24°25.3′	2.1′	-6.7′	61.4′
18	85°58.8′	S 24°32.0′	2.0′	-6.5′	61.4′
19	100°19.8′	S 24°38.4′	2.0′	-6.3′	61.4′
20	114°40.7′	S 24°44.7′	1.9′	-6.1′	61.4′
21	129°01.6′	S 24°50.8′	1.8′	-5.9′	61.3′
22	143°22.5′	S 24°56.7′	1.8′	-5.7′	61.3′
23	157°43.3′	S 25°02.4′	1.7′	-5.5′	61.3′
Mer. pass. 12 h 1 m SD 16.7′ phase 0%					

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.2′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.4′	Pollux	+1.2	243°20.2′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.4′	S 26°28.7′	Procyon	+0.4	244°53.3′	N 5°10.2′	Polaris	+2.0	314°46.0′	N 89°21.5′
Rigil Kent	−0.0	139°44.4′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 28°60.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.6′	N 19°04.2′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Sunday 05 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	74°00.8′	182°23.0′	S 22°21.8′	139°05.4′	S 24°02.3′	105°28.0′	S 13°51.1′	122°03.5′	S 18°42.9′	202°12.1′	S 18°39.7′
1	89°03.3′	197°22.7′	S 22°22.1′	154°06.6′	S 24°01.8′	120°30.1′	S 13°51.0′	137°05.8′	S 18°42.9′	217°12.7′	S 18°40.2′
2	104°05.7′	212°22.5′	S 22°22.5′	169°07.7′	S 24°01.3′	135°32.2′	S 13°50.8′	152°08.0′	S 18°42.8′	232°13.4′	S 18°40.6′
3	119°08.2′	227°22.2′	S 22°22.8′	184°08.9′	S 24°00.8′	150°34.4′	S 13°50.7′	167°10.3′	S 18°42.8′	247°14.1′	S 18°41.1′
4	134°10.7′	242°21.9′	S 22°23.1′	199°10.1′	S 24°00.3′	165°36.5′	S 13°50.6′	182°12.5′	S 18°42.7′	262°14.8′	S 18°41.5′
5	149°13.1′	257°21.7′	S 22°23.4′	214°11.3′	S 23°59.8′	180°38.6′	S 13°50.5′	197°14.8′	S 18°42.6′	277°15.5′	S 18°42.0′
6	164°15.6′	272°21.4′	S 22°23.7′	229°12.5′	S 23°59.3′	195°40.7′	S 13°50.3′	212°17.0′	S 18°42.6′	292°16.2′	S 18°42.4′
7	179°18.1′	287°21.2′	S 22°24.0′	244°13.7′	S 23°58.8′	210°42.8′	S 13°50.2′	227°19.3′	S 18°42.5′	307°16.9′	S 18°42.9′
8	194°20.5′	302°20.9′	S 22°24.3′	259°15.0′	S 23°58.3′	225°45.0′	S 13°50.1′	242°21.5′	S 18°42.5′	322°17.6′	S 18°43.3′
9	209°23.0′	317°20.6′	S 22°24.7′	274°16.2′	S 23°57.8′	240°47.1′	S 13°50.0′	257°23.8′	S 18°42.4′	337°18.3′	S 18°43.8′
10	224°25.5′	332°20.4′	S 22°25.0′	289°17.4′	S 23°57.4′	255°49.2′	S 13°49.8′	272°26.0′	S 18°42.4′	352°19.0′	S 18°44.2′
11	239°27.9′	347°20.1′	S 22°25.3′	304°18.6′	S 23°56.9′	270°51.3′	S 13°49.7′	287°28.3′	S 18°42.3′	7°19.7′	S 18°44.6′
12	254°30.4′	2°19.9′	S 22°25.6′	319°19.8′	S 23°56.4′	285°53.4′	S 13°49.6′	302°30.5′	S 18°42.3′	22°20.4′	S 18°45.1′
13	269°32.8′	17°19.6′	S 22°25.9′	334°21.0′	S 23°55.9′	300°55.5′	S 13°49.5′	317°32.8′	S 18°42.2′	37°21.1′	S 18°45.5′
14	284°35.3′	32°19.3′	S 22°26.2′	349°22.3′	S 23°55.4′	315°57.7′	S 13°49.3′	332°35.0′	S 18°42.1′	52°21.8′	S 18°46.0′
15	299°37.8′	47°19.1′	S 22°26.5′	4°23.5′	S 23°54.9′	330°59.8′	S 13°49.2′	347°37.3′	S 18°42.1′	67°22.5′	S 18°46.4′
16	314°40.2′	62°18.8′	S 22°26.8′	19°24.7′	S 23°54.4′	346°01.9′	S 13°49.1′	2°39.5′	S 18°42.0′	82°23.2′	S 18°46.9′
17	329°42.7′	77°18.5′	S 22°27.1′	34°26.0′	S 23°53.9′	1°04.0′	S 13°49.0′	17°41.8′	S 18°42.0′	97°23.9′	S 18°47.3′
18	344°45.2′	92°18.3′	S 22°27.4′	49°27.2′	S 23°53.4′	16°06.1′	S 13°48.8′	32°44.0′	S 18°41.9′	112°24.6′	S 18°47.8′
19	359°47.6′	107°18.0′	S 22°27.7′	64°28.5′	S 23°52.9′	31°08.2′	S 13°48.7′	47°46.3′	S 18°41.9′	127°25.3′	S 18°48.2′
20	14°50.1′	122°17.8′	S 22°28.0′	79°29.7′	S 23°52.4′	46°10.4′	S 13°48.6′	62°48.5′	S 18°41.8′	142°25.9′	S 18°48.7′
21	29°52.6′	137°17.5′	S 22°28.3′	94°31.0′	S 23°51.9′	61°12.5′	S 13°48.4′	77°50.8′	S 18°41.8′	157°26.6′	S 18°49.1′
22	44°55.0′	152°17.2′	S 22°28.6′	109°32.2′	S 23°51.4′	76°14.6′	S 13°48.3′	92°53.0′	S 18°41.7′	172°27.3′	S 18°49.6′
23	59°57.5′	167°17.0′	S 22°28.9′	124°33.5′	S 23°50.9′	91°16.7′	S 13°48.2′	107°55.3′	S 18°41.6′	187°28.0′	S 18°50.0′
		SD 16.2′ *d* -0.3′		*v* 1.2′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.3′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 50 m 42 s		14 h 42 m		16 h 56 m		15 h 49 m		10 h 31 m	

h	Moon					Lunar distance						
	GHA	dec	*v*	*d*	HP	−Achernar	−Deneb	−Fomalhaut	−Jupiter	−Altair	−Saturn	−Venus
0	172°04.0′	S 25°07.9′	1.7′	-5.3′	61.3′							
1	186°24.7′	S 25°13.2′	1.6′	-5.1′	61.3′	84°23.5′	82°56.0′	71°25.5′	62°34.7′	48°27.4′	45°57.0′	29°19.1′
2	200°45.3′	S 25°18.3′	1.6′	-4.9′	61.3′	84°01.4′	82°40.6′	70°49.0′	61°57.0′	48°02.1′	45°19.2′	28°42.2′
3	215°05.9′	S 25°23.2′	1.6′	-4.7′	61.3′	83°39.3′	82°25.2′	70°12.5′	61°19.3′	47°36.9′	44°41.4′	28°05.3′
4	229°26.4′	S 25°27.9′	1.5′	-4.5′	61.3′	83°17.3′	82°09.9′	69°36.0′	60°41.7′	47°12.0′	44°03.7′	27°28.5′
5	243°46.9′	S 25°32.4′	1.5′	-4.3′	61.3′	82°55.4′	81°54.6′	68°59.5′	60°04.1′	46°47.3′	43°26.0′	26°51.6′
6	258°07.4′	S 25°36.7′	1.4′	-4.1′	61.3′	82°33.4′	81°39.4′	68°23.0′	59°26.4′	46°22.8′	42°48.3′	26°14.8′
7	272°27.9′	S 25°40.8′	1.4′	-3.9′	61.3′	82°11.5′	81°24.3′	67°46.6′	58°48.8′	45°58.6′	42°10.6′	25°38.0′
8	286°48.3′	S 25°44.7′	1.4′	-3.7′	61.2′	81°49.7′	81°09.2′	67°10.3′	58°11.3′	45°34.7′	41°32.9′	25°01.2′
9	301°08.7′	S 25°48.4′	1.4′	-3.5′	61.2′	81°27.9′		66°33.9′	57°33.7′	45°11.0′	40°55.3′	24°24.5′
10	315°29.1′	S 25°51.9′	1.4′	-3.3′	61.2′	81°06.2′		65°57.6′	56°56.1′	44°47.6′	40°17.7′	23°47.7′
11	329°49.4′	S 25°55.2′	1.3′	-3.1′	61.2′	80°44.5′		65°21.3′	56°18.6′	44°24.4′	39°40.1′	23°11.0′
12	344°09.7′	S 25°58.3′	1.3′	-2.9′	61.2′	80°22.9′		64°45.1′	55°41.1′	44°01.6′	39°02.5′	22°34.3′
13	358°30.1′	S 26°01.2′	1.3′	-2.7′	61.2′	80°01.4′		64°08.9′	55°03.6′	43°39.0′	38°25.0′	21°57.6′
14	12°50.4′	S 26°03.8′	1.3′	-2.5′	61.2′	79°39.9′		63°32.7′	54°26.2′	43°16.7′	37°47.5′	21°21.0′
15	27°10.7′	S 26°06.3′	1.3′	-2.3′	61.1′	79°18.4′		62°56.6′	53°48.8′	42°54.8′	37°10.0′	20°44.3′
16	41°31.0′	S 26°08.6′	1.3′	-2.1′	61.1′	78°57.1′		62°20.5′	53°11.4′	42°33.1′	36°32.6′	20°07.7′
17	55°51.3′	S 26°10.6′	1.3′	-1.9′	61.1′	78°35.8′		61°44.5′	52°34.0′	42°11.8′	35°55.2′	19°31.2′
18	70°11.6′	S 26°12.5′	1.3′	-1.6′	61.1′	78°14.6′		61°08.5′	51°56.6′	41°50.8′	35°17.8′	18°54.6′
19	84°31.9′	S 26°14.1′	1.3′	-1.4′	61.1′	77°53.4′		60°32.5′	51°19.3′	41°30.2′	34°40.4′	18°18.1′
20	98°52.2′	S 26°15.6′	1.3′	-1.2′	61.0′	77°32.3′		59°56.6′	50°42.0′	41°09.8′	34°03.1′	17°41.7′
21	113°12.5′	S 26°16.8′	1.3′	-1.0′	61.0′	77°11.3′		59°20.8′	50°04.7′	40°49.9′	33°25.8′	17°05.2′
22	127°32.9′	S 26°17.8′	1.4′	-0.8′	61.0′	76°50.4′		58°45.0′	49°27.5′	40°30.3′	32°48.6′	16°28.9′
23	141°53.3′	S 26°18.6′	1.4′	-0.6′	61.0′	76°29.6′		58°09.2′	48°50.3′	40°11.1′	32°11.4′	15°52.5′
Mer. pass. 13 h 6 m SD 16.7′ phase 1%												

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.2′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.4′	Pollux	+1.2	243°20.2′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.4′	S 26°28.7′	Procyon	+0.4	244°53.3′	N 5°10.2′	Polaris	+2.0	314°46.1′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 28°60.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.2′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Monday 06 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	74°60.0′	182°16.7′	S 22°29.2′	139°34.7′	S 23°50.4′	106°18.8′	S 13°48.1′	122°57.5′	S 18°41.6′	202°28.7′	S 18°50.4′
1	90°02.4′	197°16.4′	S 22°29.5′	154°36.0′	S 23°50.0′	121°20.9′	S 13°47.9′	137°59.8′	S 18°41.5′	217°29.4′	S 18°50.9′
2	105°04.9′	212°16.2′	S 22°29.8′	169°37.3′	S 23°49.5′	136°23.0′	S 13°47.8′	153°02.0′	S 18°41.5′	232°30.1′	S 18°51.3′
3	120°07.3′	227°15.9′	S 22°30.1′	184°38.5′	S 23°49.0′	151°25.2′	S 13°47.7′	168°04.3′	S 18°41.4′	247°30.8′	S 18°51.8′
4	135°09.8′	242°15.6′	S 22°30.4′	199°39.8′	S 23°48.5′	166°27.3′	S 13°47.5′	183°06.5′	S 18°41.4′	262°31.5′	S 18°52.2′
5	150°12.3′	257°15.4′	S 22°30.7′	214°41.1′	S 23°48.0′	181°29.4′	S 13°47.4′	198°08.8′	S 18°41.3′	277°32.2′	S 18°52.7′
6	165°14.7′	272°15.1′	S 22°31.0′	229°42.4′	S 23°47.5′	196°31.5′	S 13°47.3′	213°11.0′	S 18°41.3′	292°32.9′	S 18°53.1′
7	180°17.2′	287°14.9′	S 22°31.3′	244°43.7′	S 23°47.0′	211°33.6′	S 13°47.2′	228°13.3′	S 18°41.2′	307°33.6′	S 18°53.5′
8	195°19.7′	302°14.6′	S 22°31.6′	259°44.9′	S 23°46.5′	226°35.7′	S 13°47.0′	243°15.5′	S 18°41.1′	322°34.2′	S 18°54.0′
9	210°22.1′	317°14.3′	S 22°31.9′	274°46.2′	S 23°46.0′	241°37.8′	S 13°46.9′	258°17.8′	S 18°41.1′	337°34.9′	S 18°54.4′
10	225°24.6′	332°14.1′	S 22°32.2′	289°47.5′	S 23°45.5′	256°40.0′	S 13°46.8′	273°20.0′	S 18°41.0′	352°35.6′	S 18°54.9′
11	240°27.1′	347°13.8′	S 22°32.5′	304°48.8′	S 23°45.0′	271°42.1′	S 13°46.7′	288°22.3′	S 18°41.0′	7°36.3′	S 18°55.3′
12	255°29.5′	2°13.5′	S 22°32.8′	319°50.1′	S 23°44.5′	286°44.2′	S 13°46.5′	303°24.5′	S 18°40.9′	22°37.0′	S 18°55.7′
13	270°32.0′	17°13.3′	S 22°33.1′	334°51.4′	S 23°44.0′	301°46.3′	S 13°46.4′	318°26.8′	S 18°40.9′	37°37.7′	S 18°56.2′
14	285°34.5′	32°13.0′	S 22°33.4′	349°52.7′	S 23°43.5′	316°48.4′	S 13°46.3′	333°29.0′	S 18°40.8′	52°38.4′	S 18°56.6′
15	300°36.9′	47°12.7′	S 22°33.7′	4°54.1′	S 23°43.0′	331°50.5′	S 13°46.1′	348°31.3′	S 18°40.7′	67°39.1′	S 18°57.1′
16	315°39.4′	62°12.5′	S 22°33.9′	19°55.4′	S 23°42.5′	346°52.6′	S 13°46.0′	3°33.5′	S 18°40.7′	82°39.8′	S 18°57.5′
17	330°41.8′	77°12.2′	S 22°34.2′	34°56.7′	S 23°42.0′	1°54.7′	S 13°45.9′	18°35.8′	S 18°40.6′	97°40.4′	S 18°58.0′
18	345°44.3′	92°11.9′	S 22°34.5′	49°58.0′	S 23°41.5′	16°56.8′	S 13°45.7′	33°38.0′	S 18°40.6′	112°41.1′	S 18°58.4′
19	0°46.8′	107°11.6′	S 22°34.8′	64°59.3′	S 23°41.0′	31°59.0′	S 13°45.6′	48°40.3′	S 18°40.5′	127°41.8′	S 18°58.8′
20	15°49.2′	122°11.4′	S 22°35.1′	80°00.7′	S 23°40.5′	47°01.1′	S 13°45.5′	63°42.5′	S 18°40.5′	142°42.5′	S 18°59.3′
21	30°51.7′	137°11.1′	S 22°35.4′	95°02.0′	S 23°40.0′	62°03.2′	S 13°45.4′	78°44.7′	S 18°40.4′	157°43.2′	S 18°59.7′
22	45°54.2′	152°10.8′	S 22°35.7′	110°03.3′	S 23°39.5′	77°05.3′	S 13°45.2′	93°47.0′	S 18°40.4′	172°43.9′	S 19°00.1′
23	60°56.6′	167°10.6′	S 22°35.9′	125°04.7′	S 23°39.0′	92°07.4′	S 13°45.1′	108°49.2′	S 18°40.3′	187°44.6′	S 19°00.6′
		SD 16.2′ *d* -0.3′		*v* 1.3′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 51 m 7 s		14 h 40 m		16 h 52 m		15 h 46 m		10 h 30 m	

h	Moon					Lunar distance					
	GHA	dec	*v*	*d*	HP	−Achernar	−Fomalhaut	−Jupiter	−Altair	−Saturn	−Venus
0	156°13.7′	S 26°19.3′	1.4′	-0.4′	61.0′	76°08.8′	57°33.5′	48°13.1′	39°52.2′	31°34.2′	15°16.2′
1	170°34.1′	S 26°19.7′	1.4′	-0.2′	60.9′	75°48.2′	56°57.9′	47°36.0′	39°33.8′	30°57.1′	14°40.0′
2	184°54.5′	S 26°19.9′	1.5′	-0.0′	60.9′	75°27.6′	56°22.3′	46°58.9′	39°15.7′	30°20.0′	14°03.7′
3	199°15.0′	S 26°19.9′	1.5′	0.2′	60.9′	75°07.1′	55°46.7′	46°21.8′	38°58.1′	29°43.0′	13°27.6′
4	213°35.5′	S 26°19.7′	1.6′	0.4′	60.9′	74°46.7′	55°11.3′	45°44.8′	38°40.9′	29°06.0′	12°51.5′
5	227°56.1′	S 26°19.3′	1.6′	0.6′	60.8′	74°26.5′	54°35.9′	45°07.8′	38°24.0′	28°29.0′	12°15.5′
6	242°16.7′	S 26°18.7′	1.6′	0.8′	60.8′	74°06.3′	54°00.5′	44°30.8′	38°07.7′	27°52.1′	11°39.5′
7	256°37.3′	S 26°17.9′	1.7′	1.0′	60.8′	73°46.2′	53°25.2′	43°53.9′	37°51.7′	27°15.3′	11°03.6′
8	270°58.0′	S 26°16.8′	1.7′	1.2′	60.8′	73°26.2′	52°50.0′	43°17.0′	37°36.2′	26°38.5′	10°27.9′
9	285°18.7′	S 26°15.6′	1.8′	1.4′	60.7′	73°06.3′	52°14.9′	42°40.1′		26°01.7′	9°52.2′
10	299°39.5′	S 26°14.2′	1.8′	1.6′	60.7′	72°46.5′	51°39.8′	42°03.3′		25°25.0′	9°16.6′
11	314°00.3′	S 26°12.6′	1.9′	1.8′	60.7′	72°26.9′	51°04.8′	41°26.5′		24°48.4′	8°41.1′
12	328°21.3′	S 26°10.8′	2.0′	2.0′	60.7′	72°07.3′	50°29.9′	40°49.8′		24°11.8′	8°05.8′
13	342°42.2′	S 26°08.8′	2.0′	2.2′	60.6′	71°47.9′	49°55.0′	40°13.1′		23°35.3′	7°30.7′
14	357°03.3′	S 26°06.6′	2.1′	2.4′	60.6′	71°28.5′	49°20.2′	39°36.4′		22°58.9′	6°55.8′
15	11°24.4′	S 26°04.2′	2.2′	2.6′	60.6′	71°09.3′	48°45.5′	38°59.8′		22°22.5′	6°21.1′
16	25°45.5′	S 26°01.6′	2.2′	2.8′	60.6′	70°50.2′	48°10.9′	38°23.3′		21°46.2′	5°46.8′
17	40°06.8′	S 25°58.8′	2.3′	3.0′	60.5′	70°31.3′	47°36.4′	37°46.7′		21°10.0′	5°12.9′
18	54°28.1′	S 25°55.9′	2.4′	3.2′	60.5′	70°12.4′	47°01.9′	37°10.3′		20°33.8′	4°39.5′
19	68°49.5′	S 25°52.7′	2.5′	3.4′	60.5′	69°53.7′	46°27.5′	36°33.8′		19°57.7′	
20	83°11.0′	S 25°49.4′	2.6′	3.5′	60.4′	69°35.1′	45°53.3′	35°57.5′		19°21.7′	
21	97°32.5′	S 25°45.8′	2.6′	3.7′	60.4′	69°16.7′	45°19.1′	35°21.1′		18°45.8′	
22	111°54.2′	S 25°42.1′	2.7′	3.9′	60.4′	68°58.3′	44°45.0′	34°44.8′		18°10.0′	
23	126°15.9′	S 25°38.2′	2.8′	4.1′	60.3′	68°40.2′	44°11.0′	34°08.6′		17°34.3′	
Mer. pass. 14 h 12 m SD 16.6′ phase 4%											

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.2′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°46.1′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 28°60.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.2′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Tuesday 07 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	75°59.1′	182°10.3′	S 22°36.2′	140°06.0′	S 23°38.5′	107°09.5′	S 13°45.0′	123°51.5′	S 18°40.2′	202°45.3′	S 19°01.0′
1	91°01.6′	197°10.0′	S 22°36.5′	155°07.4′	S 23°38.0′	122°11.6′	S 13°44.8′	138°53.7′	S 18°40.2′	217°45.9′	S 19°01.5′
2	106°04.0′	212°09.8′	S 22°36.8′	170°08.7′	S 23°37.5′	137°13.7′	S 13°44.7′	153°56.0′	S 18°40.1′	232°46.6′	S 19°01.9′
3	121°06.5′	227°09.5′	S 22°37.1′	185°10.1′	S 23°37.0′	152°15.8′	S 13°44.6′	168°58.2′	S 18°40.1′	247°47.3′	S 19°02.3′
4	136°09.0′	242°09.2′	S 22°37.3′	200°11.4′	S 23°36.5′	167°17.9′	S 13°44.5′	184°00.5′	S 18°40.0′	262°48.0′	S 19°02.8′
5	151°11.4′	257°09.0′	S 22°37.6′	215°12.8′	S 23°36.0′	182°20.1′	S 13°44.3′	199°02.7′	S 18°40.0′	277°48.7′	S 19°03.2′
6	166°13.9′	272°08.7′	S 22°37.9′	230°14.1′	S 23°35.5′	197°22.2′	S 13°44.2′	214°05.0′	S 18°39.9′	292°49.4′	S 19°03.6′
7	181°16.3′	287°08.4′	S 22°38.2′	245°15.5′	S 23°35.0′	212°24.3′	S 13°44.1′	229°07.2′	S 18°39.8′	307°50.0′	S 19°04.1′
8	196°18.8′	302°08.1′	S 22°38.4′	260°16.9′	S 23°34.4′	227°26.4′	S 13°43.9′	244°09.5′	S 18°39.8′	322°50.7′	S 19°04.5′
9	211°21.3′	317°07.9′	S 22°38.7′	275°18.3′	S 23°33.9′	242°28.5′	S 13°43.8′	259°11.7′	S 18°39.7′	337°51.4′	S 19°04.9′
10	226°23.7′	332°07.6′	S 22°39.0′	290°19.6′	S 23°33.4′	257°30.6′	S 13°43.7′	274°13.9′	S 18°39.7′	352°52.1′	S 19°05.4′
11	241°26.2′	347°07.3′	S 22°39.3′	305°21.0′	S 23°32.9′	272°32.7′	S 13°43.5′	289°16.2′	S 18°39.6′	7°52.8′	S 19°05.8′
12	256°28.7′	2°07.1′	S 22°39.5′	320°22.4′	S 23°32.4′	287°34.8′	S 13°43.4′	304°18.4′	S 18°39.6′	22°53.5′	S 19°06.3′
13	271°31.1′	17°06.8′	S 22°39.8′	335°23.8′	S 23°31.9′	302°36.9′	S 13°43.3′	319°20.7′	S 18°39.5′	37°54.2′	S 19°06.7′
14	286°33.6′	32°06.5′	S 22°40.1′	350°25.2′	S 23°31.4′	317°39.0′	S 13°43.1′	334°22.9′	S 18°39.4′	52°54.8′	S 19°07.1′
15	301°36.1′	47°06.2′	S 22°40.4′	5°26.6′	S 23°30.9′	332°41.1′	S 13°43.0′	349°25.2′	S 18°39.4′	67°55.5′	S 19°07.6′
16	316°38.5′	62°06.0′	S 22°40.6′	20°28.0′	S 23°30.4′	347°43.2′	S 13°42.9′	4°27.4′	S 18°39.3′	82°56.2′	S 19°08.0′
17	331°41.0′	77°05.7′	S 22°40.9′	35°29.4′	S 23°29.9′	2°45.3′	S 13°42.8′	19°29.7′	S 18°39.3′	97°56.9′	S 19°08.4′
18	346°43.5′	92°05.4′	S 22°41.2′	50°30.8′	S 23°29.4′	17°47.4′	S 13°42.6′	34°31.9′	S 18°39.2′	112°57.6′	S 19°08.9′
19	1°45.9′	107°05.2′	S 22°41.4′	65°32.2′	S 23°28.9′	32°49.5′	S 13°42.5′	49°34.2′	S 18°39.2′	127°58.3′	S 19°09.3′
20	16°48.4′	122°04.9′	S 22°41.7′	80°33.6′	S 23°28.4′	47°51.7′	S 13°42.4′	64°36.4′	S 18°39.1′	142°58.9′	S 19°09.7′
21	31°50.8′	137°04.6′	S 22°42.0′	95°35.0′	S 23°27.9′	62°53.8′	S 13°42.2′	79°38.6′	S 18°39.0′	157°59.6′	S 19°10.2′
22	46°53.3′	152°04.3′	S 22°42.2′	110°36.4′	S 23°27.4′	77°55.9′	S 13°42.1′	94°40.9′	S 18°39.0′	173°00.3′	S 19°10.6′
23	61°55.8′	167°04.1′	S 22°42.5′	125°37.9′	S 23°26.9′	92°58.0′	S 13°42.0′	109°43.1′	S 18°38.9′	188°01.0′	S 19°11.0′
		SD 16.2′ *d* -0.3′		*v* 1.4′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 51 m 33 s		14 h 38 m		16 h 49 m		15 h 42 m		10 h 29 m	

h	Moon					Lunar distance					
	GHA	dec	*v*	*d*	HP	−Achernar	−Fomalhaut	−Jupiter	−Saturn	−Venus	+Sun
0	140°37.7′	S 25°34.1′	2.9′	4.3′	60.3′	68°22.1′	43°37.1′	33°32.4′	16°58.7′		
1	154°59.7′	S 25°29.8′	3.0′	4.5′	60.3′	68°04.2′	43°03.3′	32°56.3′	16°23.2′		
2	169°21.7′	S 25°25.4′	3.1′	4.6′	60.3′	67°46.4′	42°29.7′	32°20.2′	15°47.9′		
3	183°43.8′	S 25°20.7′	3.2′	4.8′	60.2′	67°28.8′	41°56.1′	31°44.2′	15°12.7′		
4	198°06.0′	S 25°15.9′	3.3′	5.0′	60.2′	67°11.3′	41°22.6′	31°08.2′	14°37.6′		40°10.3′
5	212°28.3′	S 25°10.9′	3.4′	5.2′	60.2′	66°54.0′	40°49.3′	30°32.3′	14°02.7′		40°44.5′
6	226°50.7′	S 25°05.8′	3.5′	5.3′	60.1′	66°36.8′	40°16.1′	29°56.4′	13°27.9′		41°18.5′
7	241°13.2′	S 25°00.4′	3.6′	5.5′	60.1′	66°19.8′	39°42.9′	29°20.6′	12°53.4′		41°52.6′
8	255°35.9′	S 24°54.9′	3.7′	5.7′	60.1′	66°02.9′	39°10.0′	28°44.9′	12°19.0′	4°28.6′	42°26.6′
9	269°58.6′	S 24°49.3′	3.8′	5.8′	60.0′	65°46.2′	38°37.1′	28°09.2′	11°44.9′	5°01.1′	43°00.5′
10	284°21.4′	S 24°43.4′	4.0′	6.0′	60.0′	65°29.6′	38°04.4′	27°33.6′	11°11.1′	5°34.2′	43°34.4′
11	298°44.4′	S 24°37.4′	4.1′	6.2′	60.0′	65°13.2′	37°31.8′	26°58.0′	10°37.6′	6°07.7′	44°08.3′
12	313°07.5′	S 24°31.2′	4.2′	6.3′	59.9′	64°57.0′	36°59.4′	26°22.5′	10°04.4′	6°41.5′	44°42.1′
13	327°30.6′	S 24°24.9′	4.3′	6.5′	59.9′	64°40.9′	36°27.1′	25°47.1′	9°31.6′	7°15.5′	45°15.9′
14	341°53.9′	S 24°18.4′	4.4′	6.7′	59.8′	64°25.0′	35°54.9′	25°11.7′	8°59.2′	7°49.6′	45°49.6′
15	356°17.4′	S 24°11.7′	4.5′	6.8′	59.8′	64°09.3′	35°23.0′	24°36.4′	8°27.4′	8°23.9′	46°23.3′
16	10°40.9′	S 24°04.9′	4.7′	7.0′	59.8′	63°53.7′	34°51.1′	24°01.2′	7°56.3′	8°58.2′	46°56.9′
17	25°04.5′	S 23°58.0′	4.8′	7.1′	59.7′	63°38.3′	34°19.5′	23°26.1′		9°32.6′	47°30.5′
18	39°28.3′	S 23°50.9′	4.9′	7.3′	59.7′	63°23.1′	33°48.0′	22°51.0′		10°07.0′	48°04.0′
19	53°52.2′	S 23°43.6′	5.0′	7.4′	59.7′		33°16.7′	22°16.0′		10°41.4′	48°37.5′
20	68°16.2′	S 23°36.2′	5.1′	7.6′	59.6′		32°45.5′	21°41.1′		11°15.9′	49°11.0′
21	82°40.4′	S 23°28.6′	5.3′	7.7′	59.6′		32°14.6′	21°06.2′		11°50.3′	49°44.4′
22	97°04.6′	S 23°20.9′	5.4′	7.9′	59.6′		31°43.9′	20°31.5′		12°24.8′	50°17.7′
23	111°29.0′	S 23°13.0′	5.5′	8.0′	59.5′		31°13.3′	19°56.8′		12°59.2′	50°51.0′
Mer. pass. 15 h 15 m SD 16.4′ phase 11%											

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.3′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°46.2′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 28°60.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.1′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Wednesday 08 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	76°58.2′	182°03.8′	S 22°42.8′	140°39.3′	S 23°26.3′	108°00.1′	S 13°41.8′	124°45.4′	S 18°38.9′	203°01.7′	S 19°11.4′
1	92°00.7′	197°03.5′	S 22°43.0′	155°40.7′	S 23°25.8′	123°02.2′	S 13°41.7′	139°47.6′	S 18°38.8′	218°02.3′	S 19°11.9′
2	107°03.2′	212°03.2′	S 22°43.3′	170°42.2′	S 23°25.3′	138°04.3′	S 13°41.6′	154°49.9′	S 18°38.8′	233°03.0′	S 19°12.3′
3	122°05.6′	227°03.0′	S 22°43.5′	185°43.6′	S 23°24.8′	153°06.4′	S 13°41.4′	169°52.1′	S 18°38.7′	248°03.7′	S 19°12.7′
4	137°08.1′	242°02.7′	S 22°43.8′	200°45.0′	S 23°24.3′	168°08.5′	S 13°41.3′	184°54.4′	S 18°38.6′	263°04.4′	S 19°13.2′
5	152°10.6′	257°02.4′	S 22°44.1′	215°46.5′	S 23°23.8′	183°10.6′	S 13°41.2′	199°56.6′	S 18°38.6′	278°05.1′	S 19°13.6′
6	167°13.0′	272°02.1′	S 22°44.3′	230°47.9′	S 23°23.3′	198°12.7′	S 13°41.0′	214°58.8′	S 18°38.5′	293°05.7′	S 19°14.0′
7	182°15.5′	287°01.9′	S 22°44.6′	245°49.4′	S 23°22.8′	213°14.8′	S 13°40.9′	230°01.1′	S 18°38.5′	308°06.4′	S 19°14.5′
8	197°18.0′	302°01.6′	S 22°44.8′	260°50.8′	S 23°22.3′	228°16.9′	S 13°40.8′	245°03.3′	S 18°38.4′	323°07.1′	S 19°14.9′
9	212°20.4′	317°01.3′	S 22°45.1′	275°52.3′	S 23°21.8′	243°19.0′	S 13°40.6′	260°05.6′	S 18°38.4′	338°07.8′	S 19°15.3′
10	227°22.9′	332°01.0′	S 22°45.4′	290°53.8′	S 23°21.3′	258°21.1′	S 13°40.5′	275°07.8′	S 18°38.3′	353°08.5′	S 19°15.7′
11	242°25.3′	347°00.8′	S 22°45.6′	305°55.2′	S 23°20.7′	273°23.2′	S 13°40.4′	290°10.1′	S 18°38.2′	8°09.1′	S 19°16.2′
12	257°27.8′	2°00.5′	S 22°45.9′	320°56.7′	S 23°20.2′	288°25.3′	S 13°40.2′	305°12.3′	S 18°38.2′	23°09.8′	S 19°16.6′
13	272°30.3′	17°00.2′	S 22°46.1′	335°58.2′	S 23°19.7′	303°27.4′	S 13°40.1′	320°14.5′	S 18°38.1′	38°10.5′	S 19°17.0′
14	287°32.7′	31°59.9′	S 22°46.4′	350°59.6′	S 23°19.2′	318°29.5′	S 13°40.0′	335°16.8′	S 18°38.1′	53°11.2′	S 19°17.5′
15	302°35.2′	46°59.7′	S 22°46.6′	6°01.1′	S 23°18.7′	333°31.6′	S 13°39.8′	350°19.0′	S 18°38.0′	68°11.8′	S 19°17.9′
16	317°37.7′	61°59.4′	S 22°46.9′	21°02.6′	S 23°18.2′	348°33.7′	S 13°39.7′	5°21.3′	S 18°37.9′	83°12.5′	S 19°18.3′
17	332°40.1′	76°59.1′	S 22°47.1′	36°04.1′	S 23°17.7′	3°35.8′	S 13°39.6′	20°23.5′	S 18°37.9′	98°13.2′	S 19°18.7′
18	347°42.6′	91°58.8′	S 22°47.4′	51°05.6′	S 23°17.2′	18°37.9′	S 13°39.4′	35°25.8′	S 18°37.8′	113°13.9′	S 19°19.2′
19	2°45.1′	106°58.5′	S 22°47.6′	66°07.1′	S 23°16.6′	33°40.0′	S 13°39.3′	50°28.0′	S 18°37.8′	128°14.6′	S 19°19.6′
20	17°47.5′	121°58.3′	S 22°47.9′	81°08.6′	S 23°16.1′	48°42.1′	S 13°39.2′	65°30.2′	S 18°37.7′	143°15.2′	S 19°20.0′
21	32°50.0′	136°58.0′	S 22°48.1′	96°10.1′	S 23°15.6′	63°44.2′	S 13°39.0′	80°32.5′	S 18°37.7′	158°15.9′	S 19°20.4′
22	47°52.4′	151°57.7′	S 22°48.4′	111°11.6′	S 23°15.1′	78°46.3′	S 13°38.9′	95°34.7′	S 18°37.6′	173°16.6′	S 19°20.9′
23	62°54.9′	166°57.4′	S 22°48.6′	126°13.1′	S 23°14.6′	93°48.4′	S 13°38.8′	110°37.0′	S 18°37.5′	188°17.3′	S 19°21.3′
		SD 16.2′ *d* -0.3′		*v* 1.5′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 51 m 59 s		14 h 36 m		16 h 46 m		15 h 39 m		10 h 27 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Aldebaran	−Rigel	−Fomalhaut	−Jupiter	−Saturn	+Venus	+Altair	+Sun
0	125°53.5′	S 23°05.0′	5.6′	8.1′	59.5′			30°43.0′	19°22.3′		13°33.7′		51°24.3′
1	140°18.2′	S 22°56.9′	5.8′	8.3′	59.4′		119°42.3′	30°12.9′	18°47.8′		14°08.1′		51°57.5′
2	154°43.0′	S 22°48.6′	5.9′	8.4′	59.4′		119°14.2′	29°43.0′	18°13.5′		14°42.5′		52°30.7′
3	169°07.9′	S 22°40.2′	6.0′	8.5′	59.4′		118°46.0′	29°13.4′	17°39.2′		15°16.9′		53°03.8′
4	183°32.9′	S 22°31.7′	6.2′	8.7′	59.3′	119°33.3′	118°17.8′	28°44.0′	17°05.1′		15°51.2′		53°36.8′
5	197°58.0′	S 22°23.0′	6.3′	8.8′	59.3′	118°58.0′	117°49.5′	28°14.8′	16°31.0′		16°25.6′		54°09.9′
6	212°23.3′	S 22°14.2′	6.4′	8.9′	59.3′	118°22.8′	117°21.2′	27°46.0′	15°57.2′		16°59.9′		54°42.8′
7	226°48.7′	S 22°05.2′	6.5′	9.1′	59.2′	117°47.6′	116°52.9′	27°17.4′	15°23.4′		17°34.1′		55°15.7′
8	241°14.3′	S 21°56.2′	6.7′	9.2′	59.2′	117°12.5′	116°24.5′	26°49.1′	14°49.8′		18°08.4′		55°48.6′
9	255°39.9′	S 21°47.0′	6.8′	9.3′	59.1′	116°37.4′	115°56.2′	26°21.1′	14°16.4′		18°42.6′		56°21.4′
10	270°05.7′	S 21°37.7′	6.9′	9.4′	59.1′	116°02.3′	115°27.8′	25°53.4′	13°43.1′		19°16.7′		56°54.2′
11	284°31.7′	S 21°28.2′	7.1′	9.5′	59.1′	115°27.3′	114°59.4′	25°26.1′	13°10.0′		19°50.9′		57°26.9′
12	298°57.7′	S 21°18.7′	7.2′	9.7′	59.0′	114°52.3′	114°30.9′	24°59.1′	12°37.1′		20°25.0′		57°59.6′
13	313°23.9′	S 21°09.0′	7.3′	9.8′	59.0′	114°17.4′	114°02.5′	24°32.4′	12°04.5′		20°59.0′		58°32.2′
14	327°50.2′	S 20°59.2′	7.5′	9.9′	58.9′	113°42.5′	113°34.0′	24°06.2′	11°32.1′	7°23.1′	21°33.0′		59°04.8′
15	342°16.7′	S 20°49.4′	7.6′	10.0′	58.9′	113°07.7′	113°05.5′	23°40.3′	10°59.9′	7°52.6′	22°07.0′		59°37.3′
16	356°43.3′	S 20°39.3′	7.7′	10.1′	58.9′	112°33.0′	112°37.0′	23°14.8′	10°28.1′	8°22.6′	22°40.9′		60°09.8′
17	11°10.0′	S 20°29.2′	7.8′	10.2′	58.8′	111°58.2′	112°08.5′	22°49.8′	9°56.7′	8°53.2′	23°14.8′		60°42.2′
18	25°36.8′	S 20°19.0′	8.0′	10.3′	58.8′	111°23.5′	111°40.0′	22°25.3′	9°25.6′	9°24.3′	23°48.7′		61°14.6′
19	40°03.8′	S 20°08.7′	8.1′	10.4′	58.7′	110°48.9′	111°11.5′	22°01.2′	8°55.0′	9°55.7′	24°22.5′		61°46.9′
20	54°30.9′	S 19°58.3′	8.2′	10.5′	58.7′	110°14.3′	110°43.0′	21°37.6′	8°25.0′	10°27.4′	24°56.3′	38°09.7′	62°19.2′
21	68°58.1′	S 19°47.7′	8.4′	10.6′	58.7′	109°39.8′	110°14.5′	21°14.5′	7°55.6′	10°59.3′	25°30.0′	38°24.9′	62°51.5′
22	83°25.5′	S 19°37.1′	8.5′	10.7′	58.6′	109°05.3′	109°45.9′	20°52.0′		11°31.4′	26°03.7′	38°40.5′	63°23.6′
23	97°52.9′	S 19°26.4′	8.6′	10.8′	58.6′	108°30.8′	109°17.4′	20°30.0′		12°03.7′	26°37.4′	38°56.3′	63°55.8′
Mer. pass. 16 h 14 m SD 16.2′ phase 19%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.7′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.2′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°46.4′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 28°60.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.2′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Thursday 09 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	77°57.4′	181°57.2′	S 22°48.8′	141°14.6′	S 23°14.1′	108°50.5′	S 13°38.6′	125°39.2′	S 18°37.5′	203°17.9′	S 19°21.7′
1	92°59.8′	196°56.9′	S 22°49.1′	156°16.1′	S 23°13.6′	123°52.6′	S 13°38.5′	140°41.4′	S 18°37.4′	218°18.6′	S 19°22.1′
2	108°02.3′	211°56.6′	S 22°49.3′	171°17.7′	S 23°13.1′	138°54.7′	S 13°38.4′	155°43.7′	S 18°37.4′	233°19.3′	S 19°22.6′
3	123°04.8′	226°56.3′	S 22°49.6′	186°19.2′	S 23°12.5′	153°56.8′	S 13°38.2′	170°45.9′	S 18°37.3′	248°20.0′	S 19°23.0′
4	138°07.2′	241°56.0′	S 22°49.8′	201°20.7′	S 23°12.0′	168°58.9′	S 13°38.1′	185°48.2′	S 18°37.2′	263°20.6′	S 19°23.4′
5	153°09.7′	256°55.8′	S 22°50.1′	216°22.2′	S 23°11.5′	184°01.0′	S 13°38.0′	200°50.4′	S 18°37.2′	278°21.3′	S 19°23.8′
6	168°12.2′	271°55.5′	S 22°50.3′	231°23.8′	S 23°11.0′	199°03.1′	S 13°37.8′	215°52.6′	S 18°37.1′	293°22.0′	S 19°24.3′
7	183°14.6′	286°55.2′	S 22°50.5′	246°25.3′	S 23°10.5′	214°05.2′	S 13°37.7′	230°54.9′	S 18°37.1′	308°22.7′	S 19°24.7′
8	198°17.1′	301°54.9′	S 22°50.8′	261°26.9′	S 23°10.0′	229°07.3′	S 13°37.6′	245°57.1′	S 18°37.0′	323°23.3′	S 19°25.1′
9	213°19.6′	316°54.6′	S 22°51.0′	276°28.4′	S 23°09.5′	244°09.4′	S 13°37.4′	260°59.4′	S 18°37.0′	338°24.0′	S 19°25.5′
10	228°22.0′	331°54.4′	S 22°51.3′	291°30.0′	S 23°08.9′	259°11.5′	S 13°37.3′	276°01.6′	S 18°36.9′	353°24.7′	S 19°26.0′
11	243°24.5′	346°54.1′	S 22°51.5′	306°31.5′	S 23°08.4′	274°13.6′	S 13°37.2′	291°03.8′	S 18°36.8′	8°25.4′	S 19°26.4′
12	258°26.9′	1°53.8′	S 22°51.7′	321°33.1′	S 23°07.9′	289°15.7′	S 13°37.0′	306°06.1′	S 18°36.8′	23°26.0′	S 19°26.8′
13	273°29.4′	16°53.5′	S 22°52.0′	336°34.6′	S 23°07.4′	304°17.8′	S 13°36.9′	321°08.3′	S 18°36.7′	38°26.7′	S 19°27.2′
14	288°31.9′	31°53.2′	S 22°52.2′	351°36.2′	S 23°06.9′	319°19.9′	S 13°36.8′	336°10.6′	S 18°36.7′	53°27.4′	S 19°27.6′
15	303°34.3′	46°53.0′	S 22°52.4′	6°37.8′	S 23°06.4′	334°22.0′	S 13°36.6′	351°12.8′	S 18°36.6′	68°28.1′	S 19°28.1′
16	318°36.8′	61°52.7′	S 22°52.7′	21°39.4′	S 23°05.8′	349°24.0′	S 13°36.5′	6°15.0′	S 18°36.5′	83°28.7′	S 19°28.5′
17	333°39.3′	76°52.4′	S 22°52.9′	36°40.9′	S 23°05.3′	4°26.1′	S 13°36.4′	21°17.3′	S 18°36.5′	98°29.4′	S 19°28.9′
18	348°41.7′	91°52.1′	S 22°53.1′	51°42.5′	S 23°04.8′	19°28.2′	S 13°36.2′	36°19.5′	S 18°36.4′	113°30.1′	S 19°29.3′
19	3°44.2′	106°51.8′	S 22°53.4′	66°44.1′	S 23°04.3′	34°30.3′	S 13°36.1′	51°21.8′	S 18°36.4′	128°30.7′	S 19°29.7′
20	18°46.7′	121°51.5′	S 22°53.6′	81°45.7′	S 23°03.8′	49°32.4′	S 13°35.9′	66°24.0′	S 18°36.3′	143°31.4′	S 19°30.2′
21	33°49.1′	136°51.3′	S 22°53.8′	96°47.3′	S 23°03.3′	64°34.5′	S 13°35.8′	81°26.2′	S 18°36.3′	158°32.1′	S 19°30.6′
22	48°51.6′	151°51.0′	S 22°54.0′	111°48.9′	S 23°02.7′	79°36.6′	S 13°35.7′	96°28.5′	S 18°36.2′	173°32.8′	S 19°31.0′
23	63°54.1′	166°50.7′	S 22°54.3′	126°50.5′	S 23°02.2′	94°38.7′	S 13°35.5′	111°30.7′	S 18°36.1′	188°33.4′	S 19°31.4′
		SD 16.2′ *d* -0.2′		*v* 1.6′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 52 m 26 s		14 h 34 m		16 h 42 m		15 h 35 m		10 h 26 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Rigel	−Aldebaran	−Fomalhaut	−Jupiter	+Saturn	+Venus	+Altair	+Sun
0	112°20.6′	S 19°15.5′	8.7′	10.9′	58.5′	108°48.9′	107°56.4′	20°08.7′		12°36.2′	27°11.0′	39°12.5′	64°27.9′
1	126°48.3′	S 19°04.6′	8.9′	11.0′	58.5′	108°20.3′	107°22.1′	19°48.0′		13°08.7′	27°44.5′	39°29.0′	64°59.9′
2	141°16.1′	S 18°53.6′	9.0′	11.1′	58.5′	107°51.8′	106°47.8′	19°27.9′		13°41.4′	28°18.0′	39°45.8′	65°31.9′
3	155°44.1′	S 18°42.5′	9.1′	11.2′	58.4′	107°23.3′	106°13.5′	19°08.5′		14°14.1′	28°51.5′	40°02.9′	66°03.8′
4	170°12.2′	S 18°31.3′	9.2′	11.3′	58.4′	106°54.8′	105°39.3′	18°49.9′		14°46.9′	29°25.0′	40°20.3′	66°35.7′
5	184°40.5′	S 18°20.0′	9.4′	11.4′	58.3′	106°26.3′	105°05.2′	18°32.0′		15°19.8′	29°58.3′	40°37.9′	67°07.5′
6	199°08.8′	S 18°08.7′	9.5′	11.4′	58.3′	105°57.8′	104°31.0′			15°52.7′	30°31.7′	40°55.8′	67°39.3′
7	213°37.3′	S 17°57.2′	9.6′	11.5′	58.3′	105°29.3′	103°57.0′			16°25.6′	31°05.0′	41°14.0′	68°11.1′
8	228°05.9′	S 17°45.7′	9.7′	11.6′	58.2′	105°00.9′	103°23.0′			16°58.6′	31°38.3′	41°32.4′	68°42.8′
9	242°34.6′	S 17°34.1′	9.8′	11.7′	58.2′	104°32.4′	102°49.0′			17°31.5′	32°11.5′	41°51.1′	69°14.4′
10	257°03.5′	S 17°22.4′	10.0′	11.8′	58.1′	104°04.0′	102°15.1′			18°04.5′	32°44.7′	42°10.0′	69°46.0′
11	271°32.4′	S 17°10.6′	10.1′	11.8′	58.1′	103°35.5′	101°41.2′			18°37.5′	33°17.8′	42°29.2′	70°17.6′
12	286°01.5′	S 16°58.8′	10.2′	11.9′	58.1′	103°07.1′	101°07.4′			19°10.5′	33°50.9′	42°48.5′	70°49.1′
13	300°30.7′	S 16°46.9′	10.3′	12.0′	58.0′	102°38.7′	100°33.6′			19°43.5′	34°23.9′	43°08.1′	71°20.5′
14	315°00.0′	S 16°34.9′	10.4′	12.1′	58.0′	102°10.3′	99°59.8′			20°16.5′	34°56.9′	43°27.9′	71°51.9′
15	329°29.4′	S 16°22.8′	10.5′	12.1′	57.9′	101°42.0′	99°26.1′			20°49.5′	35°29.9′	43°47.9′	72°23.3′
16	343°59.0′	S 16°10.7′	10.7′	12.2′	57.9′	101°13.6′	98°52.5′			21°22.4′	36°02.8′	44°08.1′	72°54.6′
17	358°28.6′	S 15°58.5′	10.8′	12.3′	57.9′	100°45.3′	98°18.9′			21°55.4′	36°35.7′	44°28.5′	73°25.8′
18	12°58.4′	S 15°46.3′	10.9′	12.3′	57.8′	100°17.0′	97°45.3′			22°28.3′	37°08.5′	44°49.0′	73°57.1′
19	27°28.3′	S 15°33.9′	11.0′	12.4′	57.8′	99°48.7′	97°11.8′			23°01.3′	37°41.3′	45°09.8′	74°28.2′
20	41°58.3′	S 15°21.6′	11.1′	12.4′	57.8′	99°20.4′	96°38.4′		7°32.2′	23°34.1′	38°14.1′	45°30.7′	74°59.3′
21	56°28.4′	S 15°09.1′	11.2′	12.5′	57.7′	98°52.2′	96°05.0′		8°00.1′	24°07.0′	38°46.8′	45°51.8′	75°30.4′
22	70°58.6′	S 14°56.6′	11.3′	12.6′	57.7′	98°24.0′	95°31.6′		8°28.5′	24°39.9′	39°19.4′	46°13.1′	76°01.4′
23	85°28.9′	S 14°44.0′	11.4′	12.6′	57.6′	97°55.8′	94°58.3′		8°57.5′	25°12.7′	39°52.0′	46°34.5′	76°32.4′
Mer. pass. 17 h 6 m SD 16.0′ phase 28%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°46.6′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Friday 10 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	78°56.5′	181°50.4′	S 22°54.5′	141°52.1′	S 23°01.7′	109°40.8′	S 13°35.4′	126°33.0′	S 18°36.1′	203°34.1′	S 19°31.8′
1	93°59.0′	196°50.1′	S 22°54.7′	156°53.7′	S 23°01.2′	124°42.9′	S 13°35.3′	141°35.2′	S 18°36.0′	218°34.8′	S 19°32.3′
2	109°01.4′	211°49.8′	S 22°54.9′	171°55.3′	S 23°00.7′	139°45.0′	S 13°35.1′	156°37.4′	S 18°36.0′	233°35.4′	S 19°32.7′
3	124°03.9′	226°49.6′	S 22°55.2′	186°56.9′	S 23°00.1′	154°47.1′	S 13°35.0′	171°39.7′	S 18°35.9′	248°36.1′	S 19°33.1′
4	139°06.4′	241°49.3′	S 22°55.4′	201°58.5′	S 22°59.6′	169°49.2′	S 13°34.9′	186°41.9′	S 18°35.8′	263°36.8′	S 19°33.5′
5	154°08.8′	256°49.0′	S 22°55.6′	217°00.2′	S 22°59.1′	184°51.3′	S 13°34.7′	201°44.1′	S 18°35.8′	278°37.4′	S 19°33.9′
6	169°11.3′	271°48.7′	S 22°55.8′	232°01.8′	S 22°58.6′	199°53.4′	S 13°34.6′	216°46.4′	S 18°35.7′	293°38.1′	S 19°34.3′
7	184°13.8′	286°48.4′	S 22°56.0′	247°03.4′	S 22°58.1′	214°55.4′	S 13°34.5′	231°48.6′	S 18°35.7′	308°38.8′	S 19°34.8′
8	199°16.2′	301°48.1′	S 22°56.3′	262°05.0′	S 22°57.6′	229°57.5′	S 13°34.3′	246°50.9′	S 18°35.6′	323°39.5′	S 19°35.2′
9	214°18.7′	316°47.9′	S 22°56.5′	277°06.7′	S 22°57.0′	244°59.6′	S 13°34.2′	261°53.1′	S 18°35.5′	338°40.1′	S 19°35.6′
10	229°21.2′	331°47.6′	S 22°56.7′	292°08.3′	S 22°56.5′	260°01.7′	S 13°34.0′	276°55.3′	S 18°35.5′	353°40.8′	S 19°36.0′
11	244°23.6′	346°47.3′	S 22°56.9′	307°10.0′	S 22°56.0′	275°03.8′	S 13°33.9′	291°57.6′	S 18°35.4′	8°41.5′	S 19°36.4′
12	259°26.1′	1°47.0′	S 22°57.1′	322°11.6′	S 22°55.5′	290°05.9′	S 13°33.8′	306°59.8′	S 18°35.4′	23°42.1′	S 19°36.8′
13	274°28.6′	16°46.7′	S 22°57.4′	337°13.3′	S 22°55.0′	305°08.0′	S 13°33.6′	322°02.0′	S 18°35.3′	38°42.8′	S 19°37.2′
14	289°31.0′	31°46.4′	S 22°57.6′	352°14.9′	S 22°54.4′	320°10.1′	S 13°33.5′	337°04.3′	S 18°35.2′	53°43.5′	S 19°37.7′
15	304°33.5′	46°46.2′	S 22°57.8′	7°16.6′	S 22°53.9′	335°12.2′	S 13°33.4′	352°06.5′	S 18°35.2′	68°44.1′	S 19°38.1′
16	319°35.9′	61°45.9′	S 22°58.0′	22°18.3′	S 22°53.4′	350°14.3′	S 13°33.2′	7°08.8′	S 18°35.1′	83°44.8′	S 19°38.5′
17	334°38.4′	76°45.6′	S 22°58.2′	37°19.9′	S 22°52.9′	5°16.4′	S 13°33.1′	22°11.0′	S 18°35.1′	98°45.5′	S 19°38.9′
18	349°40.9′	91°45.3′	S 22°58.4′	52°21.6′	S 22°52.4′	20°18.4′	S 13°32.9′	37°13.2′	S 18°35.0′	113°46.1′	S 19°39.3′
19	4°43.3′	106°45.0′	S 22°58.6′	67°23.3′	S 22°51.8′	35°20.5′	S 13°32.8′	52°15.5′	S 18°34.9′	128°46.8′	S 19°39.7′
20	19°45.8′	121°44.7′	S 22°58.8′	82°25.0′	S 22°51.3′	50°22.6′	S 13°32.7′	67°17.7′	S 18°34.9′	143°47.5′	S 19°40.1′
21	34°48.3′	136°44.4′	S 22°59.1′	97°26.6′	S 22°50.8′	65°24.7′	S 13°32.5′	82°19.9′	S 18°34.8′	158°48.1′	S 19°40.6′
22	49°50.7′	151°44.1′	S 22°59.3′	112°28.3′	S 22°50.3′	80°26.8′	S 13°32.4′	97°22.2′	S 18°34.8′	173°48.8′	S 19°41.0′
23	64°53.2′	166°43.9′	S 22°59.5′	127°30.0′	S 22°49.7′	95°28.9′	S 13°32.3′	112°24.4′	S 18°34.7′	188°49.5′	S 19°41.4′
		SD 16.2′ *d* -0.2′		*v* 1.7′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 52 m 53 s		14 h 31 m		16 h 39 m		15 h 32 m		10 h 25 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Capella	−Rigel	−Aldebaran	+Jupiter	+Fomalhaut	+Saturn	+Sun
0	99°59.3′	S 14°31.4′	11.5′	12.7′	57.6′	111°16.5′	107°43.4′	97°27.6′	94°25.0′	9°26.8′		25°45.5′	77°03.4′
1	114°29.8′	S 14°18.8′	11.6′	12.7′	57.6′	110°45.0′	107°12.4′	96°59.5′	93°51.8′	9°56.5′		26°18.3′	77°34.3′
2	129°00.4′	S 14°06.0′	11.7′	12.8′	57.5′	110°13.6′	106°41.5′	96°31.4′	93°18.6′	10°26.5′		26°51.0′	78°05.1′
3	143°31.2′	S 13°53.2′	11.8′	12.8′	57.5′	109°42.2′	106°10.5′	96°03.3′	92°45.4′	10°56.8′		27°23.7′	78°35.9′
4	158°02.0′	S 13°40.4′	11.9′	12.9′	57.4′	109°10.8′	105°39.6′	95°35.3′	92°12.3′	11°27.2′		27°56.4′	79°06.6′
5	172°32.9′	S 13°27.5′	12.0′	12.9′	57.4′	108°39.5′	105°08.7′	95°07.2′	91°39.3′	11°57.8′		28°29.0′	79°37.3′
6	187°04.0′	S 13°14.6′	12.1′	13.0′	57.4′	108°08.2′	104°37.9′	94°39.2′	91°06.3′	12°28.6′		29°01.7′	80°08.0′
7	201°35.1′	S 13°01.6′	12.2′	13.0′	57.3′	107°36.9′	104°07.0′	94°11.3′	90°33.3′	12°59.5′		29°34.2′	80°38.6′
8	216°06.3′	S 12°48.6′	12.3′	13.1′	57.3′	107°05.6′	103°36.3′	93°43.3′	90°00.4′	13°30.5′		30°06.8′	81°09.2′
9	230°37.6′	S 12°35.6′	12.4′	13.1′	57.3′	106°34.4′	103°05.5′	93°15.4′	89°27.5′	14°01.5′		30°39.3′	81°39.7′
10	245°09.1′	S 12°22.5′	12.5′	13.1′	57.2′	106°03.2′	102°34.8′	92°47.6′	88°54.7′	14°32.7′		31°11.8′	82°10.2′
11	259°40.6′	S 12°09.3′	12.6′	13.2′	57.2′	105°32.1′	102°04.1′	92°19.7′	88°21.9′	15°03.9′		31°44.3′	82°40.6′
12	274°12.2′	S 11°56.1′	12.7′	13.2′	57.1′	105°01.0′	101°33.4′	91°51.9′	87°49.2′	15°35.1′		32°16.7′	83°11.0′
13	288°43.9′	S 11°42.9′	12.8′	13.3′	57.1′	104°29.9′	101°02.8′	91°24.2′	87°16.5′	16°06.4′	17°49.3′	32°49.1′	83°41.4′
14	303°15.6′	S 11°29.6′	12.9′	13.3′	57.1′	103°58.8′	100°32.2′	90°56.4′	86°43.8′	16°37.8′	18°04.4′	33°21.4′	84°11.7′
15	317°47.5′	S 11°16.3′	13.0′	13.3′	57.0′	103°27.8′	100°01.6′	90°28.7′	86°11.2′	17°09.1′	18°20.3′	33°53.7′	84°42.0′
16	332°19.5′	S 11°03.0′	13.0′	13.4′	57.0′	102°56.8′	99°31.0′	90°01.1′	85°38.6′	17°40.5′	18°36.8′	34°26.0′	85°12.2′
17	346°51.5′	S 10°49.6′	13.1′	13.4′	57.0′	102°25.8′	99°00.5′	89°33.4′	85°06.1′	18°11.9′	18°54.0′	34°58.2′	85°42.4′
18	1°23.6′	S 10°36.2′	13.2′	13.4′	56.9′	101°54.9′	98°30.1′	89°05.8′	84°33.6′	18°43.3′	19°11.9′	35°30.5′	86°12.5′
19	15°55.8′	S 10°22.8′	13.3′	13.5′	56.9′	101°24.0′	97°59.6′	88°38.3′	84°01.2′	19°14.7′	19°30.3′	36°02.6′	86°42.6′
20	30°28.1′	S 10°09.4′	13.4′	13.5′	56.9′	100°53.1′	97°29.2′	88°10.7′	83°28.7′	19°46.1′	19°49.3′	36°34.8′	87°12.7′
21	45°00.5′	S 9°55.9′	13.4′	13.5′	56.8′	100°22.3′	96°58.8′	87°43.3′	82°56.4′	20°17.6′	20°08.9′	37°06.9′	87°42.7′
22	59°33.0′	S 9°42.4′	13.5′	13.5′	56.8′	99°51.5′	96°28.5′	87°15.8′	82°24.1′	20°49.0′	20°28.9′	37°38.9′	88°12.7′
23	74°05.5′	S 9°28.8′	13.6′	13.6′	56.7′	99°20.7′	95°58.2′	86°48.4′	81°51.8′	21°20.4′	20°49.4′	38°11.0′	88°42.6′
Mer. pass. 17 h 54 m SD 15.7′ phase 39%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.1′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°46.9′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Saturday 11 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	79°55.7′	181°43.6′	S 22°59.7′	142°31.7′	S 22°49.2′	110°31.0′	S 13°32.1′	127°26.7′	S 18°34.6′	203°50.1′	S 19°41.8′
1	94°58.1′	196°43.3′	S 22°59.9′	157°33.4′	S 22°48.7′	125°33.1′	S 13°32.0′	142°28.9′	S 18°34.6′	218°50.8′	S 19°42.2′
2	110°00.6′	211°43.0′	S 23°00.1′	172°35.1′	S 22°48.2′	140°35.2′	S 13°31.8′	157°31.1′	S 18°34.5′	233°51.5′	S 19°42.6′
3	125°03.0′	226°42.7′	S 23°00.3′	187°36.8′	S 22°47.7′	155°37.2′	S 13°31.7′	172°33.4′	S 18°34.5′	248°52.1′	S 19°43.0′
4	140°05.5′	241°42.4′	S 23°00.5′	202°38.5′	S 22°47.1′	170°39.3′	S 13°31.6′	187°35.6′	S 18°34.4′	263°52.8′	S 19°43.4′
5	155°08.0′	256°42.1′	S 23°00.7′	217°40.3′	S 22°46.6′	185°41.4′	S 13°31.4′	202°37.8′	S 18°34.3′	278°53.4′	S 19°43.8′
6	170°10.4′	271°41.9′	S 23°00.9′	232°42.0′	S 22°46.1′	200°43.5′	S 13°31.3′	217°40.1′	S 18°34.3′	293°54.1′	S 19°44.2′
7	185°12.9′	286°41.6′	S 23°01.1′	247°43.7′	S 22°45.6′	215°45.6′	S 13°31.1′	232°42.3′	S 18°34.2′	308°54.8′	S 19°44.7′
8	200°15.4′	301°41.3′	S 23°01.3′	262°45.4′	S 22°45.1′	230°47.7′	S 13°31.0′	247°44.5′	S 18°34.2′	323°55.4′	S 19°45.1′
9	215°17.8′	316°41.0′	S 23°01.5′	277°47.2′	S 22°44.5′	245°49.8′	S 13°30.9′	262°46.8′	S 18°34.1′	338°56.1′	S 19°45.5′
10	230°20.3′	331°40.7′	S 23°01.7′	292°48.9′	S 22°44.0′	260°51.9′	S 13°30.7′	277°49.0′	S 18°34.0′	353°56.8′	S 19°45.9′
11	245°22.8′	346°40.4′	S 23°01.9′	307°50.6′	S 22°43.5′	275°53.9′	S 13°30.6′	292°51.2′	S 18°34.0′	8°57.4′	S 19°46.3′
12	260°25.2′	1°40.1′	S 23°02.1′	322°52.4′	S 22°43.0′	290°56.0′	S 13°30.5′	307°53.5′	S 18°33.9′	23°58.1′	S 19°46.7′
13	275°27.7′	16°39.8′	S 23°02.3′	337°54.1′	S 22°42.4′	305°58.1′	S 13°30.3′	322°55.7′	S 18°33.9′	38°58.8′	S 19°47.1′
14	290°30.2′	31°39.5′	S 23°02.5′	352°55.9′	S 22°41.9′	321°00.2′	S 13°30.2′	337°57.9′	S 18°33.8′	53°59.4′	S 19°47.5′
15	305°32.6′	46°39.3′	S 23°02.7′	7°57.6′	S 22°41.4′	336°02.3′	S 13°30.0′	353°00.2′	S 18°33.7′	69°00.1′	S 19°47.9′
16	320°35.1′	61°39.0′	S 23°02.9′	22°59.4′	S 22°40.9′	351°04.4′	S 13°29.9′	8°02.4′	S 18°33.7′	84°00.7′	S 19°48.3′
17	335°37.5′	76°38.7′	S 23°03.1′	38°01.2′	S 22°40.3′	6°06.4′	S 13°29.8′	23°04.6′	S 18°33.6′	99°01.4′	S 19°48.7′
18	350°40.0′	91°38.4′	S 23°03.3′	53°02.9′	S 22°39.8′	21°08.5′	S 13°29.6′	38°06.9′	S 18°33.6′	114°02.1′	S 19°49.1′
19	5°42.5′	106°38.1′	S 23°03.5′	68°04.7′	S 22°39.3′	36°10.6′	S 13°29.5′	53°09.1′	S 18°33.5′	129°02.7′	S 19°49.6′
20	20°44.9′	121°37.8′	S 23°03.6′	83°06.5′	S 22°38.8′	51°12.7′	S 13°29.3′	68°11.3′	S 18°33.4′	144°03.4′	S 19°50.0′
21	35°47.4′	136°37.5′	S 23°03.8′	98°08.3′	S 22°38.2′	66°14.8′	S 13°29.2′	83°13.6′	S 18°33.4′	159°04.0′	S 19°50.4′
22	50°49.9′	151°37.2′	S 23°04.0′	113°10.0′	S 22°37.7′	81°16.9′	S 13°29.1′	98°15.8′	S 18°33.3′	174°04.7′	S 19°50.8′
23	65°52.3′	166°36.9′	S 23°04.2′	128°11.8′	S 22°37.2′	96°19.0′	S 13°28.9′	113°18.0′	S 18°33.3′	189°05.4′	S 19°51.2′
		SD 16.2′ *d* -0.2′		*v* 1.7′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 53 m 21 s		14 h 28 m		16 h 36 m		15 h 28 m		10 h 24 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Capella	−Rigel	−Aldebaran	+Fomalhaut	+Jupiter	+Saturn	+Sun
0	88°38.1′	S 9°15.2′	13.7′	13.6′	56.7′	98°50.0′	95°27.9′	86°21.0′	81°19.5′	21°10.4′	21°51.8′	38°43.0′	89°12.5′
1	103°10.8′	S 9°01.7′	13.8′	13.6′	56.7′	98°19.3′	94°57.7′	85°53.7′	80°47.3′	21°31.8′	22°23.2′	39°14.9′	89°42.3′
2	117°43.5′	S 8°48.0′	13.8′	13.6′	56.6′	97°48.6′	94°27.5′	85°26.4′	80°15.2′	21°53.6′	22°54.5′	39°46.9′	90°12.1′
3	132°16.3′	S 8°34.4′	13.9′	13.7′	56.6′	97°18.0′	93°57.3′	84°59.2′	79°43.1′	22°15.7′	23°25.9′	40°18.8′	90°41.9′
4	146°49.2′	S 8°20.7′	14.0′	13.7′	56.6′	96°47.4′	93°27.2′	84°32.0′	79°11.0′	22°38.3′	23°57.2′	40°50.6′	91°11.7′
5	161°22.2′	S 8°07.1′	14.0′	13.7′	56.5′	96°16.8′	92°57.1′	84°04.8′	78°38.9′	23°01.1′	24°28.6′	41°22.5′	91°41.3′
6	175°55.2′	S 7°53.4′	14.1′	13.7′	56.5′	95°46.3′	92°27.0′	83°37.7′	78°06.9′	23°24.3′	24°59.9′	41°54.2′	92°11.0′
7	190°28.4′	S 7°39.7′	14.2′	13.7′	56.5′	95°15.8′	91°56.9′	83°10.6′	77°35.0′	23°47.8′	25°31.2′	42°26.0′	92°40.6′
8	205°01.5′	S 7°25.9′	14.2′	13.7′	56.4′	94°45.3′	91°26.9′	82°43.6′	77°03.1′	24°11.6′	26°02.4′	42°57.7′	93°10.2′
9	219°34.8′	S 7°12.2′	14.3′	13.8′	56.4′	94°14.9′	90°57.0′	82°16.6′	76°31.2′	24°35.6′	26°33.7′	43°29.4′	93°39.7′
10	234°08.1′	S 6°58.4′	14.4′	13.8′	56.4′	93°44.5′	90°27.0′	81°49.6′	75°59.3′	24°59.9′	27°04.9′	44°01.1′	94°09.2′
11	248°41.4′	S 6°44.6′	14.4′	13.8′	56.3′	93°14.1′	89°57.1′	81°22.7′	75°27.5′	25°24.5′	27°36.1′	44°32.7′	94°38.7′
12	263°14.8′	S 6°30.9′	14.5′	13.8′	56.3′	92°43.8′	89°27.3′	80°55.8′	74°55.7′	25°49.3′	28°07.3′	45°04.3′	95°08.1′
13	277°48.3′	S 6°17.1′	14.5′	13.8′	56.3′	92°13.5′	88°57.4′	80°29.0′	74°24.0′	26°14.2′	28°38.5′	45°35.8′	95°37.5′
14	292°21.9′	S 6°03.2′	14.6′	13.8′	56.2′	91°43.2′	88°27.6′	80°02.2′	73°52.3′	26°39.4′	29°09.6′	46°07.3′	96°06.9′
15	306°55.5′	S 5°49.4′	14.7′	13.8′	56.2′	91°13.0′	87°57.9′	79°35.5′	73°20.6′	27°04.8′	29°40.7′	46°38.8′	96°36.2′
16	321°29.1′	S 5°35.6′	14.7′	13.8′	56.2′	90°42.8′	87°28.2′	79°08.8′	72°49.0′	27°30.3′	30°11.8′	47°10.3′	97°05.5′
17	336°02.8′	S 5°21.8′	14.8′	13.8′	56.1′	90°12.6′	86°58.5′	78°42.2′	72°17.4′	27°56.1′	30°42.9′	47°41.7′	97°34.7′
18	350°36.6′	S 5°07.9′	14.8′	13.9′	56.1′	89°42.5′	86°28.8′	78°15.6′	71°45.9′	28°21.9′	31°13.9′	48°13.1′	98°03.9′
19	5°10.4′	S 4°54.1′	14.9′	13.9′	56.1′	89°12.4′	85°59.2′	77°49.0′	71°14.4′	28°48.0′	31°44.9′	48°44.4′	98°33.1′
20	19°44.3′	S 4°40.2′	14.9′	13.9′	56.1′	88°42.3′	85°29.6′	77°22.5′	70°42.9′	29°14.1′	32°15.9′	49°15.8′	99°02.3′
21	34°18.2′	S 4°26.3′	15.0′	13.9′	56.0′	88°12.3′	85°00.0′	76°56.1′	70°11.4′	29°40.5′	32°46.9′	49°47.0′	99°31.4′
22	48°52.1′	S 4°12.5′	15.0′	13.9′	56.0′	87°42.3′	84°30.5′	76°29.7′	69°40.0′	30°06.9′	33°17.8′	50°18.3′	100°00.5′
23	63°26.1′	S 3°58.6′	15.1′	13.9′	56.0′	87°12.3′	84°01.0′	76°03.3′	69°08.7′	30°33.5′	33°48.7′	50°49.5′	100°29.5′
Mer. pass. 18 h 39 m SD 15.5′ phase 49%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.2′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°47.1′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Sunday 12 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	80°54.8′	181°36.6′	S 23°04.4′	143°13.6′	S 22°36.7′	111°21.0′	S 13°28.8′	128°20.3′	S 18°33.2′	204°06.0′	S 19°51.6′
1	95°57.3′	196°36.4′	S 23°04.6′	158°15.4′	S 22°36.1′	126°23.1′	S 13°28.6′	143°22.5′	S 18°33.1′	219°06.7′	S 19°52.0′
2	110°59.7′	211°36.1′	S 23°04.8′	173°17.2′	S 22°35.6′	141°25.2′	S 13°28.5′	158°24.7′	S 18°33.1′	234°07.3′	S 19°52.4′
3	126°02.2′	226°35.8′	S 23°05.0′	188°19.0′	S 22°35.1′	156°27.3′	S 13°28.4′	173°27.0′	S 18°33.0′	249°08.0′	S 19°52.8′
4	141°04.6′	241°35.5′	S 23°05.2′	203°20.8′	S 22°34.6′	171°29.4′	S 13°28.2′	188°29.2′	S 18°33.0′	264°08.7′	S 19°53.2′
5	156°07.1′	256°35.2′	S 23°05.3′	218°22.6′	S 22°34.0′	186°31.4′	S 13°28.1′	203°31.4′	S 18°32.9′	279°09.3′	S 19°53.6′
6	171°09.6′	271°34.9′	S 23°05.5′	233°24.5′	S 22°33.5′	201°33.5′	S 13°27.9′	218°33.7′	S 18°32.8′	294°10.0′	S 19°54.0′
7	186°12.0′	286°34.6′	S 23°05.7′	248°26.3′	S 22°33.0′	216°35.6′	S 13°27.8′	233°35.9′	S 18°32.8′	309°10.6′	S 19°54.4′
8	201°14.5′	301°34.3′	S 23°05.9′	263°28.1′	S 22°32.5′	231°37.7′	S 13°27.7′	248°38.1′	S 18°32.7′	324°11.3′	S 19°54.8′
9	216°17.0′	316°34.0′	S 23°06.1′	278°29.9′	S 22°31.9′	246°39.8′	S 13°27.5′	263°40.4′	S 18°32.7′	339°12.0′	S 19°55.2′
10	231°19.4′	331°33.7′	S 23°06.2′	293°31.8′	S 22°31.4′	261°41.9′	S 13°27.4′	278°42.6′	S 18°32.6′	354°12.6′	S 19°55.6′
11	246°21.9′	346°33.4′	S 23°06.4′	308°33.6′	S 22°30.9′	276°43.9′	S 13°27.2′	293°44.8′	S 18°32.5′	9°13.3′	S 19°56.0′
12	261°24.4′	1°33.2′	S 23°06.6′	323°35.4′	S 22°30.4′	291°46.0′	S 13°27.1′	308°47.1′	S 18°32.5′	24°13.9′	S 19°56.4′
13	276°26.8′	16°32.9′	S 23°06.8′	338°37.3′	S 22°29.8′	306°48.1′	S 13°27.0′	323°49.3′	S 18°32.4′	39°14.6′	S 19°56.8′
14	291°29.3′	31°32.6′	S 23°07.0′	353°39.1′	S 22°29.3′	321°50.2′	S 13°26.8′	338°51.5′	S 18°32.3′	54°15.2′	S 19°57.2′
15	306°31.8′	46°32.3′	S 23°07.1′	8°41.0′	S 22°28.8′	336°52.3′	S 13°26.7′	353°53.8′	S 18°32.3′	69°15.9′	S 19°57.6′
16	321°34.2′	61°32.0′	S 23°07.3′	23°42.8′	S 22°28.3′	351°54.3′	S 13°26.5′	8°56.0′	S 18°32.2′	84°16.6′	S 19°58.0′
17	336°36.7′	76°31.7′	S 23°07.5′	38°44.7′	S 22°27.7′	6°56.4′	S 13°26.4′	23°58.2′	S 18°32.2′	99°17.2′	S 19°58.4′
18	351°39.1′	91°31.4′	S 23°07.7′	53°46.6′	S 22°27.2′	21°58.5′	S 13°26.2′	39°00.5′	S 18°32.1′	114°17.9′	S 19°58.8′
19	6°41.6′	106°31.1′	S 23°07.8′	68°48.4′	S 22°26.7′	37°00.6′	S 13°26.1′	54°02.7′	S 18°32.0′	129°18.5′	S 19°59.2′
20	21°44.1′	121°30.8′	S 23°08.0′	83°50.3′	S 22°26.2′	52°02.7′	S 13°26.0′	69°04.9′	S 18°32.0′	144°19.2′	S 19°59.6′
21	36°46.5′	136°30.5′	S 23°08.2′	98°52.2′	S 22°25.6′	67°04.7′	S 13°25.8′	84°07.2′	S 18°31.9′	159°19.8′	S 20°00.0′
22	51°49.0′	151°30.2′	S 23°08.3′	113°54.1′	S 22°25.1′	82°06.8′	S 13°25.7′	99°09.4′	S 18°31.9′	174°20.5′	S 20°00.4′
23	66°51.5′	166°29.9′	S 23°08.5′	128°55.9′	S 22°24.6′	97°08.9′	S 13°25.5′	114°11.6′	S 18°31.8′	189°21.1′	S 20°00.8′
		SD 16.2′	*d* -0.2′	*v* 1.8′	*d* 0.5′	*v* 2.1′	*d* 0.1′	*v* 2.2′	*d* 0.1′	*v* 0.7′	*d* -0.4′
Mer. pass.		11 h 53 m 48 s		14 h 25 m		16 h 32 m		15 h 24 m		10 h 23 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Capella	−Rigel	−Aldebaran	+Fomalhaut	+Jupiter	+Saturn	+Sun
0	78°00.2′	S 3°44.7′	15.1′	13.9′	55.9′	86°42.3′	83°31.6′	75°37.0′	68°37.3′	31°00.1′	34°19.6′	51°20.7′	100°58.5′
1	92°34.3′	S 3°30.9′	15.1′	13.9′	55.9′	86°12.4′	83°02.2′	75°10.8′	68°06.0′	31°26.9′	34°50.5′	51°51.9′	101°27.5′
2	107°08.4′	S 3°17.0′	15.2′	13.9′	55.9′	85°42.6′	82°32.8′	74°44.6′	67°34.7′	31°53.8′	35°21.3′	52°23.0′	101°56.4′
3	121°42.6′	S 3°03.1′	15.2′	13.9′	55.8′	85°12.7′	82°03.5′	74°18.4′	67°03.5′	32°20.8′	35°52.1′	52°54.1′	102°25.3′
4	136°16.9′	S 2°49.3′	15.3′	13.9′	55.8′	84°42.9′	81°34.2′	73°52.3′	66°32.3′	32°47.8′	36°22.9′	53°25.2′	102°54.2′
5	150°51.1′	S 2°35.4′	15.3′	13.9′	55.8′	84°13.2′	81°04.9′	73°26.3′	66°01.1′	33°15.0′	36°53.7′	53°56.3′	103°23.1′
6	165°25.4′	S 2°21.5′	15.3′	13.9′	55.8′	83°43.4′	80°35.6′	73°00.3′	65°30.0′	33°42.2′	37°24.4′	54°27.3′	103°51.9′
7	179°59.8′	S 2°07.7′	15.4′	13.9′	55.7′	83°13.7′	80°06.4′	72°34.4′	64°58.9′	34°09.6′	37°55.1′	54°58.2′	104°20.7′
8	194°34.1′	S 1°53.8′	15.4′	13.8′	55.7′	82°44.0′	79°37.3′	72°08.5′	64°27.8′	34°36.9′	38°25.8′	55°29.2′	104°49.4′
9	209°08.6′	S 1°40.0′	15.4′	13.8′	55.7′	82°14.4′	79°08.1′	71°42.6′	63°56.7′	35°04.4′	38°56.4′	56°00.1′	105°18.1′
10	223°43.0′	S 1°26.2′	15.5′	13.8′	55.6′	81°44.8′	78°39.0′	71°16.9′	63°25.7′	35°31.9′	39°27.1′	56°31.0′	105°46.8′
11	238°17.5′	S 1°12.3′	15.5′	13.8′	55.6′	81°15.2′	78°10.0′	70°51.2′	62°54.8′	35°59.5′	39°57.7′	57°01.9′	106°15.5′
12	252°52.0′	S 0°58.5′	15.5′	13.8′	55.6′	80°45.7′	77°41.0′	70°25.5′	62°23.8′	36°27.1′	40°28.2′	57°32.7′	106°44.1′
13	267°26.5′	S 0°44.7′	15.6′	13.8′	55.6′	80°16.1′	77°12.0′	69°59.9′	61°52.9′	36°54.8′	40°58.8′	58°03.6′	107°12.7′
14	282°01.1′	S 0°30.9′	15.6′	13.8′	55.5′	79°46.7′	76°43.0′	69°34.3′	61°22.0′	37°22.6′	41°29.3′	58°34.3′	107°41.3′
15	296°35.7′	S 0°17.1′	15.6′	13.8′	55.5′	79°17.2′	76°14.1′	69°08.8′	60°51.2′	37°50.4′	41°59.8′	59°05.1′	108°09.8′
16	311°10.3′	S 0°03.3′	15.6′	13.8′	55.5′	78°47.8′	75°45.2′	68°43.4′	60°20.3′	38°18.2′	42°30.3′	59°35.8′	108°38.3′
17	325°45.0′	N 0°10.5′	15.7′	13.8′	55.5′	78°18.4′	75°16.4′	68°18.0′	59°49.5′	38°46.1′	43°00.8′	60°06.5′	109°06.8′
18	340°19.6′	N 0°24.2′	15.7′	13.7′	55.4′	77°49.1′	74°47.5′	67°52.7′	59°18.8′	39°14.1′	43°31.2′	60°37.2′	109°35.3′
19	354°54.3′	N 0°38.0′	15.7′	13.7′	55.4′	77°19.7′	74°18.8′	67°27.4′	58°48.0′	39°42.0′	44°01.6′	61°07.9′	110°03.7′
20	9°29.0′	N 0°51.7′	15.7′	13.7′	55.4′	76°50.4′	73°50.0′	67°02.2′	58°17.3′	40°10.0′	44°32.0′	61°38.5′	110°32.1′
21	24°03.8′	N 1°05.4′	15.8′	13.7′	55.3′	76°21.2′	73°21.3′	66°37.1′	57°46.6′	40°38.1′	45°02.4′	62°09.1′	111°00.5′
22	38°38.5′	N 1°19.1′	15.8′	13.7′	55.3′	75°52.0′	72°52.6′	66°12.0′	57°16.0′	41°06.2′	45°32.7′	62°39.7′	111°28.9′
23	53°13.3′	N 1°32.8′	15.8′	13.7′	55.3′	75°22.8′	72°24.0′	65°47.0′	56°45.4′	41°34.3′	46°03.0′	63°10.2′	111°57.2′
Mer. pass. 19 h 21 m SD 15.3′ phase 60%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.1′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°47.4′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Monday 13 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	81°53.9′	181°29.6′	S 23°08.7′	143°57.8′	S 22°24.1′	112°11.0′	S 13°25.4′	129°13.8′	S 18°31.7′	204°21.8′	S 20°01.2′
1	96°56.4′	196°29.3′	S 23°08.8′	158°59.7′	S 22°23.5′	127°13.1′	S 13°25.3′	144°16.1′	S 18°31.7′	219°22.5′	S 20°01.6′
2	111°58.9′	211°29.0′	S 23°09.0′	174°01.6′	S 22°23.0′	142°15.1′	S 13°25.1′	159°18.3′	S 18°31.6′	234°23.1′	S 20°02.0′
3	127°01.3′	226°28.8′	S 23°09.2′	189°03.5′	S 22°22.5′	157°17.2′	S 13°25.0′	174°20.5′	S 18°31.5′	249°23.8′	S 20°02.4′
4	142°03.8′	241°28.5′	S 23°09.3′	204°05.4′	S 22°22.0′	172°19.3′	S 13°24.8′	189°22.8′	S 18°31.5′	264°24.4′	S 20°02.8′
5	157°06.3′	256°28.2′	S 23°09.5′	219°07.3′	S 22°21.4′	187°21.4′	S 13°24.7′	204°25.0′	S 18°31.4′	279°25.1′	S 20°03.2′
6	172°08.7′	271°27.9′	S 23°09.7′	234°09.3′	S 22°20.9′	202°23.4′	S 13°24.5′	219°27.2′	S 18°31.4′	294°25.7′	S 20°03.6′
7	187°11.2′	286°27.6′	S 23°09.8′	249°11.2′	S 22°20.4′	217°25.5′	S 13°24.4′	234°29.5′	S 18°31.3′	309°26.4′	S 20°04.0′
8	202°13.6′	301°27.3′	S 23°10.0′	264°13.1′	S 22°19.8′	232°27.6′	S 13°24.3′	249°31.7′	S 18°31.2′	324°27.0′	S 20°04.4′
9	217°16.1′	316°27.0′	S 23°10.2′	279°15.0′	S 22°19.3′	247°29.7′	S 13°24.1′	264°33.9′	S 18°31.2′	339°27.7′	S 20°04.8′
10	232°18.6′	331°26.7′	S 23°10.3′	294°17.0′	S 22°18.8′	262°31.7′	S 13°24.0′	279°36.1′	S 18°31.1′	354°28.3′	S 20°05.2′
11	247°21.0′	346°26.4′	S 23°10.5′	309°18.9′	S 22°18.3′	277°33.8′	S 13°23.8′	294°38.4′	S 18°31.1′	9°29.0′	S 20°05.6′
12	262°23.5′	1°26.1′	S 23°10.6′	324°20.8′	S 22°17.7′	292°35.9′	S 13°23.7′	309°40.6′	S 18°31.0′	24°29.6′	S 20°06.0′
13	277°26.0′	16°25.8′	S 23°10.8′	339°22.8′	S 22°17.2′	307°38.0′	S 13°23.5′	324°42.8′	S 18°30.9′	39°30.3′	S 20°06.3′
14	292°28.4′	31°25.5′	S 23°11.0′	354°24.7′	S 22°16.7′	322°40.0′	S 13°23.4′	339°45.1′	S 18°30.9′	54°30.9′	S 20°06.7′
15	307°30.9′	46°25.2′	S 23°11.1′	9°26.7′	S 22°16.2′	337°42.1′	S 13°23.3′	354°47.3′	S 18°30.8′	69°31.6′	S 20°07.1′
16	322°33.4′	61°24.9′	S 23°11.3′	24°28.6′	S 22°15.6′	352°44.2′	S 13°23.1′	9°49.5′	S 18°30.7′	84°32.2′	S 20°07.5′
17	337°35.8′	76°24.6′	S 23°11.4′	39°30.6′	S 22°15.1′	7°46.3′	S 13°23.0′	24°51.8′	S 18°30.7′	99°32.9′	S 20°07.9′
18	352°38.3′	91°24.3′	S 23°11.6′	54°32.6′	S 22°14.6′	22°48.3′	S 13°22.8′	39°54.0′	S 18°30.6′	114°33.5′	S 20°08.3′
19	7°40.7′	106°24.0′	S 23°11.7′	69°34.5′	S 22°14.0′	37°50.4′	S 13°22.7′	54°56.2′	S 18°30.6′	129°34.2′	S 20°08.7′
20	22°43.2′	121°23.7′	S 23°11.9′	84°36.5′	S 22°13.5′	52°52.5′	S 13°22.5′	69°58.4′	S 18°30.5′	144°34.8′	S 20°09.1′
21	37°45.7′	136°23.4′	S 23°12.0′	99°38.5′	S 22°13.0′	67°54.6′	S 13°22.4′	85°00.7′	S 18°30.4′	159°35.5′	S 20°09.5′
22	52°48.1′	151°23.1′	S 23°12.2′	114°40.5′	S 22°12.5′	82°56.6′	S 13°22.3′	100°02.9′	S 18°30.4′	174°36.1′	S 20°09.9′
23	67°50.6′	166°22.8′	S 23°12.3′	129°42.4′	S 22°11.9′	97°58.7′	S 13°22.1′	115°05.1′	S 18°30.3′	189°36.8′	S 20°10.3′
		SD 16.2′ *d* -0.2′		*v* 1.9′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.7′ *d* -0.4′	
Mer. pass.		11 h 54 m 17 s		14 h 22 m		16 h 29 m		15 h 21 m		10 h 22 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Capella	−Rigel	−Aldebaran	+Fomalhaut	+Jupiter	+Saturn	+Sun
0	67°48.1′	N 1°46.4′	15.8′	13.6′	55.3′	74°53.6′	71°55.4′	65°22.1′	56°14.8′	42°02.4′	46°33.3′	63°40.7′	112°25.5′
1	82°22.9′	N 2°00.1′	15.8′	13.6′	55.2′	74°24.5′	71°26.9′	64°57.2′	55°44.2′	42°30.6′	47°03.6′	64°11.2′	112°53.8′
2	96°57.7′	N 2°13.7′	15.8′	13.6′	55.2′	73°55.4′	70°58.3′	64°32.4′	55°13.7′	42°58.8′	47°33.8′	64°41.7′	113°22.0′
3	111°32.6′	N 2°27.3′	15.8′	13.6′	55.2′	73°26.3′	70°29.8′	64°07.6′	54°43.2′	43°27.0′	48°04.0′	65°12.2′	113°50.2′
4	126°07.4′	N 2°40.9′	15.9′	13.6′	55.2′	72°57.3′	70°01.4′	63°42.9′	54°12.7′	43°55.2′	48°34.2′	65°42.6′	114°18.4′
5	140°42.3′	N 2°54.5′	15.9′	13.5′	55.2′	72°28.3′	69°33.0′	63°18.3′	53°42.3′	44°23.5′	49°04.4′	66°13.0′	114°46.6′
6	155°17.1′	N 3°08.0′	15.9′	13.5′	55.1′	71°59.3′	69°04.6′	62°53.8′	53°11.8′	44°51.8′	49°34.6′	66°43.4′	115°14.8′
7	169°52.0′	N 3°21.5′	15.9′	13.5′	55.1′	71°30.4′	68°36.3′	62°29.3′	52°41.4′	45°20.1′	50°04.7′	67°13.7′	115°42.9′
8	184°26.9′	N 3°35.0′	15.9′	13.5′	55.1′	71°01.5′	68°08.0′	62°04.9′	52°11.1′	45°48.4′	50°34.8′	67°44.1′	116°11.0′
9	199°01.8′	N 3°48.5′	15.9′	13.4′	55.1′	70°32.6′	67°39.7′	61°40.6′	51°40.7′	46°16.7′	51°04.9′	68°14.4′	116°39.1′
10	213°36.7′	N 4°01.9′	15.9′	13.4′	55.0′	70°03.8′	67°11.5′	61°16.3′	51°10.4′	46°45.1′	51°35.0′	68°44.7′	117°07.1′
11	228°11.6′	N 4°15.4′	15.9′	13.4′	55.0′	69°34.9′	66°43.3′	60°52.1′	50°40.1′	47°13.4′	52°05.0′	69°14.9′	117°35.2′
12	242°46.5′	N 4°28.8′	15.9′	13.4′	55.0′	69°06.2′	66°15.1′	60°28.0′	50°09.9′	47°41.8′	52°35.1′	69°45.2′	118°03.2′
13	257°21.4′	N 4°42.1′	15.9′	13.3′	55.0′	68°37.4′	65°47.0′	60°03.9′	49°39.6′	48°10.2′	53°05.1′	70°15.4′	118°31.2′
14	271°56.3′	N 4°55.5′	15.9′	13.3′	55.0′	68°08.7′	65°18.9′	59°40.0′	49°09.4′	48°38.6′	53°35.1′	70°45.6′	118°59.1′
15	286°31.3′	N 5°08.8′	15.9′	13.3′	54.9′	67°40.0′	64°50.9′	59°16.1′	48°39.2′	49°07.1′	54°05.0′	71°15.8′	119°27.1′
16	301°06.2′	N 5°22.1′	15.9′	13.3′	54.9′	67°11.4′	64°22.9′	58°52.3′	48°09.1′	49°35.5′	54°35.0′	71°46.0′	119°55.0′
17	315°41.1′	N 5°35.3′	15.9′	13.2′	54.9′	66°42.8′	63°54.9′	58°28.6′	47°38.9′	50°03.9′	55°04.9′	72°16.1′	
18	330°16.0′	N 5°48.6′	15.9′	13.2′	54.9′	66°14.2′	63°27.0′	58°04.9′	47°08.8′	50°32.4′	55°34.8′	72°46.3′	
19	344°50.9′	N 6°01.7′	15.9′	13.2′	54.9′	65°45.6′	62°59.1′	57°41.3′	46°38.7′	51°00.9′	56°04.7′	73°16.4′	
20	359°25.8′	N 6°14.9′	15.9′	13.1′	54.8′	65°17.1′	62°31.3′	57°17.9′	46°08.7′	51°29.3′	56°34.6′	73°46.4′	
21	14°00.7′	N 6°28.0′	15.9′	13.1′	54.8′	64°48.6′	62°03.5′	56°54.5′	45°38.6′	51°57.8′	57°04.5′	74°16.5′	
22	28°35.6′	N 6°41.1′	15.9′	13.1′	54.8′	64°20.2′	61°35.7′	56°31.2′	45°08.6′	52°26.3′	57°34.3′	74°46.6′	
23	43°10.5′	N 6°54.2′	15.9′	13.0′	54.8′	63°51.8′	61°08.0′	56°07.9′	44°38.6′	52°54.8′	58°04.1′	75°16.6′	
Mer. pass. 20 h 2 m SD 15.1′ phase 69%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.1′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°47.6′	N 89°21.5′
Rigil Kent	−0.0	139°44.3′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.8′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.3′				

Tuesday 14 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	82°53.1′	181°22.5′	S 23°12.5′	144°44.4′	S 22°11.4′	113°00.8′	S 13°22.0′	130°07.4′	S 18°30.2′	204°37.4′	S 20°10.7′
1	97°55.5′	196°22.2′	S 23°12.6′	159°46.4′	S 22°10.9′	128°02.9′	S 13°21.8′	145°09.6′	S 18°30.2′	219°38.1′	S 20°11.1′
2	112°58.0′	211°21.9′	S 23°12.8′	174°48.4′	S 22°10.3′	143°04.9′	S 13°21.7′	160°11.8′	S 18°30.1′	234°38.7′	S 20°11.4′
3	128°00.5′	226°21.7′	S 23°12.9′	189°50.4′	S 22°09.8′	158°07.0′	S 13°21.5′	175°14.0′	S 18°30.1′	249°39.4′	S 20°11.8′
4	143°02.9′	241°21.4′	S 23°13.1′	204°52.4′	S 22°09.3′	173°09.1′	S 13°21.4′	190°16.3′	S 18°30.0′	264°40.0′	S 20°12.2′
5	158°05.4′	256°21.1′	S 23°13.2′	219°54.4′	S 22°08.8′	188°11.2′	S 13°21.2′	205°18.5′	S 18°29.9′	279°40.7′	S 20°12.6′
6	173°07.9′	271°20.8′	S 23°13.4′	234°56.5′	S 22°08.2′	203°13.2′	S 13°21.1′	220°20.7′	S 18°29.9′	294°41.3′	S 20°13.0′
7	188°10.3′	286°20.5′	S 23°13.5′	249°58.5′	S 22°07.7′	218°15.3′	S 13°21.0′	235°22.9′	S 18°29.8′	309°42.0′	S 20°13.4′
8	203°12.8′	301°20.2′	S 23°13.7′	265°00.5′	S 22°07.2′	233°17.4′	S 13°20.8′	250°25.2′	S 18°29.8′	324°42.6′	S 20°13.8′
9	218°15.2′	316°19.9′	S 23°13.8′	280°02.5′	S 22°06.7′	248°19.4′	S 13°20.7′	265°27.4′	S 18°29.7′	339°43.3′	S 20°14.2′
10	233°17.7′	331°19.6′	S 23°13.9′	295°04.6′	S 22°06.1′	263°21.5′	S 13°20.5′	280°29.6′	S 18°29.6′	354°43.9′	S 20°14.6′
11	248°20.2′	346°19.3′	S 23°14.1′	310°06.6′	S 22°05.6′	278°23.6′	S 13°20.4′	295°31.9′	S 18°29.6′	9°44.6′	S 20°14.9′
12	263°22.6′	1°19.0′	S 23°14.2′	325°08.6′	S 22°05.1′	293°25.7′	S 13°20.2′	310°34.1′	S 18°29.5′	24°45.2′	S 20°15.3′
13	278°25.1′	16°18.7′	S 23°14.4′	340°10.7′	S 22°04.5′	308°27.7′	S 13°20.1′	325°36.3′	S 18°29.4′	39°45.9′	S 20°15.7′
14	293°27.6′	31°18.4′	S 23°14.5′	355°12.7′	S 22°04.0′	323°29.8′	S 13°19.9′	340°38.5′	S 18°29.4′	54°46.5′	S 20°16.1′
15	308°30.0′	46°18.1′	S 23°14.6′	10°14.8′	S 22°03.5′	338°31.9′	S 13°19.8′	355°40.8′	S 18°29.3′	69°47.2′	S 20°16.5′
16	323°32.5′	61°17.8′	S 23°14.8′	25°16.8′	S 22°03.0′	353°33.9′	S 13°19.7′	10°43.0′	S 18°29.2′	84°47.8′	S 20°16.9′
17	338°35.0′	76°17.5′	S 23°14.9′	40°18.9′	S 22°02.4′	8°36.0′	S 13°19.5′	25°45.2′	S 18°29.2′	99°48.5′	S 20°17.3′
18	353°37.4′	91°17.2′	S 23°15.0′	55°21.0′	S 22°01.9′	23°38.1′	S 13°19.4′	40°47.4′	S 18°29.1′	114°49.1′	S 20°17.6′
19	8°39.9′	106°16.9′	S 23°15.2′	70°23.0′	S 22°01.4′	38°40.1′	S 13°19.2′	55°49.7′	S 18°29.1′	129°49.7′	S 20°18.0′
20	23°42.4′	121°16.6′	S 23°15.3′	85°25.1′	S 22°00.8′	53°42.2′	S 13°19.1′	70°51.9′	S 18°29.0′	144°50.4′	S 20°18.4′
21	38°44.8′	136°16.3′	S 23°15.4′	100°27.2′	S 22°00.3′	68°44.3′	S 13°18.9′	85°54.1′	S 18°28.9′	159°51.0′	S 20°18.8′
22	53°47.3′	151°16.0′	S 23°15.6′	115°29.3′	S 21°59.8′	83°46.4′	S 13°18.8′	100°56.3′	S 18°28.9′	174°51.7′	S 20°19.2′
23	68°49.7′	166°15.7′	S 23°15.7′	130°31.4′	S 21°59.3′	98°48.4′	S 13°18.6′	115°58.6′	S 18°28.8′	189°52.3′	S 20°19.6′
		SD 16.2′	*d* -0.1′	*v* 2.0′	*d* 0.5′	*v* 2.1′	*d* 0.1′	*v* 2.2′	*d* 0.1′	*v* 0.6′	*d* -0.4′
Mer. pass.		11 h 54 m 45 s		14 h 19 m		16 h 26 m		15 h 17 m		10 h 21 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Capella	−Rigel	−Aldebaran	+Fomalhaut	+Jupiter	+Achernar	+Saturn
0	57°45.3′	N 7°07.2′	15.9′	13.0′	54.8′	63°23.4′	60°40.3′	55°44.8′	44°08.7′	53°23.3′	58°33.9′		75°46.6′
1	72°20.2′	N 7°20.2′	15.9′	13.0′	54.7′	62°55.0′	60°12.7′	55°21.8′	43°38.7′	53°51.8′	59°03.7′		76°16.6′
2	86°55.1′	N 7°33.2′	15.8′	12.9′	54.7′	62°26.7′	59°45.1′	54°58.8′	43°08.8′	54°20.3′	59°33.5′		76°46.6′
3	101°29.9′	N 7°46.1′	15.8′	12.9′	54.7′	61°58.5′	59°17.6′	54°35.9′	42°38.9′	54°48.8′	60°03.3′		77°16.5′
4	116°04.7′	N 7°59.0′	15.8′	12.8′	54.7′	61°30.2′	58°50.1′	54°13.2′	42°09.1′	55°17.3′	60°33.0′		77°46.5′
5	130°39.5′	N 8°11.8′	15.8′	12.8′	54.7′	61°02.0′	58°22.6′	53°50.5′	41°39.2′	55°45.9′	61°02.7′		78°16.4′
6	145°14.3′	N 8°24.6′	15.8′	12.8′	54.6′	60°33.8′	57°55.2′	53°27.9′	41°09.4′	56°14.4′	61°32.4′		78°46.3′
7	159°49.1′	N 8°37.4′	15.8′	12.7′	54.6′	60°05.7′	57°27.8′	53°05.5′	40°39.6′	56°42.9′	62°02.1′		79°16.2′
8	174°23.9′	N 8°50.1′	15.8′	12.7′	54.6′	59°37.6′	57°00.5′	52°43.1′	40°09.9′	57°11.5′	62°31.8′		79°46.1′
9	188°58.7′	N 9°02.8′	15.7′	12.6′	54.6′	59°09.5′	56°33.2′	52°20.8′	39°40.1′	57°40.0′	63°01.4′		80°15.9′
10	203°33.4′	N 9°15.5′	15.7′	12.6′	54.6′	58°41.5′	56°06.0′	51°58.7′	39°10.4′	58°08.5′	63°31.1′		80°45.8′
11	218°08.1′	N 9°28.1′	15.7′	12.6′	54.6′	58°13.5′	55°38.8′	51°36.6′	38°40.7′	58°37.1′	64°00.7′		81°15.6′
12	232°42.8′	N 9°40.6′	15.7′	12.5′	54.5′	57°45.5′	55°11.6′	51°14.7′	38°11.1′	59°05.6′	64°30.3′		81°45.4′
13	247°17.5′	N 9°53.2′	15.7′	12.5′	54.5′	57°17.6′	54°44.5′	50°52.9′	37°41.4′	59°34.2′	64°59.9′		82°15.2′
14	261°52.1′	N 10°05.6′	15.6′	12.4′	54.5′	56°49.7′	54°17.5′	50°31.1′	37°11.8′	60°02.7′	65°29.5′		82°45.0′
15	276°26.8′	N 10°18.1′	15.6′	12.4′	54.5′	56°21.8′	53°50.5′	50°09.5′	36°42.2′	60°31.3′	65°59.1′		83°14.8′
16	291°01.4′	N 10°30.4′	15.6′	12.3′	54.5′	55°54.0′	53°23.6′	49°48.0′	36°12.7′	60°59.8′	66°28.6′		83°44.5′
17	305°36.0′	N 10°42.8′	15.6′	12.3′	54.5′	55°26.3′	52°56.7′	49°26.7′	35°43.1′	61°28.4′	66°58.2′		84°14.3′
18	320°10.5′	N 10°55.1′	15.5′	12.2′	54.5′	54°58.5′	52°29.8′	49°05.4′	35°13.6′	61°56.9′	67°27.7′		84°44.0′
19	334°45.1′	N 11°07.3′	15.5′	12.2′	54.4′	54°30.8′	52°03.0′	48°44.3′	34°44.1′	62°25.5′	67°57.2′		85°13.7′
20	349°19.6′	N 11°19.5′	15.5′	12.1′	54.4′	54°03.2′	51°36.3′	48°23.3′	34°14.7′	62°54.0′	68°26.7′		85°43.4′
21	3°54.0′	N 11°31.6′	15.5′	12.1′	54.4′	53°35.6′	51°09.6′	48°02.4′	33°45.3′	63°22.6′	68°56.2′		86°13.1′
22	18°28.5′	N 11°43.7′	15.4′	12.0′	54.4′	53°08.0′	50°43.0′	47°41.7′	33°15.9′	63°51.1′	69°25.7′		86°42.8′
23	33°02.9′	N 11°55.8′	15.4′	12.0′	54.4′	52°40.5′	50°16.5′	47°21.1′	32°46.5′	64°19.7′	69°55.2′	69°40.4′	87°12.4′
Mer. pass. 20 h 44 m SD 14.9′ phase 78%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.0′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°47.9′	N 89°21.5′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.9′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.4′				

Wednesday 15 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	83°52.2′	181°15.4′	S 23°15.8′	145°33.5′	S 21°58.7′	113°50.5′	S 13°18.5′	131°00.8′	S 18°28.7′	204°53.0′	S 20°20.0′
1	98°54.7′	196°15.1′	S 23°16.0′	160°35.6′	S 21°58.2′	128°52.6′	S 13°18.3′	146°03.0′	S 18°28.7′	219°53.6′	S 20°20.3′
2	113°57.1′	211°14.8′	S 23°16.1′	175°37.7′	S 21°57.7′	143°54.6′	S 13°18.2′	161°05.3′	S 18°28.6′	234°54.3′	S 20°20.7′
3	128°59.6′	226°14.5′	S 23°16.2′	190°39.8′	S 21°57.1′	158°56.7′	S 13°18.1′	176°07.5′	S 18°28.6′	249°54.9′	S 20°21.1′
4	144°02.1′	241°14.2′	S 23°16.4′	205°41.9′	S 21°56.6′	173°58.8′	S 13°17.9′	191°09.7′	S 18°28.5′	264°55.5′	S 20°21.5′
5	159°04.5′	256°13.9′	S 23°16.5′	220°44.0′	S 21°56.1′	189°00.8′	S 13°17.8′	206°11.9′	S 18°28.4′	279°56.2′	S 20°21.9′
6	174°07.0′	271°13.6′	S 23°16.6′	235°46.1′	S 21°55.6′	204°02.9′	S 13°17.6′	221°14.2′	S 18°28.4′	294°56.8′	S 20°22.2′
7	189°09.5′	286°13.3′	S 23°16.7′	250°48.2′	S 21°55.0′	219°05.0′	S 13°17.5′	236°16.4′	S 18°28.3′	309°57.5′	S 20°22.6′
8	204°11.9′	301°13.0′	S 23°16.9′	265°50.3′	S 21°54.5′	234°07.0′	S 13°17.3′	251°18.6′	S 18°28.2′	324°58.1′	S 20°23.0′
9	219°14.4′	316°12.7′	S 23°17.0′	280°52.5′	S 21°54.0′	249°09.1′	S 13°17.2′	266°20.8′	S 18°28.2′	339°58.8′	S 20°23.4′
10	234°16.8′	331°12.4′	S 23°17.1′	295°54.6′	S 21°53.4′	264°11.2′	S 13°17.0′	281°23.1′	S 18°28.1′	354°59.4′	S 20°23.8′
11	249°19.3′	346°12.1′	S 23°17.2′	310°56.8′	S 21°52.9′	279°13.2′	S 13°16.9′	296°25.3′	S 18°28.1′	10°00.0′	S 20°24.2′
12	264°21.8′	1°11.8′	S 23°17.3′	325°58.9′	S 21°52.4′	294°15.3′	S 13°16.7′	311°27.5′	S 18°28.0′	25°00.7′	S 20°24.5′
13	279°24.2′	16°11.5′	S 23°17.5′	341°01.0′	S 21°51.9′	309°17.4′	S 13°16.6′	326°29.7′	S 18°27.9′	40°01.3′	S 20°24.9′
14	294°26.7′	31°11.2′	S 23°17.6′	356°03.2′	S 21°51.3′	324°19.4′	S 13°16.4′	341°32.0′	S 18°27.9′	55°02.0′	S 20°25.3′
15	309°29.2′	46°10.9′	S 23°17.7′	11°05.4′	S 21°50.8′	339°21.5′	S 13°16.3′	356°34.2′	S 18°27.8′	70°02.6′	S 20°25.7′
16	324°31.6′	61°10.6′	S 23°17.8′	26°07.5′	S 21°50.3′	354°23.6′	S 13°16.1′	11°36.4′	S 18°27.7′	85°03.2′	S 20°26.1′
17	339°34.1′	76°10.3′	S 23°17.9′	41°09.7′	S 21°49.7′	9°25.6′	S 13°16.0′	26°38.6′	S 18°27.7′	100°03.9′	S 20°26.4′
18	354°36.6′	91°10.0′	S 23°18.0′	56°11.9′	S 21°49.2′	24°27.7′	S 13°15.9′	41°40.8′	S 18°27.6′	115°04.5′	S 20°26.8′
19	9°39.0′	106°09.7′	S 23°18.2′	71°14.0′	S 21°48.7′	39°29.8′	S 13°15.7′	56°43.1′	S 18°27.5′	130°05.2′	S 20°27.2′
20	24°41.5′	121°09.4′	S 23°18.3′	86°16.2′	S 21°48.2′	54°31.8′	S 13°15.6′	71°45.3′	S 18°27.5′	145°05.8′	S 20°27.6′
21	39°44.0′	136°09.1′	S 23°18.4′	101°18.4′	S 21°47.6′	69°33.9′	S 13°15.4′	86°47.5′	S 18°27.4′	160°06.4′	S 20°27.9′
22	54°46.4′	151°08.8′	S 23°18.5′	116°20.6′	S 21°47.1′	84°35.9′	S 13°15.3′	101°49.7′	S 18°27.4′	175°07.1′	S 20°28.3′
23	69°48.9′	166°08.5′	S 23°18.6′	131°22.8′	S 21°46.6′	99°38.0′	S 13°15.1′	116°52.0′	S 18°27.3′	190°07.7′	S 20°28.7′
		SD 16.2′ *d* -0.1′		*v* 2.1′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.4′	
Mer. pass.		11 h 55 m 14 s		14 h 16 m		16 h 22 m		15 h 14 m		10 h 20 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Capella	−Rigel	−Aldebaran	+Fomalhaut	+Achernar	+Jupiter	+Saturn
0	47°37.3′	N 12°07.8′	15.4′	11.9′	54.4′	52°13.0′	49°49.9′	47°00.6′	32°17.1′	64°48.2′	69°55.5′	70°24.6′	87°42.1′
1	62°11.7′	N 12°19.7′	15.3′	11.9′	54.4′	51°45.6′	49°23.5′	46°40.3′	31°47.8′	65°16.8′	70°10.6′	70°54.1′	88°11.7′
2	76°46.0′	N 12°31.6′	15.3′	11.8′	54.3′	51°18.2′	48°57.1′	46°20.1′	31°18.5′	65°45.3′	70°25.7′	71°23.5′	88°41.3′
3	91°20.3′	N 12°43.4′	15.3′	11.8′	54.3′	50°50.8′	48°30.8′	46°00.1′	30°49.3′	66°13.9′	70°41.0′	71°52.9′	89°10.9′
4	105°54.6′	N 12°55.2′	15.2′	11.7′	54.3′	50°23.5′	48°04.5′	45°40.2′	30°20.0′	66°42.4′	70°56.3′	72°22.4′	89°40.5′
5	120°28.8′	N 13°06.9′	15.2′	11.7′	54.3′	49°56.2′	47°38.3′	45°20.4′	29°50.8′	67°11.0′	71°11.6′	72°51.8′	90°10.1′
6	135°03.0′	N 13°18.6′	15.2′	11.6′	54.3′	49°29.0′	47°12.2′	45°00.8′	29°21.7′	67°39.5′	71°27.0′	73°21.1′	90°39.7′
7	149°37.1′	N 13°30.2′	15.1′	11.6′	54.3′	49°01.8′	46°46.1′	44°41.4′	28°52.5′	68°08.1′	71°42.5′	73°50.5′	91°09.3′
8	164°11.3′	N 13°41.8′	15.1′	11.5′	54.3′	48°34.7′	46°20.1′	44°22.1′	28°23.4′	68°36.6′	71°58.1′	74°19.9′	91°38.8′
9	178°45.4′	N 13°53.2′	15.1′	11.4′	54.3′	48°07.7′	45°54.2′	44°03.0′	27°54.4′	69°05.2′	72°13.6′	74°49.3′	92°08.4′
10	193°19.4′	N 14°04.7′	15.0′	11.4′	54.2′	47°40.6′	45°28.3′	43°44.0′	27°25.4′	69°33.7′	72°29.3′	75°18.6′	92°37.9′
11	207°53.4′	N 14°16.1′	15.0′	11.3′	54.2′	47°13.7′	45°02.5′	43°25.2′	26°56.4′	70°02.3′	72°45.0′	75°47.9′	93°07.5′
12	222°27.4′	N 14°27.4′	14.9′	11.3′	54.2′	46°46.8′	44°36.8′	43°06.6′	26°27.4′	70°30.8′	73°00.7′	76°17.3′	93°37.0′
13	237°01.3′	N 14°38.6′	14.9′	11.2′	54.2′	46°19.9′	44°11.2′	42°48.2′	25°58.5′	70°59.4′	73°16.5′	76°46.6′	94°06.5′
14	251°35.2′	N 14°49.8′	14.9′	11.1′	54.2′	45°53.1′	43°45.6′	42°29.9′	25°29.6′	71°27.9′	73°32.4′	77°15.9′	94°36.0′
15	266°09.1′	N 15°01.0′	14.8′	11.1′	54.2′	45°26.3′	43°20.1′	42°11.9′	25°00.8′	71°56.4′	73°48.3′	77°45.2′	95°05.5′
16	280°42.9′	N 15°12.0′	14.8′	11.0′	54.2′	44°59.7′	42°54.7′	41°54.0′	24°32.0′	72°25.0′	74°04.3′	78°14.5′	95°35.0′
17	295°16.7′	N 15°23.0′	14.7′	10.9′	54.2′	44°33.0′	42°29.4′	41°36.3′	24°03.3′	72°53.5′	74°20.3′	78°43.8′	96°04.4′
18	309°50.4′	N 15°34.0′	14.7′	10.9′	54.2′	44°06.5′	42°04.2′	41°18.8′	23°34.6′	73°22.0′	74°36.3′	79°13.1′	96°33.9′
19	324°24.1′	N 15°44.9′	14.6′	10.8′	54.2′	43°39.9′	41°39.0′	41°01.4′	23°05.9′	73°50.6′	74°52.4′	79°42.3′	97°03.4′
20	338°57.7′	N 15°55.7′	14.6′	10.7′	54.1′	43°13.5′	41°14.0′	40°44.3′	22°37.4′	74°19.1′	75°08.5′	80°11.6′	97°32.8′
21	353°31.3′	N 16°06.4′	14.6′	10.7′	54.1′	42°47.1′	40°49.0′	40°27.4′	22°08.8′	74°47.6′	75°24.7′	80°40.9′	98°02.2′
22	8°04.9′	N 16°17.1′	14.5′	10.6′	54.1′	42°20.8′	40°24.2′	40°10.7′	21°40.4′	75°16.2′	75°41.0′	81°10.1′	98°31.7′
23	22°38.4′	N 16°27.7′	14.5′	10.5′	54.1′	41°54.6′	39°59.4′	39°54.3′	21°12.0′	75°44.7′	75°57.2′	81°39.4′	99°01.1′
Mer. pass. 21 h 27 m SD 14.8′ phase 85%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.7′	Acrux	+0.8	173°03.0′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°48.1′	N 89°21.5′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.9′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.4′				

Thursday 16 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	84°51.3′	181°08.2′	S 23°18.7′	146°25.0′	S 21°46.0′	114°40.1′	S 13°15.0′	131°54.2′	S 18°27.2′	205°08.4′	S 20°29.1′
1	99°53.8′	196°07.9′	S 23°18.8′	161°27.2′	S 21°45.5′	129°42.1′	S 13°14.8′	146°56.4′	S 18°27.2′	220°09.0′	S 20°29.4′
2	114°56.3′	211°07.6′	S 23°18.9′	176°29.4′	S 21°45.0′	144°44.2′	S 13°14.7′	161°58.6′	S 18°27.1′	235°09.6′	S 20°29.8′
3	129°58.7′	226°07.3′	S 23°19.1′	191°31.6′	S 21°44.5′	159°46.3′	S 13°14.5′	177°00.9′	S 18°27.0′	250°10.3′	S 20°30.2′
4	145°01.2′	241°07.0′	S 23°19.2′	206°33.8′	S 21°43.9′	174°48.3′	S 13°14.4′	192°03.1′	S 18°27.0′	265°10.9′	S 20°30.6′
5	160°03.7′	256°06.7′	S 23°19.3′	221°36.0′	S 21°43.4′	189°50.4′	S 13°14.2′	207°05.3′	S 18°26.9′	280°11.6′	S 20°30.9′
6	175°06.1′	271°06.3′	S 23°19.4′	236°38.2′	S 21°42.9′	204°52.5′	S 13°14.1′	222°07.5′	S 18°26.8′	295°12.2′	S 20°31.3′
7	190°08.6′	286°06.0′	S 23°19.5′	251°40.5′	S 21°42.3′	219°54.5′	S 13°13.9′	237°09.7′	S 18°26.8′	310°12.8′	S 20°31.7′
8	205°11.1′	301°05.7′	S 23°19.6′	266°42.7′	S 21°41.8′	234°56.6′	S 13°13.8′	252°12.0′	S 18°26.7′	325°13.5′	S 20°32.1′
9	220°13.5′	316°05.4′	S 23°19.7′	281°44.9′	S 21°41.3′	249°58.6′	S 13°13.6′	267°14.2′	S 18°26.7′	340°14.1′	S 20°32.4′
10	235°16.0′	331°05.1′	S 23°19.8′	296°47.2′	S 21°40.8′	265°00.7′	S 13°13.5′	282°16.4′	S 18°26.6′	355°14.7′	S 20°32.8′
11	250°18.5′	346°04.8′	S 23°19.9′	311°49.4′	S 21°40.2′	280°02.8′	S 13°13.3′	297°18.6′	S 18°26.5′	10°15.4′	S 20°33.2′
12	265°20.9′	1°04.5′	S 23°20.0′	326°51.7′	S 21°39.7′	295°04.8′	S 13°13.2′	312°20.9′	S 18°26.5′	25°16.0′	S 20°33.6′
13	280°23.4′	16°04.2′	S 23°20.1′	341°53.9′	S 21°39.2′	310°06.9′	S 13°13.0′	327°23.1′	S 18°26.4′	40°16.6′	S 20°33.9′
14	295°25.8′	31°03.9′	S 23°20.2′	356°56.2′	S 21°38.6′	325°09.0′	S 13°12.9′	342°25.3′	S 18°26.3′	55°17.3′	S 20°34.3′
15	310°28.3′	46°03.6′	S 23°20.3′	11°58.5′	S 21°38.1′	340°11.0′	S 13°12.7′	357°27.5′	S 18°26.3′	70°17.9′	S 20°34.7′
16	325°30.8′	61°03.3′	S 23°20.4′	27°00.7′	S 21°37.6′	355°13.1′	S 13°12.6′	12°29.7′	S 18°26.2′	85°18.6′	S 20°35.1′
17	340°33.2′	76°03.0′	S 23°20.5′	42°03.0′	S 21°37.1′	10°15.1′	S 13°12.4′	27°32.0′	S 18°26.1′	100°19.2′	S 20°35.4′
18	355°35.7′	91°02.7′	S 23°20.6′	57°05.3′	S 21°36.5′	25°17.2′	S 13°12.3′	42°34.2′	S 18°26.1′	115°19.8′	S 20°35.8′
19	10°38.2′	106°02.4′	S 23°20.7′	72°07.6′	S 21°36.0′	40°19.3′	S 13°12.1′	57°36.4′	S 18°26.0′	130°20.5′	S 20°36.2′
20	25°40.6′	121°02.1′	S 23°20.8′	87°09.8′	S 21°35.5′	55°21.3′	S 13°12.0′	72°38.6′	S 18°25.9′	145°21.1′	S 20°36.5′
21	40°43.1′	136°01.8′	S 23°20.9′	102°12.1′	S 21°34.9′	70°23.4′	S 13°11.8′	87°40.9′	S 18°25.9′	160°21.7′	S 20°36.9′
22	55°45.6′	151°01.5′	S 23°21.0′	117°14.4′	S 21°34.4′	85°25.4′	S 13°11.7′	102°43.1′	S 18°25.8′	175°22.4′	S 20°37.3′
23	70°48.0′	166°01.2′	S 23°21.1′	132°16.7′	S 21°33.9′	100°27.5′	S 13°11.5′	117°45.3′	S 18°25.8′	190°23.0′	S 20°37.6′
		SD 16.2′ *d* -0.1′		*v* 2.3′ *d* 0.5′		*v* 2.1′ *d* 0.1′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.4′	
Mer. pass.		11 h 55 m 43 s		14 h 12 m		16 h 19 m		15 h 10 m		10 h 19 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Betelgeuse	−Rigel	−Capella	−Aldebaran	+Fomalhaut	+Achernar	+Jupiter	+Saturn
0	37°11.8′	N 16°38.2′	14.4′	10.5′	54.1′	41°28.4′	39°38.0′	39°34.7′	20°43.6′	76°13.2′	76°13.5′	82°08.6′	99°30.5′
1	51°45.2′	N 16°48.7′	14.4′	10.4′	54.1′	41°02.3′	39°22.0′	39°10.2′	20°15.3′	76°41.8′	76°29.9′	82°37.8′	99°59.9′
2	66°18.6′	N 16°59.1′	14.3′	10.3′	54.1′	40°36.2′	39°06.2′	38°45.7′	19°47.2′	77°10.3′	76°46.3′	83°07.0′	100°29.3′
3	80°51.9′	N 17°09.4′	14.3′	10.3′	54.1′	40°10.3′	38°50.6′	38°21.4′	19°19.0′	77°38.8′	77°02.7′	83°36.2′	100°58.7′
4	95°25.2′	N 17°19.7′	14.2′	10.2′	54.1′	39°44.4′	38°35.2′	37°57.2′	18°51.0′	78°07.3′	77°19.2′	84°05.5′	101°28.1′
5	109°58.4′	N 17°29.9′	14.2′	10.1′	54.1′	39°18.6′		37°33.0′	18°23.1′	78°35.8′	77°35.7′	84°34.7′	101°57.5′
6	124°31.6′	N 17°40.0′	14.1′	10.0′	54.1′	38°52.9′		37°09.0′	17°55.2′	79°04.3′	77°52.2′	85°03.9′	102°26.9′
7	139°04.7′	N 17°50.0′	14.1′	10.0′	54.1′	38°27.3′		36°45.2′	17°27.5′	79°32.9′	78°08.8′	85°33.0′	102°56.3′
8	153°37.8′	N 17°60.0′	14.0′	9.9′	54.0′	38°01.7′		36°21.4′	16°59.8′	80°01.4′	78°25.4′	86°02.2′	103°25.6′
9	168°10.8′	N 18°09.9′	14.0′	9.8′	54.0′	37°36.3′		35°57.8′	16°32.3′	80°29.9′	78°42.0′	86°31.4′	103°55.0′
10	182°43.8′	N 18°19.7′	13.9′	9.7′	54.0′	37°10.9′		35°34.3′	16°04.9′	80°58.4′	78°58.7′	87°00.6′	104°24.3′
11	197°16.7′	N 18°29.4′	13.9′	9.7′	54.0′	36°45.6′		35°11.0′	15°37.7′	81°26.9′	79°15.4′	87°29.7′	104°53.7′
12	211°49.6′	N 18°39.1′	13.8′	9.6′	54.0′	36°20.5′		34°47.8′	15°10.6′	81°55.4′	79°32.1′	87°58.9′	105°23.0′
13	226°22.4′	N 18°48.6′	13.8′	9.5′	54.0′	35°55.4′		34°24.7′	14°43.7′	82°23.9′	79°48.9′	88°28.1′	105°52.4′
14	240°55.2′	N 18°58.1′	13.7′	9.4′	54.0′	35°30.5′		34°01.8′	14°16.9′	82°52.4′	80°05.6′	88°57.2′	106°21.7′
15	255°27.9′	N 19°07.5′	13.7′	9.3′	54.0′	35°05.6′		33°39.1′	13°50.4′	83°20.9′	80°22.5′	89°26.4′	106°51.0′
16	270°00.6′	N 19°16.9′	13.6′	9.2′	54.0′	34°40.9′		33°16.5′	13°24.0′	83°49.4′	80°39.3′	89°55.5′	107°20.4′
17	284°33.2′	N 19°26.1′	13.6′	9.2′	54.0′	34°16.3′		32°54.1′	12°58.0′	84°17.9′	80°56.2′	90°24.7′	107°49.7′
18	299°05.7′	N 19°35.3′	13.5′	9.1′	54.0′	33°51.8′		32°31.9′	12°32.1′	84°46.4′	81°13.1′	90°53.8′	108°19.0′
19	313°38.3′	N 19°44.4′	13.5′	9.0′	54.0′	33°27.4′		32°09.8′	12°06.6′	85°14.9′	81°30.0′	91°22.9′	108°48.3′
20	328°10.7′	N 19°53.4′	13.4′	8.9′	54.0′	33°03.2′		31°48.0′	11°41.3′	85°43.4′	81°46.9′	91°52.1′	109°17.6′
21	342°43.1′	N 20°02.3′	13.3′	8.8′	54.0′	32°39.1′		31°26.3′	11°16.5′	86°11.9′	82°03.9′	92°21.2′	109°46.9′
22	357°15.5′	N 20°11.1′	13.3′	8.7′	54.0′	32°15.1′		31°04.8′	10°52.0′	86°40.4′	82°20.9′	92°50.3′	110°16.2′
23	11°47.8′	N 20°19.8′	13.2′	8.7′	54.0′	31°51.3′		30°43.6′	10°28.0′	87°08.9′	82°37.9′	93°19.4′	110°45.5′
Mer. pass. 22 h 11 m SD 14.8′ phase 91%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°03.0′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°48.3′	N 89°21.5′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.9′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°40.0′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.4′				

Friday 17 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	85°50.5′	181°00.9′	S 23°21.1′	147°19.0′	S 21°33.4′	115°29.6′	S 13°11.4′	132°47.5′	S 18°25.7′	205°23.6′	S 20°38.0′
1	100°53.0′	196°00.6′	S 23°21.2′	162°21.3′	S 21°32.8′	130°31.6′	S 13°11.2′	147°49.7′	S 18°25.6′	220°24.3′	S 20°38.4′
2	115°55.4′	211°00.3′	S 23°21.3′	177°23.6′	S 21°32.3′	145°33.7′	S 13°11.1′	162°52.0′	S 18°25.6′	235°24.9′	S 20°38.8′
3	130°57.9′	225°60.0′	S 23°21.4′	192°26.0′	S 21°31.8′	160°35.7′	S 13°10.9′	177°54.2′	S 18°25.5′	250°25.5′	S 20°39.1′
4	146°00.3′	240°59.7′	S 23°21.5′	207°28.3′	S 21°31.3′	175°37.8′	S 13°10.8′	192°56.4′	S 18°25.4′	265°26.2′	S 20°39.5′
5	161°02.8′	255°59.4′	S 23°21.6′	222°30.6′	S 21°30.7′	190°39.8′	S 13°10.6′	207°58.6′	S 18°25.4′	280°26.8′	S 20°39.9′
6	176°05.3′	270°59.1′	S 23°21.7′	237°32.9′	S 21°30.2′	205°41.9′	S 13°10.5′	223°00.8′	S 18°25.3′	295°27.4′	S 20°40.2′
7	191°07.7′	285°58.8′	S 23°21.8′	252°35.3′	S 21°29.7′	220°44.0′	S 13°10.3′	238°03.1′	S 18°25.2′	310°28.1′	S 20°40.6′
8	206°10.2′	300°58.5′	S 23°21.8′	267°37.6′	S 21°29.1′	235°46.0′	S 13°10.2′	253°05.3′	S 18°25.2′	325°28.7′	S 20°41.0′
9	221°12.7′	315°58.1′	S 23°21.9′	282°40.0′	S 21°28.6′	250°48.1′	S 13°10.0′	268°07.5′	S 18°25.1′	340°29.3′	S 20°41.3′
10	236°15.1′	330°57.8′	S 23°22.0′	297°42.3′	S 21°28.1′	265°50.1′	S 13°09.9′	283°09.7′	S 18°25.0′	355°30.0′	S 20°41.7′
11	251°17.6′	345°57.5′	S 23°22.1′	312°44.7′	S 21°27.6′	280°52.2′	S 13°09.7′	298°11.9′	S 18°25.0′	10°30.6′	S 20°42.1′
12	266°20.1′	0°57.2′	S 23°22.2′	327°47.0′	S 21°27.0′	295°54.2′	S 13°09.6′	313°14.2′	S 18°24.9′	25°31.2′	S 20°42.4′
13	281°22.5′	15°56.9′	S 23°22.3′	342°49.4′	S 21°26.5′	310°56.3′	S 13°09.4′	328°16.4′	S 18°24.8′	40°31.9′	S 20°42.8′
14	296°25.0′	30°56.6′	S 23°22.3′	357°51.7′	S 21°26.0′	325°58.4′	S 13°09.3′	343°18.6′	S 18°24.8′	55°32.5′	S 20°43.2′
15	311°27.4′	45°56.3′	S 23°22.4′	12°54.1′	S 21°25.5′	341°00.4′	S 13°09.1′	358°20.8′	S 18°24.7′	70°33.1′	S 20°43.5′
16	326°29.9′	60°56.0′	S 23°22.5′	27°56.5′	S 21°24.9′	356°02.5′	S 13°09.0′	13°23.0′	S 18°24.7′	85°33.7′	S 20°43.9′
17	341°32.4′	75°55.7′	S 23°22.6′	42°58.9′	S 21°24.4′	11°04.5′	S 13°08.8′	28°25.3′	S 18°24.6′	100°34.4′	S 20°44.2′
18	356°34.8′	90°55.4′	S 23°22.7′	58°01.3′	S 21°23.9′	26°06.6′	S 13°08.7′	43°27.5′	S 18°24.5′	115°35.0′	S 20°44.6′
19	11°37.3′	105°55.1′	S 23°22.7′	73°03.6′	S 21°23.4′	41°08.6′	S 13°08.5′	58°29.7′	S 18°24.5′	130°35.6′	S 20°45.0′
20	26°39.8′	120°54.8′	S 23°22.8′	88°06.0′	S 21°22.8′	56°10.7′	S 13°08.4′	73°31.9′	S 18°24.4′	145°36.3′	S 20°45.3′
21	41°42.2′	135°54.5′	S 23°22.9′	103°08.4′	S 21°22.3′	71°12.8′	S 13°08.2′	88°34.1′	S 18°24.3′	160°36.9′	S 20°45.7′
22	56°44.7′	150°54.2′	S 23°23.0′	118°10.8′	S 21°21.8′	86°14.8′	S 13°08.1′	103°36.4′	S 18°24.3′	175°37.5′	S 20°46.1′
23	71°47.2′	165°53.9′	S 23°23.0′	133°13.2′	S 21°21.2′	101°16.9′	S 13°07.9′	118°38.6′	S 18°24.2′	190°38.1′	S 20°46.4′
		SD 16.2′	*d* -0.1′	*v* 2.4′	*d* 0.5′	*v* 2.1′	*d* 0.2′	*v* 2.2′	*d* 0.1′	*v* 0.6′	*d* -0.4′
Mer. pass.		11 h 56 m 12 s		14 h 9 m		16 h 16 m		15 h 7 m		10 h 18 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Pollux	−Betelgeuse	−Capella	−Aldebaran	+Achernar	+Fomalhaut	+Jupiter	+Saturn
0	26°20.0′	N 20°28.5′	13.2′	8.6′	54.0′	52°12.5′	31°27.6′	30°22.5′	10°04.4′	82°54.9′	87°37.4′	93°48.5′	111°14.8′
1	40°52.2′	N 20°37.1′	13.1′	8.5′	54.0′	51°42.9′	31°04.1′	30°01.7′	9°41.4′	83°12.0′	88°05.8′	94°17.7′	111°44.1′
2	55°24.3′	N 20°45.5′	13.1′	8.4′	53.9′	51°13.4′	30°40.7′	29°41.0′	9°19.1′	83°29.0′	88°34.3′	94°46.8′	112°13.4′
3	69°56.4′	N 20°53.9′	13.0′	8.3′	53.9′	50°43.8′	30°17.5′	29°20.7′	8°57.4′	83°46.1′	89°02.8′	95°15.9′	112°42.7′
4	84°28.4′	N 21°02.2′	13.0′	8.2′	53.9′	50°14.3′	29°54.5′	29°00.5′		84°03.2′	89°31.3′	95°45.0′	113°12.0′
5	99°00.4′	N 21°10.4′	12.9′	8.1′	53.9′	49°44.7′	29°31.6′	28°40.7′		84°20.4′	89°59.8′	96°14.1′	113°41.3′
6	113°32.3′	N 21°18.5′	12.9′	8.0′	53.9′	49°15.1′	29°09.0′	28°21.0′		84°37.5′	90°28.2′	96°43.2′	114°10.5′
7	128°04.2′	N 21°26.6′	12.8′	7.9′	53.9′	48°45.6′	28°46.5′	28°01.7′		84°54.6′	90°56.7′	97°12.3′	114°39.8′
8	142°36.0′	N 21°34.5′	12.8′	7.8′	53.9′	48°16.0′	28°24.2′	27°42.6′		85°11.8′	91°25.2′	97°41.4′	115°09.1′
9	157°07.7′	N 21°42.3′	12.7′	7.7′	53.9′	47°46.5′	28°02.2′	27°23.8′		85°29.0′	91°53.6′	98°10.5′	115°38.3′
10	171°39.4′	N 21°50.1′	12.6′	7.6′	53.9′	47°16.9′	27°40.3′	27°05.3′		85°46.2′	92°22.1′	98°39.6′	116°07.6′
11	186°11.1′	N 21°57.7′	12.6′	7.5′	53.9′	46°47.4′	27°18.7′	26°47.1′		86°03.4′	92°50.6′	99°08.7′	116°36.9′
12	200°42.7′	N 22°05.2′	12.5′	7.4′	53.9′	46°17.9′	26°57.3′	26°29.3′		86°20.6′	93°19.0′	99°37.8′	117°06.1′
13	215°14.2′	N 22°12.7′	12.5′	7.4′	53.9′	45°48.3′	26°36.2′	26°11.7′		86°37.8′	93°47.5′	100°06.9′	117°35.4′
14	229°45.7′	N 22°20.0′	12.4′	7.3′	53.9′	45°18.8′	26°15.3′	25°54.5′		86°55.0′	94°16.0′	100°35.9′	118°04.7′
15	244°17.1′	N 22°27.3′	12.4′	7.2′	53.9′	44°49.2′	25°54.7′	25°37.7′		87°12.3′	94°44.4′	101°05.0′	118°33.9′
16	258°48.5′	N 22°34.4′	12.3′	7.1′	53.9′	44°19.7′	25°34.3′	25°21.2′		87°29.5′	95°12.9′	101°34.1′	119°03.2′
17	273°19.8′	N 22°41.5′	12.3′	7.0′	53.9′	43°50.2′	25°14.2′	25°05.1′		87°46.8′	95°41.3′	102°03.2′	119°32.4′
18	287°51.1′	N 22°48.4′	12.2′	6.9′	53.9′	43°20.6′	24°54.5′	24°49.4′		88°04.0′	96°09.8′	102°32.3′	
19	302°22.3′	N 22°55.3′	12.2′	6.7′	53.9′	42°51.1′	24°35.0′			88°21.3′	96°38.2′	103°01.4′	
20	316°53.5′	N 23°02.0′	12.1′	6.6′	53.9′	42°21.6′	24°15.9′			88°38.6′	97°06.7′	103°30.5′	
21	331°24.6′	N 23°08.7′	12.1′	6.5′	53.9′	41°52.0′	23°57.0′			88°55.8′	97°35.1′	103°59.6′	
22	345°55.6′	N 23°15.2′	12.0′	6.4′	53.9′	41°22.5′	23°38.6′			89°13.1′	98°03.6′	104°28.6′	
23	0°26.6′	N 23°21.7′	12.0′	6.3′	53.9′	40°53.0′	23°20.5′			89°30.4′	98°32.0′	104°57.7′	
Mer. pass. 22 h 58 m SD 14.7′ phase 96%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°03.0′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°48.4′	N 89°21.5′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.9′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.7′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°53.0′	S 52°42.4′				

Saturday 18 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	86°49.6′	180°53.6′	S 23°23.1′	148°15.7′	S 21°20.7′	116°18.9′	S 13°07.8′	133°40.8′	S 18°24.1′	205°38.8′	S 20°46.8′
1	101°52.1′	195°53.3′	S 23°23.2′	163°18.1′	S 21°20.2′	131°21.0′	S 13°07.6′	148°43.0′	S 18°24.1′	220°39.4′	S 20°47.1′
2	116°54.6′	210°53.0′	S 23°23.2′	178°20.5′	S 21°19.7′	146°23.0′	S 13°07.5′	163°45.2′	S 18°24.0′	235°40.0′	S 20°47.5′
3	131°57.0′	225°52.6′	S 23°23.3′	193°22.9′	S 21°19.1′	161°25.1′	S 13°07.3′	178°47.4′	S 18°23.9′	250°40.7′	S 20°47.9′
4	146°59.5′	240°52.3′	S 23°23.4′	208°25.4′	S 21°18.6′	176°27.1′	S 13°07.2′	193°49.7′	S 18°23.9′	265°41.3′	S 20°48.2′
5	162°01.9′	255°52.0′	S 23°23.4′	223°27.8′	S 21°18.1′	191°29.2′	S 13°07.0′	208°51.9′	S 18°23.8′	280°41.9′	S 20°48.6′
6	177°04.4′	270°51.7′	S 23°23.5′	238°30.2′	S 21°17.6′	206°31.2′	S 13°06.9′	223°54.1′	S 18°23.7′	295°42.5′	S 20°49.0′
7	192°06.9′	285°51.4′	S 23°23.6′	253°32.7′	S 21°17.0′	221°33.3′	S 13°06.7′	238°56.3′	S 18°23.7′	310°43.2′	S 20°49.3′
8	207°09.3′	300°51.1′	S 23°23.6′	268°35.1′	S 21°16.5′	236°35.3′	S 13°06.6′	253°58.5′	S 18°23.6′	325°43.8′	S 20°49.7′
9	222°11.8′	315°50.8′	S 23°23.7′	283°37.6′	S 21°16.0′	251°37.4′	S 13°06.4′	269°00.8′	S 18°23.5′	340°44.4′	S 20°50.0′
10	237°14.3′	330°50.5′	S 23°23.8′	298°40.0′	S 21°15.5′	266°39.5′	S 13°06.3′	284°03.0′	S 18°23.5′	355°45.0′	S 20°50.4′
11	252°16.7′	345°50.2′	S 23°23.8′	313°42.5′	S 21°14.9′	281°41.5′	S 13°06.1′	299°05.2′	S 18°23.4′	10°45.7′	S 20°50.7′
12	267°19.2′	0°49.9′	S 23°23.9′	328°45.0′	S 21°14.4′	296°43.6′	S 13°06.0′	314°07.4′	S 18°23.3′	25°46.3′	S 20°51.1′
13	282°21.7′	15°49.6′	S 23°24.0′	343°47.4′	S 21°13.9′	311°45.6′	S 13°05.8′	329°09.6′	S 18°23.3′	40°46.9′	S 20°51.5′
14	297°24.1′	30°49.3′	S 23°24.0′	358°49.9′	S 21°13.4′	326°47.7′	S 13°05.6′	344°11.8′	S 18°23.2′	55°47.6′	S 20°51.8′
15	312°26.6′	45°49.0′	S 23°24.1′	13°52.4′	S 21°12.8′	341°49.7′	S 13°05.5′	359°14.1′	S 18°23.1′	70°48.2′	S 20°52.2′
16	327°29.1′	60°48.7′	S 23°24.1′	28°54.9′	S 21°12.3′	356°51.8′	S 13°05.3′	14°16.3′	S 18°23.1′	85°48.8′	S 20°52.5′
17	342°31.5′	75°48.4′	S 23°24.2′	43°57.4′	S 21°11.8′	11°53.8′	S 13°05.2′	29°18.5′	S 18°23.0′	100°49.4′	S 20°52.9′
18	357°34.0′	90°48.0′	S 23°24.3′	58°59.9′	S 21°11.3′	26°55.9′	S 13°05.0′	44°20.7′	S 18°23.0′	115°50.1′	S 20°53.2′
19	12°36.4′	105°47.7′	S 23°24.3′	74°02.4′	S 21°10.7′	41°57.9′	S 13°04.9′	59°22.9′	S 18°22.9′	130°50.7′	S 20°53.6′
20	27°38.9′	120°47.4′	S 23°24.4′	89°04.9′	S 21°10.2′	56°60.0′	S 13°04.7′	74°25.1′	S 18°22.8′	145°51.3′	S 20°54.0′
21	42°41.4′	135°47.1′	S 23°24.4′	104°07.4′	S 21°09.7′	72°02.0′	S 13°04.6′	89°27.4′	S 18°22.8′	160°51.9′	S 20°54.3′
22	57°43.8′	150°46.8′	S 23°24.5′	119°09.9′	S 21°09.2′	87°04.1′	S 13°04.4′	104°29.6′	S 18°22.7′	175°52.5′	S 20°54.7′
23	72°46.3′	165°46.5′	S 23°24.5′	134°12.4′	S 21°08.6′	102°06.1′	S 13°04.3′	119°31.8′	S 18°22.6′	190°53.2′	S 20°55.0′
		SD 16.2′ *d* -0.1′		*v* 2.5′ *d* 0.5′		*v* 2.1′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.4′	
Mer. pass.		11 h 56 m 42 s		14 h 5 m		16 h 13 m		15 h 3 m		10 h 17 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Regulus	−Procyon	−Pollux	−Betelgeuse	+Aldebaran	+Achernar	+Fomalhaut	+Jupiter
0	14°57.6′	N 23°28.0′	11.9′	6.2′	53.9′	76°43.0′	45°28.0′	40°23.5′	23°02.7′		89°47.7′	99°00.4′	105°26.8′
1	29°28.5′	N 23°34.2′	11.9′	6.1′	53.9′	76°13.5′	45°02.2′	39°53.9′	22°45.4′		90°05.0′	99°28.9′	105°55.9′
2	43°59.4′	N 23°40.3′	11.8′	6.0′	53.9′	75°44.1′	44°36.4′	39°24.4′	22°28.4′		90°22.3′	99°57.3′	106°25.0′
3	58°30.2′	N 23°46.4′	11.8′	5.9′	53.9′	75°14.6′	44°10.7′	38°54.9′	22°11.9′		90°39.5′	100°25.7′	106°54.1′
4	73°00.9′	N 23°52.3′	11.7′	5.8′	53.9′	74°45.1′	43°45.0′	38°25.3′	21°55.8′		90°56.8′	100°54.2′	107°23.2′
5	87°31.6′	N 23°58.1′	11.7′	5.7′	53.9′	74°15.6′	43°19.4′	37°55.8′	21°40.2′		91°14.1′	101°22.6′	107°52.2′
6	102°02.3′	N 24°03.8′	11.6′	5.6′	53.9′	73°46.1′	42°53.9′	37°26.3′		9°14.1′	91°31.4′	101°51.0′	108°21.3′
7	116°32.9′	N 24°09.3′	11.6′	5.5′	53.9′	73°16.6′	42°28.4′	36°56.8′		9°36.4′	91°48.7′	102°19.4′	108°50.4′
8	131°03.5′	N 24°14.8′	11.5′	5.4′	53.9′	72°47.1′	42°03.1′	36°27.2′		9°59.2′	92°05.9′	102°47.9′	109°19.5′
9	145°34.0′	N 24°20.2′	11.5′	5.2′	53.9′	72°17.6′	41°37.8′	35°57.7′		10°22.6′	92°23.2′	103°16.3′	109°48.6′
10	160°04.4′	N 24°25.4′	11.4′	5.1′	53.9′	71°48.1′	41°12.5′	35°28.2′		10°46.5′	92°40.4′	103°44.7′	110°17.7′
11	174°34.9′	N 24°30.5′	11.4′	5.0′	53.9′	71°18.6′	40°47.4′	34°58.7′		11°10.9′	92°57.7′	104°13.1′	110°46.8′
12	189°05.2′	N 24°35.6′	11.3′	4.9′	53.9′	70°49.1′	40°22.3′	34°29.1′		11°35.7′	93°14.9′	104°41.5′	111°15.9′
13	203°35.6′	N 24°40.5′	11.3′	4.8′	53.9′	70°19.6′	39°57.3′	33°59.6′		12°00.8′	93°32.2′	105°09.9′	111°45.0′
14	218°05.9′	N 24°45.3′	11.2′	4.7′	53.9′	69°50.1′	39°32.4′	33°30.1′		12°26.3′	93°49.4′	105°38.3′	112°14.1′
15	232°36.1′	N 24°49.9′	11.2′	4.6′	53.9′	69°20.6′	39°07.6′	33°00.6′		12°52.1′	94°06.6′	106°06.7′	112°43.2′
16	247°06.3′	N 24°54.5′	11.2′	4.4′	53.9′	68°51.1′	38°42.9′	32°31.0′		13°18.1′	94°23.8′	106°35.1′	113°12.3′
17	261°36.5′	N 24°58.9′	11.1′	4.3′	53.9′	68°21.6′	38°18.3′	32°01.5′		13°44.3′	94°41.0′	107°03.5′	113°41.4′
18	276°06.6′	N 25°03.3′	11.1′	4.2′	53.9′	67°52.1′	37°53.7′	31°32.0′		14°10.8′	94°58.2′	107°31.9′	114°10.5′
19	290°36.6′	N 25°07.5′	11.0′	4.1′	53.9′	67°22.6′	37°29.3′	31°02.5′		14°37.5′	95°15.4′	108°00.2′	114°39.6′
20	305°06.7′	N 25°11.6′	11.0′	4.0′	53.9′	66°53.0′	37°05.0′	30°32.9′		15°04.4′	95°32.5′	108°28.6′	115°08.7′
21	319°36.7′	N 25°15.6′	11.0′	3.9′	53.9′	66°23.5′	36°40.8′	30°03.4′		15°31.4′	95°49.6′	108°57.0′	115°37.8′
22	334°06.6′	N 25°19.4′	10.9′	3.7′	53.9′	65°54.0′	36°16.7′	29°33.9′		15°58.6′	96°06.8′	109°25.4′	116°06.9′
23	348°36.5′	N 25°23.2′	10.9′	3.6′	53.9′	65°24.5′	35°52.7′	29°04.4′		16°25.9′	96°23.9′	109°53.7′	116°36.0′
Mer. pass. 23 h 47 m SD 14.7′ phase 99%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°03.0′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°06.0′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°48.6′	N 89°21.6′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.0′	Achernar	+0.5	335°21.8′	S 57°07.9′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Sunday 19 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	87°48.8′	180°46.2′	S 23°24.6′	149°14.9′	S 21°08.1′	117°08.2′	S 13°04.1′	134°34.0′	S 18°22.6′	205°53.8′	S 20°55.4′
1	102°51.2′	195°45.9′	S 23°24.6′	164°17.4′	S 21°07.6′	132°10.2′	S 13°04.0′	149°36.2′	S 18°22.5′	220°54.4′	S 20°55.7′
2	117°53.7′	210°45.6′	S 23°24.7′	179°20.0′	S 21°07.1′	147°12.3′	S 13°03.8′	164°38.4′	S 18°22.4′	235°55.0′	S 20°56.1′
3	132°56.2′	225°45.3′	S 23°24.7′	194°22.5′	S 21°06.5′	162°14.3′	S 13°03.7′	179°40.7′	S 18°22.4′	250°55.7′	S 20°56.4′
4	147°58.6′	240°45.0′	S 23°24.8′	209°25.0′	S 21°06.0′	177°16.4′	S 13°03.5′	194°42.9′	S 18°22.3′	265°56.3′	S 20°56.8′
5	163°01.1′	255°44.7′	S 23°24.8′	224°27.6′	S 21°05.5′	192°18.4′	S 13°03.4′	209°45.1′	S 18°22.2′	280°56.9′	S 20°57.1′
6	178°03.6′	270°44.4′	S 23°24.9′	239°30.1′	S 21°05.0′	207°20.5′	S 13°03.2′	224°47.3′	S 18°22.2′	295°57.5′	S 20°57.5′
7	193°06.0′	285°44.1′	S 23°24.9′	254°32.7′	S 21°04.5′	222°22.5′	S 13°03.0′	239°49.5′	S 18°22.1′	310°58.2′	S 20°57.9′
8	208°08.5′	300°43.7′	S 23°25.0′	269°35.3′	S 21°03.9′	237°24.6′	S 13°02.9′	254°51.7′	S 18°22.0′	325°58.8′	S 20°58.2′
9	223°10.9′	315°43.4′	S 23°25.0′	284°37.8′	S 21°03.4′	252°26.6′	S 13°02.7′	269°54.0′	S 18°22.0′	340°59.4′	S 20°58.6′
10	238°13.4′	330°43.1′	S 23°25.1′	299°40.4′	S 21°02.9′	267°28.7′	S 13°02.6′	284°56.2′	S 18°21.9′	356°00.0′	S 20°58.9′
11	253°15.9′	345°42.8′	S 23°25.1′	314°43.0′	S 21°02.4′	282°30.7′	S 13°02.4′	299°58.4′	S 18°21.8′	11°00.6′	S 20°59.3′
12	268°18.3′	0°42.5′	S 23°25.1′	329°45.5′	S 21°01.8′	297°32.8′	S 13°02.3′	315°00.6′	S 18°21.8′	26°01.3′	S 20°59.6′
13	283°20.8′	15°42.2′	S 23°25.2′	344°48.1′	S 21°01.3′	312°34.8′	S 13°02.1′	330°02.8′	S 18°21.7′	41°01.9′	S 20°60.0′
14	298°23.3′	30°41.9′	S 23°25.2′	359°50.7′	S 21°00.8′	327°36.9′	S 13°02.0′	345°05.0′	S 18°21.6′	56°02.5′	S 21°00.3′
15	313°25.7′	45°41.6′	S 23°25.3′	14°53.3′	S 21°00.3′	342°38.9′	S 13°01.8′	0°07.2′	S 18°21.6′	71°03.1′	S 21°00.7′
16	328°28.2′	60°41.3′	S 23°25.3′	29°55.9′	S 20°59.8′	357°40.9′	S 13°01.7′	15°09.5′	S 18°21.5′	86°03.7′	S 21°01.0′
17	343°30.7′	75°41.0′	S 23°25.3′	44°58.5′	S 20°59.2′	12°43.0′	S 13°01.5′	30°11.7′	S 18°21.4′	101°04.4′	S 21°01.4′
18	358°33.1′	90°40.7′	S 23°25.4′	60°01.1′	S 20°58.7′	27°45.0′	S 13°01.3′	45°13.9′	S 18°21.4′	116°05.0′	S 21°01.7′
19	13°35.6′	105°40.4′	S 23°25.4′	75°03.7′	S 20°58.2′	42°47.1′	S 13°01.2′	60°16.1′	S 18°21.3′	131°05.6′	S 21°02.1′
20	28°38.1′	120°40.0′	S 23°25.5′	90°06.3′	S 20°57.7′	57°49.1′	S 13°01.0′	75°18.3′	S 18°21.2′	146°06.2′	S 21°02.4′
21	43°40.5′	135°39.7′	S 23°25.5′	105°08.9′	S 20°57.1′	72°51.2′	S 13°00.9′	90°20.5′	S 18°21.2′	161°06.8′	S 21°02.8′
22	58°43.0′	150°39.4′	S 23°25.5′	120°11.6′	S 20°56.6′	87°53.2′	S 13°00.7′	105°22.7′	S 18°21.1′	176°07.5′	S 21°03.1′
23	73°45.4′	165°39.1′	S 23°25.6′	135°14.2′	S 20°56.1′	102°55.3′	S 13°00.6′	120°25.0′	S 18°21.0′	191°08.1′	S 21°03.4′
		SD 16.2′	*d* -0.0′	*v* 2.6′	*d* 0.5′	*v* 2.0′	*d* 0.2′	*v* 2.2′	*d* 0.1′	*v* 0.6′	*d* -0.4′
Mer. pass.		11 h 57 m 11 s		14 h 1 m		16 h 9 m		15 h 0 m		10 h 16 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Arcturus	−Regulus	−Procyon	−Pollux	+Aldebaran	+Rigel	+Achernar	+Fomalhaut
0	3°06.4′	N 25°26.8′	10.8′	3.5′	53.9′	113°42.0′	64°54.9′	35°28.8′	28°34.9′	16°53.4′		96°41.0′	110°22.1′
1	17°36.3′	N 25°30.3′	10.8′	3.4′	53.9′	113°16.4′	64°25.4′	35°05.1′	28°05.3′	17°21.0′		96°58.0′	110°50.4′
2	32°06.1′	N 25°33.7′	10.8′	3.3′	53.9′	112°50.7′	63°55.9′	34°41.5′	27°35.8′	17°48.7′		97°15.1′	111°18.8′
3	46°35.9′	N 25°37.0′	10.7′	3.1′	53.9′	112°25.0′	63°26.4′	34°18.0′	27°06.3′	18°16.5′		97°32.1′	111°47.1′
4	61°05.6′	N 25°40.1′	10.7′	3.0′	54.0′	111°59.3′	62°56.8′	33°54.7′	26°36.8′	18°44.3′		97°49.1′	112°15.5′
5	75°35.3′	N 25°43.1′	10.7′	2.9′	54.0′	111°33.5′	62°27.3′	33°31.5′	26°07.2′	19°12.3′		98°06.1′	112°43.8′
6	90°05.0′	N 25°46.0′	10.6′	2.8′	54.0′	111°07.8′	61°57.7′	33°08.4′	25°37.7′	19°40.4′		98°23.1′	113°12.1′
7	104°34.6′	N 25°48.8′	10.6′	2.7′	54.0′	110°42.0′	61°28.2′	32°45.6′	25°08.2′	20°08.5′		98°40.0′	113°40.5′
8	119°04.3′	N 25°51.4′	10.6′	2.5′	54.0′	110°16.1′	60°58.6′	32°22.8′	24°38.7′	20°36.7′		98°57.0′	114°08.8′
9	133°33.8′	N 25°54.0′	10.6′	2.4′	54.0′	109°50.3′	60°29.1′	32°00.3′	24°09.2′	21°05.0′		99°13.9′	114°37.1′
10	148°03.4′	N 25°56.4′	10.5′	2.3′	54.0′	109°24.4′	59°59.5′	31°37.9′	23°39.7′	21°33.4′		99°30.7′	115°05.4′
11	162°32.9′	N 25°58.7′	10.5′	2.2′	54.0′	108°58.5′	59°30.0′	31°15.6′	23°10.2′	22°01.8′		99°47.6′	115°33.7′
12	177°02.4′	N 26°00.8′	10.5′	2.0′	54.0′	108°32.5′	59°00.4′	30°53.6′	22°40.7′	22°30.3′		100°04.4′	116°02.0′
13	191°31.9′	N 26°02.9′	10.5′	1.9′	54.0′	108°06.6′	58°30.8′	30°31.8′	22°11.1′	22°58.8′		100°21.2′	116°30.3′
14	206°01.4′	N 26°04.8′	10.4′	1.8′	54.0′	107°40.6′	58°01.3′	30°10.1′	21°41.6′	23°27.3′		100°37.9′	116°58.5′
15	220°30.8′	N 26°06.6′	10.4′	1.7′	54.0′	107°14.6′	57°31.7′	29°48.7′	21°12.2′	23°56.0′		100°54.7′	117°26.8′
16	235°00.2′	N 26°08.2′	10.4′	1.5′	54.0′	106°48.5′	57°02.1′	29°27.5′	20°42.7′	24°24.6′		101°11.4′	117°55.1′
17	249°29.6′	N 26°09.8′	10.4′	1.4′	54.0′	106°22.5′	56°32.5′	29°06.5′	20°13.2′	24°53.3′		101°28.0′	118°23.3′
18	263°59.0′	N 26°11.2′	10.4′	1.3′	54.0′	105°56.4′	56°02.9′	28°45.7′	19°43.7′	25°22.1′		101°44.7′	118°51.6′
19	278°28.3′	N 26°12.4′	10.3′	1.2′	54.0′	105°30.3′	55°33.4′	28°25.2′	19°14.2′	25°50.9′		102°01.3′	119°19.8′
20	292°57.7′	N 26°13.6′	10.3′	1.0′	54.0′	105°04.2′	55°03.8′	28°04.9′	18°44.8′	26°19.7′		102°17.8′	119°48.0′
21	307°27.0′	N 26°14.6′	10.3′	0.9′	54.0′	104°38.0′	54°34.2′	27°44.8′	18°15.3′	26°48.6′	38°18.8′	102°34.3′	
22	321°56.3′	N 26°15.5′	10.3′	0.8′	54.0′	104°11.9′	54°04.6′	27°25.1′	17°45.9′	27°17.5′	38°33.9′	102°50.8′	
23	336°25.6′	N 26°16.3′	10.3′	0.6′	54.0′	103°45.7′	53°35.0′	27°05.6′	17°16.4′	27°46.4′	38°49.3′	103°07.3′	
Mer. pass. 0 h 38 m SD 14.7′ phase 100%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°03.0′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.4′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°48.8′	N 89°21.6′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.5′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Monday 20 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	88°47.9′	180°38.8′	S 23°25.6′	150°16.8′	S 20°55.6′	117°57.3′	S 13°00.4′	135°27.2′	S 18°21.0′	206°08.7′	S 21°03.8′
1	103°50.4′	195°38.5′	S 23°25.6′	165°19.5′	S 20°55.1′	132°59.4′	S 13°00.3′	150°29.4′	S 18°20.9′	221°09.3′	S 21°04.1′
2	118°52.8′	210°38.2′	S 23°25.7′	180°22.1′	S 20°54.5′	148°01.4′	S 13°00.1′	165°31.6′	S 18°20.8′	236°09.9′	S 21°04.5′
3	133°55.3′	225°37.9′	S 23°25.7′	195°24.7′	S 20°54.0′	163°03.5′	S 12°59.9′	180°33.8′	S 18°20.8′	251°10.5′	S 21°04.8′
4	148°57.8′	240°37.6′	S 23°25.7′	210°27.4′	S 20°53.5′	178°05.5′	S 12°59.8′	195°36.0′	S 18°20.7′	266°11.2′	S 21°05.2′
5	164°00.2′	255°37.3′	S 23°25.8′	225°30.0′	S 20°53.0′	193°07.5′	S 12°59.6′	210°38.2′	S 18°20.6′	281°11.8′	S 21°05.5′
6	179°02.7′	270°37.0′	S 23°25.8′	240°32.7′	S 20°52.5′	208°09.6′	S 12°59.5′	225°40.5′	S 18°20.6′	296°12.4′	S 21°05.9′
7	194°05.2′	285°36.7′	S 23°25.8′	255°35.4′	S 20°51.9′	223°11.6′	S 12°59.3′	240°42.7′	S 18°20.5′	311°13.0′	S 21°06.2′
8	209°07.6′	300°36.3′	S 23°25.8′	270°38.0′	S 20°51.4′	238°13.7′	S 12°59.2′	255°44.9′	S 18°20.4′	326°13.6′	S 21°06.6′
9	224°10.1′	315°36.0′	S 23°25.9′	285°40.7′	S 20°50.9′	253°15.7′	S 12°59.0′	270°47.1′	S 18°20.4′	341°14.2′	S 21°06.9′
10	239°12.6′	330°35.7′	S 23°25.9′	300°43.4′	S 20°50.4′	268°17.8′	S 12°58.9′	285°49.3′	S 18°20.3′	356°14.9′	S 21°07.2′
11	254°15.0′	345°35.4′	S 23°25.9′	315°46.1′	S 20°49.9′	283°19.8′	S 12°58.7′	300°51.5′	S 18°20.2′	11°15.5′	S 21°07.6′
12	269°17.5′	0°35.1′	S 23°25.9′	330°48.8′	S 20°49.3′	298°21.9′	S 12°58.5′	315°53.7′	S 18°20.2′	26°16.1′	S 21°07.9′
13	284°19.9′	15°34.8′	S 23°26.0′	345°51.5′	S 20°48.8′	313°23.9′	S 12°58.4′	330°56.0′	S 18°20.1′	41°16.7′	S 21°08.3′
14	299°22.4′	30°34.5′	S 23°26.0′	0°54.2′	S 20°48.3′	328°25.9′	S 12°58.2′	345°58.2′	S 18°20.0′	56°17.3′	S 21°08.6′
15	314°24.9′	45°34.2′	S 23°26.0′	15°56.9′	S 20°47.8′	343°28.0′	S 12°58.1′	1°00.4′	S 18°20.0′	71°17.9′	S 21°09.0′
16	329°27.3′	60°33.9′	S 23°26.0′	30°59.6′	S 20°47.3′	358°30.0′	S 12°57.9′	16°02.6′	S 18°19.9′	86°18.6′	S 21°09.3′
17	344°29.8′	75°33.6′	S 23°26.0′	46°02.3′	S 20°46.7′	13°32.1′	S 12°57.8′	31°04.8′	S 18°19.8′	101°19.2′	S 21°09.6′
18	359°32.3′	90°33.3′	S 23°26.1′	61°05.0′	S 20°46.2′	28°34.1′	S 12°57.6′	46°07.0′	S 18°19.8′	116°19.8′	S 21°10.0′
19	14°34.7′	105°32.9′	S 23°26.1′	76°07.7′	S 20°45.7′	43°36.2′	S 12°57.4′	61°09.2′	S 18°19.7′	131°20.4′	S 21°10.3′
20	29°37.2′	120°32.6′	S 23°26.1′	91°10.4′	S 20°45.2′	58°38.2′	S 12°57.3′	76°11.4′	S 18°19.6′	146°21.0′	S 21°10.7′
21	44°39.7′	135°32.3′	S 23°26.1′	106°13.2′	S 20°44.7′	73°40.2′	S 12°57.1′	91°13.7′	S 18°19.6′	161°21.6′	S 21°11.0′
22	59°42.1′	150°32.0′	S 23°26.1′	121°15.9′	S 20°44.2′	88°42.3′	S 12°57.0′	106°15.9′	S 18°19.5′	176°22.2′	S 21°11.3′
23	74°44.6′	165°31.7′	S 23°26.1′	136°18.6′	S 20°43.6′	103°44.3′	S 12°56.8′	121°18.1′	S 18°19.4′	191°22.8′	S 21°11.7′
		SD 16.2′ *d* -0.0′		*v* 2.7′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		11 h 57 m 41 s		13 h 56 m		16 h 6 m		14 h 56 m		10 h 15 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Arcturus	−Regulus	−Procyon	−Pollux	+Betelgeuse	+Capella	+Aldebaran	+Rigel
0	350°54.8′	N 26°17.0′	10.3′	0.5′	54.1′	103°19.5′	53°05.3′	26°46.4′	16°47.0′		24°31.7′	28°15.4′	39°04.9′
1	5°24.1′	N 26°17.5′	10.2′	0.4′	54.1′	102°53.3′	52°35.7′	26°27.5′	16°17.6′		24°47.1′	28°44.4′	39°20.7′
2	19°53.3′	N 26°17.9′	10.2′	0.3′	54.1′	102°27.0′	52°06.1′	26°08.9′	15°48.2′		25°02.8′	29°13.4′	39°36.7′
3	34°22.6′	N 26°18.1′	10.2′	0.1′	54.1′	102°00.8′	51°36.5′	25°50.6′	15°18.8′	21°21.0′	25°19.0′	29°42.5′	39°53.0′
4	48°51.8′	N 26°18.3′	10.2′	0.0′	54.1′	101°34.5′	51°06.9′	25°32.7′	14°49.5′	21°36.1′	25°35.5′	30°11.6′	40°09.5′
5	63°21.0′	N 26°18.3′	10.2′	-0.1′	54.1′	101°08.2′	50°37.2′	25°15.1′	14°20.2′	21°51.7′	25°52.4′	30°40.7′	40°26.2′
6	77°50.2′	N 26°18.2′	10.2′	-0.2′	54.1′	100°41.9′	50°07.6′	24°57.9′	13°50.9′	22°07.8′	26°09.7′	31°09.8′	40°43.1′
7	92°19.4′	N 26°17.9′	10.2′	-0.4′	54.1′	100°15.6′	49°38.0′	24°41.0′	13°21.6′	22°24.4′	26°27.4′	31°39.0′	41°00.3′
8	106°48.6′	N 26°17.5′	10.2′	-0.5′	54.1′	99°49.2′	49°08.3′	24°24.5′	12°52.3′	22°41.3′	26°45.3′	32°08.2′	41°17.6′
9	121°17.8′	N 26°17.0′	10.2′	-0.6′	54.1′	99°22.9′	48°38.7′	24°08.4′	12°23.1′	22°58.7′	27°03.6′	32°37.4′	41°35.1′
10	135°47.0′	N 26°16.4′	10.2′	-0.8′	54.1′	98°56.5′	48°09.0′	23°52.7′	11°54.0′	23°16.5′	27°22.2′	33°06.6′	41°52.8′
11	150°16.2′	N 26°15.6′	10.2′	-0.9′	54.1′	98°30.1′	47°39.3′		11°24.9′	23°34.7′	27°41.1′	33°35.9′	42°10.7′
12	164°45.4′	N 26°14.8′	10.2′	-1.0′	54.1′	98°03.7′	47°09.7′		10°55.8′	23°53.3′	28°00.4′	34°05.2′	42°28.8′
13	179°14.6′	N 26°13.7′	10.2′	-1.1′	54.2′	97°37.2′	46°40.0′		10°26.9′	24°12.2′	28°19.9′	34°34.5′	42°47.1′
14	193°43.8′	N 26°12.6′	10.2′	-1.3′	54.2′	97°10.8′	46°10.3′		9°58.0′	24°31.4′	28°39.7′	35°03.8′	43°05.6′
15	208°13.0′	N 26°11.3′	10.2′	-1.4′	54.2′	96°44.4′	45°40.7′		9°29.1′	24°51.0′	28°59.7′	35°33.2′	43°24.2′
16	222°42.2′	N 26°09.9′	10.2′	-1.5′	54.2′	96°17.9′	45°11.0′		9°00.4′	25°11.0′	29°20.0′	36°02.5′	43°43.0′
17	237°11.4′	N 26°08.4′	10.2′	-1.7′	54.2′	95°51.4′	44°41.3′		8°31.9′	25°31.2′	29°40.6′	36°31.9′	44°02.0′
18	251°40.6′	N 26°06.7′	10.2′	-1.8′	54.2′	95°24.9′	44°11.6′		8°03.4′	25°51.7′	30°01.4′	37°01.3′	44°21.1′
19	266°09.8′	N 26°05.0′	10.2′	-1.9′	54.2′	94°58.4′	43°41.9′		7°35.2′	26°12.5′	30°22.4′	37°30.8′	44°40.4′
20	280°39.0′	N 26°03.0′	10.2′	-2.0′	54.2′	94°31.9′	43°12.2′		7°07.2′	26°33.6′	30°43.7′	38°00.2′	44°59.9′
21	295°08.3′	N 26°01.0′	10.2′	-2.2′	54.2′	94°05.4′	42°42.5′		6°39.4′	26°54.9′	31°05.2′	38°29.7′	45°19.5′
22	309°37.5′	N 25°58.8′	10.3′	-2.3′	54.2′	93°38.8′	42°12.8′		6°12.0′	27°16.5′	31°26.9′	38°59.2′	45°39.2′
23	324°06.7′	N 25°56.5′	10.3′	-2.4′	54.2′	93°12.3′	41°43.1′		5°44.9′	27°38.4′	31°48.8′	39°28.7′	45°59.2′
Mer. pass. 0 h 38 m SD 14.7′ phase 99%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.1′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°49.0′	N 89°21.6′
Rigil Kent	−0.0	139°44.2′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Tuesday 21 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	89°47.1′	180°31.4′	S 23°26.1′	151°21.4′	S 20°43.1′	118°46.4′	S 12°56.7′	136°20.3′	S 18°19.4′	206°23.5′	S 21°12.0′
1	104°49.5′	195°31.1′	S 23°26.2′	166°24.1′	S 20°42.6′	133°48.4′	S 12°56.5′	151°22.5′	S 18°19.3′	221°24.1′	S 21°12.4′
2	119°52.0′	210°30.8′	S 23°26.2′	181°26.9′	S 20°42.1′	148°50.4′	S 12°56.4′	166°24.7′	S 18°19.2′	236°24.7′	S 21°12.7′
3	134°54.4′	225°30.5′	S 23°26.2′	196°29.6′	S 20°41.6′	163°52.5′	S 12°56.2′	181°26.9′	S 18°19.2′	251°25.3′	S 21°13.0′
4	149°56.9′	240°30.2′	S 23°26.2′	211°32.4′	S 20°41.0′	178°54.5′	S 12°56.0′	196°29.1′	S 18°19.1′	266°25.9′	S 21°13.4′
5	164°59.4′	255°29.9′	S 23°26.2′	226°35.2′	S 20°40.5′	193°56.6′	S 12°55.9′	211°31.3′	S 18°19.0′	281°26.5′	S 21°13.7′
6	180°01.8′	270°29.5′	S 23°26.2′	241°37.9′	S 20°40.0′	208°58.6′	S 12°55.7′	226°33.6′	S 18°19.0′	296°27.1′	S 21°14.1′
7	195°04.3′	285°29.2′	S 23°26.2′	256°40.7′	S 20°39.5′	224°00.6′	S 12°55.6′	241°35.8′	S 18°18.9′	311°27.7′	S 21°14.4′
8	210°06.8′	300°28.9′	S 23°26.2′	271°43.5′	S 20°39.0′	239°02.7′	S 12°55.4′	256°38.0′	S 18°18.8′	326°28.4′	S 21°14.7′
9	225°09.2′	315°28.6′	S 23°26.2′	286°46.3′	S 20°38.5′	254°04.7′	S 12°55.2′	271°40.2′	S 18°18.8′	341°29.0′	S 21°15.1′
10	240°11.7′	330°28.3′	S 23°26.2′	301°49.1′	S 20°37.9′	269°06.8′	S 12°55.1′	286°42.4′	S 18°18.7′	356°29.6′	S 21°15.4′
11	255°14.2′	345°28.0′	S 23°26.2′	316°51.9′	S 20°37.4′	284°08.8′	S 12°54.9′	301°44.6′	S 18°18.6′	11°30.2′	S 21°15.7′
12	270°16.6′	0°27.7′	S 23°26.2′	331°54.7′	S 20°36.9′	299°10.8′	S 12°54.8′	316°46.8′	S 18°18.5′	26°30.8′	S 21°16.1′
13	285°19.1′	15°27.4′	S 23°26.2′	346°57.5′	S 20°36.4′	314°12.9′	S 12°54.6′	331°49.0′	S 18°18.5′	41°31.4′	S 21°16.4′
14	300°21.5′	30°27.1′	S 23°26.2′	2°00.3′	S 20°35.9′	329°14.9′	S 12°54.5′	346°51.2′	S 18°18.4′	56°32.0′	S 21°16.7′
15	315°24.0′	45°26.8′	S 23°26.2′	17°03.1′	S 20°35.4′	344°17.0′	S 12°54.3′	1°53.5′	S 18°18.3′	71°32.6′	S 21°17.1′
16	330°26.5′	60°26.4′	S 23°26.2′	32°05.9′	S 20°34.9′	359°19.0′	S 12°54.1′	16°55.7′	S 18°18.3′	86°33.2′	S 21°17.4′
17	345°28.9′	75°26.1′	S 23°26.2′	47°08.7′	S 20°34.3′	14°21.0′	S 12°54.0′	31°57.9′	S 18°18.2′	101°33.8′	S 21°17.7′
18	0°31.4′	90°25.8′	S 23°26.2′	62°11.6′	S 20°33.8′	29°23.1′	S 12°53.8′	47°00.1′	S 18°18.1′	116°34.5′	S 21°18.1′
19	15°33.9′	105°25.5′	S 23°26.2′	77°14.4′	S 20°33.3′	44°25.1′	S 12°53.7′	62°02.3′	S 18°18.1′	131°35.1′	S 21°18.4′
20	30°36.3′	120°25.2′	S 23°26.2′	92°17.2′	S 20°32.8′	59°27.1′	S 12°53.5′	77°04.5′	S 18°18.0′	146°35.7′	S 21°18.7′
21	45°38.8′	135°24.9′	S 23°26.2′	107°20.1′	S 20°32.3′	74°29.2′	S 12°53.3′	92°06.7′	S 18°17.9′	161°36.3′	S 21°19.1′
22	60°41.3′	150°24.6′	S 23°26.2′	122°22.9′	S 20°31.8′	89°31.2′	S 12°53.2′	107°08.9′	S 18°17.9′	176°36.9′	S 21°19.4′
23	75°43.7′	165°24.3′	S 23°26.2′	137°25.8′	S 20°31.3′	104°33.3′	S 12°53.0′	122°11.1′	S 18°17.8′	191°37.5′	S 21°19.7′
		SD 16.3′ *d* -0.0′		*v* 2.8′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		11 h 58 m 10 s		13 h 52 m		16 h 3 m		14 h 52 m		10 h 14 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Spica	−Arcturus	−Regulus	−Pollux	+Betelgeuse	+Capella	+Aldebaran	+Rigel
0	338°36.0′	N 25°54.1′	10.3′	-2.5′	54.3′	95°15.1′	92°45.7′	41°13.3′	5°18.4′	28°00.5′	32°10.9′	39°58.2′	46°19.2′
1	353°05.3′	N 25°51.6′	10.3′	-2.7′	54.3′	94°45.2′	92°19.1′	40°43.6′		28°22.8′	32°33.3′	40°27.7′	46°39.4′
2	7°34.6′	N 25°48.9′	10.3′	-2.8′	54.3′	94°15.4′	91°52.6′	40°13.9′		28°45.3′	32°55.8′	40°57.3′	46°59.8′
3	22°03.9′	N 25°46.1′	10.3′	-2.9′	54.3′	93°45.5′	91°26.0′	39°44.1′		29°08.1′	33°18.4′	41°26.9′	47°20.2′
4	36°33.2′	N 25°43.2′	10.3′	-3.1′	54.3′	93°15.7′	90°59.4′	39°14.4′		29°31.0′	33°41.3′	41°56.5′	47°40.8′
5	51°02.6′	N 25°40.1′	10.4′	-3.2′	54.3′	92°45.8′	90°32.7′	38°44.7′		29°54.2′	34°04.3′	42°26.1′	48°01.6′
6	65°31.9′	N 25°36.9′	10.4′	-3.3′	54.3′	92°15.9′	90°06.1′	38°14.9′		30°17.5′	34°27.5′	42°55.7′	48°22.5′
7	80°01.3′	N 25°33.6′	10.4′	-3.4′	54.3′	91°46.0′	89°39.5′	37°45.2′		30°41.0′	34°50.9′	43°25.4′	48°43.5′
8	94°30.7′	N 25°30.2′	10.4′	-3.6′	54.3′	91°16.1′	89°12.8′	37°15.4′		31°04.7′	35°14.4′	43°55.0′	49°04.6′
9	109°00.1′	N 25°26.6′	10.4′	-3.7′	54.4′	90°46.2′	88°46.2′	36°45.7′		31°28.6′	35°38.0′	44°24.7′	49°25.8′
10	123°29.5′	N 25°23.0′	10.5′	-3.8′	54.4′	90°16.2′	88°19.5′	36°15.9′		31°52.6′	36°01.8′	44°54.4′	49°47.2′
11	137°59.0′	N 25°19.2′	10.5′	-3.9′	54.4′	89°46.3′	87°52.9′	35°46.1′		32°16.8′	36°25.8′	45°24.1′	50°08.7′
12	152°28.5′	N 25°15.2′	10.5′	-4.1′	54.4′	89°16.3′	87°26.2′	35°16.4′		32°41.2′	36°49.9′	45°53.8′	50°30.3′
13	166°58.0′	N 25°11.2′	10.5′	-4.2′	54.4′	88°46.4′	86°59.5′	34°46.6′		33°05.7′	37°14.1′	46°23.6′	50°52.0′
14	181°27.5′	N 25°07.0′	10.6′	-4.3′	54.4′	88°16.4′	86°32.8′	34°16.8′		33°30.3′	37°38.4′	46°53.3′	51°13.8′
15	195°57.1′	N 25°02.7′	10.6′	-4.4′	54.4′	87°46.4′	86°06.1′	33°47.0′		33°55.1′	38°02.9′	47°23.1′	51°35.7′
16	210°26.7′	N 24°58.3′	10.6′	-4.5′	54.4′	87°16.4′	85°39.4′	33°17.2′		34°20.0′	38°27.5′	47°52.9′	51°57.8′
17	224°56.3′	N 24°53.7′	10.6′	-4.7′	54.4′	86°46.4′	85°12.7′	32°47.5′		34°45.0′	38°52.2′	48°22.7′	52°19.9′
18	239°25.9′	N 24°49.1′	10.7′	-4.8′	54.5′	86°16.4′	84°46.0′	32°17.7′	5°03.9′	35°10.2′	39°17.0′	48°52.6′	52°42.1′
19	253°55.6′	N 24°44.3′	10.7′	-4.9′	54.5′	85°46.4′	84°19.3′	31°47.9′	5°30.2′	35°35.5′	39°42.0′	49°22.4′	53°04.5′
20	268°25.3′	N 24°39.4′	10.7′	-5.0′	54.5′	85°16.3′	83°52.6′	31°18.1′	5°57.2′	36°00.9′	40°07.0′	49°52.3′	53°26.9′
21	282°55.0′	N 24°34.4′	10.8′	-5.1′	54.5′	84°46.3′	83°25.9′	30°48.3′	6°24.6′	36°26.4′	40°32.2′	50°22.1′	53°49.5′
22	297°24.8′	N 24°29.2′	10.8′	-5.3′	54.5′	84°16.2′	82°59.1′	30°18.5′	6°52.5′	36°52.1′	40°57.5′	50°52.0′	54°12.1′
23	311°54.6′	N 24°23.9′	10.8′	-5.4′	54.5′	83°46.1′	82°32.4′	29°48.7′	7°20.6′	37°17.8′	41°22.8′	51°21.9′	54°34.8′
Mer. pass. 1 h 29 m SD 14.8′ phase 97%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.2′	N 5°10.1′	Polaris	+2.0	314°49.3′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.5′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Wednesday 22 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	90°46.2′	180°24.0′	S 23°26.2′	152°28.6′	S 20°30.7′	119°35.3′	S 12°52.9′	137°13.3′	S 18°17.7′	206°38.1′	S 21°20.1′
1	105°48.7′	195°23.7′	S 23°26.2′	167°31.5′	S 20°30.2′	134°37.3′	S 12°52.7′	152°15.6′	S 18°17.7′	221°38.7′	S 21°20.4′
2	120°51.1′	210°23.3′	S 23°26.2′	182°34.3′	S 20°29.7′	149°39.4′	S 12°52.6′	167°17.8′	S 18°17.6′	236°39.3′	S 21°20.7′
3	135°53.6′	225°23.0′	S 23°26.2′	197°37.2′	S 20°29.2′	164°41.4′	S 12°52.4′	182°20.0′	S 18°17.5′	251°39.9′	S 21°21.1′
4	150°56.0′	240°22.7′	S 23°26.2′	212°40.1′	S 20°28.7′	179°43.4′	S 12°52.2′	197°22.2′	S 18°17.5′	266°40.5′	S 21°21.4′
5	165°58.5′	255°22.4′	S 23°26.2′	227°43.0′	S 20°28.2′	194°45.5′	S 12°52.1′	212°24.4′	S 18°17.4′	281°41.1′	S 21°21.7′
6	181°01.0′	270°22.1′	S 23°26.2′	242°45.8′	S 20°27.7′	209°47.5′	S 12°51.9′	227°26.6′	S 18°17.3′	296°41.8′	S 21°22.1′
7	196°03.4′	285°21.8′	S 23°26.2′	257°48.7′	S 20°27.2′	224°49.6′	S 12°51.8′	242°28.8′	S 18°17.3′	311°42.4′	S 21°22.4′
8	211°05.9′	300°21.5′	S 23°26.1′	272°51.6′	S 20°26.6′	239°51.6′	S 12°51.6′	257°31.0′	S 18°17.2′	326°43.0′	S 21°22.7′
9	226°08.4′	315°21.2′	S 23°26.1′	287°54.5′	S 20°26.1′	254°53.6′	S 12°51.4′	272°33.2′	S 18°17.1′	341°43.6′	S 21°23.0′
10	241°10.8′	330°20.9′	S 23°26.1′	302°57.4′	S 20°25.6′	269°55.7′	S 12°51.3′	287°35.4′	S 18°17.1′	356°44.2′	S 21°23.4′
11	256°13.3′	345°20.6′	S 23°26.1′	318°00.3′	S 20°25.1′	284°57.7′	S 12°51.1′	302°37.6′	S 18°17.0′	11°44.8′	S 21°23.7′
12	271°15.8′	0°20.2′	S 23°26.1′	333°03.2′	S 20°24.6′	299°59.7′	S 12°51.0′	317°39.9′	S 18°16.9′	26°45.4′	S 21°24.0′
13	286°18.2′	15°19.9′	S 23°26.1′	348°06.2′	S 20°24.1′	315°01.8′	S 12°50.8′	332°42.1′	S 18°16.8′	41°46.0′	S 21°24.4′
14	301°20.7′	30°19.6′	S 23°26.1′	3°09.1′	S 20°23.6′	330°03.8′	S 12°50.6′	347°44.3′	S 18°16.8′	56°46.6′	S 21°24.7′
15	316°23.2′	45°19.3′	S 23°26.0′	18°12.0′	S 20°23.1′	345°05.8′	S 12°50.5′	2°46.5′	S 18°16.7′	71°47.2′	S 21°25.0′
16	331°25.6′	60°19.0′	S 23°26.0′	33°14.9′	S 20°22.6′	0°07.9′	S 12°50.3′	17°48.7′	S 18°16.6′	86°47.8′	S 21°25.3′
17	346°28.1′	75°18.7′	S 23°26.0′	48°17.9′	S 20°22.0′	15°09.9′	S 12°50.2′	32°50.9′	S 18°16.6′	101°48.4′	S 21°25.7′
18	1°30.5′	90°18.4′	S 23°26.0′	63°20.8′	S 20°21.5′	30°11.9′	S 12°50.0′	47°53.1′	S 18°16.5′	116°49.0′	S 21°26.0′
19	16°33.0′	105°18.1′	S 23°26.0′	78°23.7′	S 20°21.0′	45°14.0′	S 12°49.8′	62°55.3′	S 18°16.4′	131°49.6′	S 21°26.3′
20	31°35.5′	120°17.8′	S 23°25.9′	93°26.7′	S 20°20.5′	60°16.0′	S 12°49.7′	77°57.5′	S 18°16.4′	146°50.2′	S 21°26.6′
21	46°37.9′	135°17.5′	S 23°25.9′	108°29.6′	S 20°20.0′	75°18.0′	S 12°49.5′	92°59.7′	S 18°16.3′	161°50.8′	S 21°27.0′
22	61°40.4′	150°17.1′	S 23°25.9′	123°32.6′	S 20°19.5′	90°20.1′	S 12°49.4′	108°01.9′	S 18°16.2′	176°51.4′	S 21°27.3′
23	76°42.9′	165°16.8′	S 23°25.9′	138°35.6′	S 20°19.0′	105°22.1′	S 12°49.2′	123°04.1′	S 18°16.2′	191°52.0′	S 21°27.6′
		SD 16.3′ *d* 0.0′		*v* 2.9′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		11 h 58 m 40 s		13 h 47 m		16 h 0 m		14 h 49 m		10 h 13 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Acrux	−Spica	−Arcturus	−Regulus	+Pollux	+Procyon	+Betelgeuse	+Capella
0	326°24.4′	N 24°18.6′	10.9′	-5.5′	54.5′	100°16.6′	83°16.0′	82°05.7′	29°18.9′	7°49.1′		37°43.7′	41°48.3′
1	340°54.3′	N 24°13.1′	10.9′	-5.6′	54.6′	99°59.6′	82°45.9′	81°38.9′	28°49.2′	8°17.7′		38°09.6′	42°13.9′
2	355°24.2′	N 24°07.4′	10.9′	-5.7′	54.6′	99°42.4′	82°15.8′	81°12.2′	28°19.4′	8°46.5′		38°35.7′	42°39.5′
3	9°54.1′	N 24°01.7′	11.0′	-5.9′	54.6′	99°25.3′	81°45.7′	80°45.4′	27°49.6′	9°15.5′		39°01.8′	43°05.3′
4	24°24.1′	N 23°55.8′	11.0′	-6.0′	54.6′	99°08.1′	81°15.5′	80°18.7′	27°19.8′	9°44.7′		39°28.0′	43°31.1′
5	38°54.1′	N 23°49.9′	11.0′	-6.1′	54.6′	98°50.8′	80°45.4′	79°51.9′	26°50.0′	10°13.9′		39°54.4′	43°57.0′
6	53°24.1′	N 23°43.8′	11.1′	-6.2′	54.6′	98°33.6′	80°15.2′	79°25.2′	26°20.3′	10°43.3′		40°20.8′	44°23.0′
7	67°54.2′	N 23°37.6′	11.1′	-6.3′	54.6′	98°16.3′	79°45.0′	78°58.4′	25°50.5′	11°12.7′		40°47.3′	44°49.1′
8	82°24.3′	N 23°31.2′	11.1′	-6.4′	54.7′	97°58.9′	79°14.8′	78°31.7′	25°20.7′	11°42.3′		41°13.9′	45°15.3′
9	96°54.4′	N 23°24.8′	11.2′	-6.5′	54.7′	97°41.6′	78°44.6′	78°04.9′	24°51.0′	12°11.9′		41°40.6′	45°41.6′
10	111°24.6′	N 23°18.3′	11.2′	-6.7′	54.7′	97°24.1′	78°14.4′	77°38.2′	24°21.2′	12°41.6′		42°07.3′	46°07.9′
11	125°54.8′	N 23°11.6′	11.3′	-6.8′	54.7′	97°06.7′	77°44.2′	77°11.4′	23°51.5′	13°11.4′		42°34.1′	46°34.3′
12	140°25.1′	N 23°04.8′	11.3′	-6.9′	54.7′	96°49.2′	77°13.9′	76°44.7′	23°21.8′	13°41.2′	23°28.7′	43°01.1′	47°00.8′
13	154°55.4′	N 22°57.9′	11.3′	-7.0′	54.7′	96°31.7′	76°43.7′	76°17.9′	22°52.0′	14°11.0′	23°43.9′	43°28.0′	47°27.3′
14	169°25.7′	N 22°50.9′	11.4′	-7.1′	54.7′	96°14.2′	76°13.4′	75°51.2′	22°22.4′	14°41.0′	23°59.7′	43°55.1′	47°54.0′
15	183°56.1′	N 22°43.8′	11.4′	-7.2′	54.8′	95°56.7′	75°43.1′	75°24.4′	21°52.7′	15°10.9′	24°15.9′	44°22.2′	48°20.7′
16	198°26.5′	N 22°36.6′	11.5′	-7.3′	54.8′	95°39.1′	75°12.8′	74°57.7′	21°23.0′	15°40.9′	24°32.5′	44°49.4′	48°47.4′
17	212°56.9′	N 22°29.3′	11.5′	-7.4′	54.8′	95°21.5′	74°42.5′	74°31.0′	20°53.4′	16°11.0′	24°49.5′	45°16.7′	49°14.2′
18	227°27.4′	N 22°21.8′	11.5′	-7.5′	54.8′	95°03.8′	74°12.1′	74°04.2′	20°23.7′	16°41.1′	25°07.0′	45°44.0′	49°41.1′
19	241°58.0′	N 22°14.3′	11.6′	-7.7′	54.8′	94°46.2′	73°41.8′	73°37.5′	19°54.1′	17°11.2′	25°24.8′	46°11.4′	50°08.1′
20	256°28.6′	N 22°06.6′	11.6′	-7.8′	54.8′	94°28.5′	73°11.4′	73°10.8′	19°24.6′	17°41.3′	25°43.0′	46°38.9′	50°35.1′
21	270°59.2′	N 21°58.9′	11.7′	-7.9′	54.9′	94°10.8′	72°41.0′	72°44.1′	18°55.0′	18°11.5′	26°01.6′	47°06.4′	51°02.2′
22	285°29.8′	N 21°51.0′	11.7′	-8.0′	54.9′	93°53.0′	72°10.6′	72°17.3′	18°25.5′	18°41.8′	26°20.5′	47°34.0′	51°29.3′
23	300°00.5′	N 21°43.0′	11.7′	-8.1′	54.9′	93°35.3′	71°40.2′	71°50.6′	17°56.1′	19°12.0′	26°39.8′	48°01.6′	51°56.6′
Mer. pass. 2 h 19 m SD 14.9′ phase 93%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.8′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°37.0′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°49.5′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Thursday 23 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	91°45.3′	180°16.5′	S 23°25.8′	153°38.5′	S 20°18.5′	120°24.1′	S 12°49.0′	138°06.4′	S 18°16.1′	206°52.6′	S 21°27.9′
1	106°47.8′	195°16.2′	S 23°25.8′	168°41.5′	S 20°18.0′	135°26.2′	S 12°48.9′	153°08.6′	S 18°16.0′	221°53.2′	S 21°28.3′
2	121°50.3′	210°15.9′	S 23°25.8′	183°44.5′	S 20°17.5′	150°28.2′	S 12°48.7′	168°10.8′	S 18°16.0′	236°53.8′	S 21°28.6′
3	136°52.7′	225°15.6′	S 23°25.7′	198°47.5′	S 20°16.9′	165°30.2′	S 12°48.6′	183°13.0′	S 18°15.9′	251°54.4′	S 21°28.9′
4	151°55.2′	240°15.3′	S 23°25.7′	213°50.4′	S 20°16.4′	180°32.3′	S 12°48.4′	198°15.2′	S 18°15.8′	266°55.0′	S 21°29.2′
5	166°57.7′	255°15.0′	S 23°25.7′	228°53.4′	S 20°15.9′	195°34.3′	S 12°48.2′	213°17.4′	S 18°15.8′	281°55.6′	S 21°29.6′
6	182°00.1′	270°14.7′	S 23°25.7′	243°56.4′	S 20°15.4′	210°36.3′	S 12°48.1′	228°19.6′	S 18°15.7′	296°56.2′	S 21°29.9′
7	197°02.6′	285°14.4′	S 23°25.6′	258°59.4′	S 20°14.9′	225°38.4′	S 12°47.9′	243°21.8′	S 18°15.6′	311°56.8′	S 21°30.2′
8	212°05.0′	300°14.0′	S 23°25.6′	274°02.4′	S 20°14.4′	240°40.4′	S 12°47.8′	258°24.0′	S 18°15.5′	326°57.4′	S 21°30.5′
9	227°07.5′	315°13.7′	S 23°25.6′	289°05.4′	S 20°13.9′	255°42.4′	S 12°47.6′	273°26.2′	S 18°15.5′	341°58.0′	S 21°30.8′
10	242°10.0′	330°13.4′	S 23°25.5′	304°08.4′	S 20°13.4′	270°44.5′	S 12°47.4′	288°28.4′	S 18°15.4′	356°58.6′	S 21°31.2′
11	257°12.4′	345°13.1′	S 23°25.5′	319°11.5′	S 20°12.9′	285°46.5′	S 12°47.3′	303°30.6′	S 18°15.3′	11°59.2′	S 21°31.5′
12	272°14.9′	0°12.8′	S 23°25.5′	334°14.5′	S 20°12.4′	300°48.5′	S 12°47.1′	318°32.8′	S 18°15.3′	26°59.8′	S 21°31.8′
13	287°17.4′	15°12.5′	S 23°25.4′	349°17.5′	S 20°11.9′	315°50.5′	S 12°46.9′	333°35.0′	S 18°15.2′	42°00.4′	S 21°32.1′
14	302°19.8′	30°12.2′	S 23°25.4′	4°20.5′	S 20°11.4′	330°52.6′	S 12°46.8′	348°37.3′	S 18°15.1′	57°01.0′	S 21°32.4′
15	317°22.3′	45°11.9′	S 23°25.3′	19°23.6′	S 20°10.9′	345°54.6′	S 12°46.6′	3°39.5′	S 18°15.1′	72°01.6′	S 21°32.8′
16	332°24.8′	60°11.6′	S 23°25.3′	34°26.6′	S 20°10.4′	0°56.6′	S 12°46.5′	18°41.7′	S 18°15.0′	87°02.2′	S 21°33.1′
17	347°27.2′	75°11.3′	S 23°25.3′	49°29.7′	S 20°09.9′	15°58.7′	S 12°46.3′	33°43.9′	S 18°14.9′	102°02.8′	S 21°33.4′
18	2°29.7′	90°10.9′	S 23°25.2′	64°32.7′	S 20°09.4′	31°00.7′	S 12°46.1′	48°46.1′	S 18°14.9′	117°03.4′	S 21°33.7′
19	17°32.1′	105°10.6′	S 23°25.2′	79°35.8′	S 20°08.8′	46°02.7′	S 12°46.0′	63°48.3′	S 18°14.8′	132°04.0′	S 21°34.0′
20	32°34.6′	120°10.3′	S 23°25.1′	94°38.8′	S 20°08.3′	61°04.8′	S 12°45.8′	78°50.5′	S 18°14.7′	147°04.6′	S 21°34.3′
21	47°37.1′	135°10.0′	S 23°25.1′	109°41.9′	S 20°07.8′	76°06.8′	S 12°45.6′	93°52.7′	S 18°14.6′	162°05.2′	S 21°34.7′
22	62°39.5′	150°09.7′	S 23°25.1′	124°45.0′	S 20°07.3′	91°08.8′	S 12°45.5′	108°54.9′	S 18°14.6′	177°05.8′	S 21°35.0′
23	77°42.0′	165°09.4′	S 23°25.0′	139°48.0′	S 20°06.8′	106°10.8′	S 12°45.3′	123°57.1′	S 18°14.5′	192°06.4′	S 21°35.3′
		SD 16.3′ *d* 0.0′		*v* 3.0′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		11 h 59 m 10 s		13 h 43 m		15 h 56 m		14 h 45 m		10 h 12 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Acrux	−Arcturus	−Spica	−Regulus	+Pollux	+Procyon	+Betelgeuse	+Sirius
0	314°31.3′	N 21°34.9′	11.8′	-8.2′	54.9′	93°17.5′	71°23.9′	71°09.8′	17°26.7′	19°42.3′	26°59.4′	48°29.3′	51°53.6′
1	329°02.1′	N 21°26.8′	11.8′	-8.3′	54.9′	92°59.7′	70°57.2′	70°39.3′	16°57.3′	20°12.7′	27°19.4′	48°57.1′	52°08.9′
2	343°32.9′	N 21°18.5′	11.9′	-8.4′	55.0′	92°41.9′	70°30.5′	70°08.9′	16°28.0′	20°43.0′	27°39.6′	49°24.9′	52°24.4′
3	358°03.8′	N 21°10.1′	11.9′	-8.5′	55.0′	92°24.1′	70°03.9′	69°38.4′	15°58.7′	21°13.4′	28°00.1′	49°52.8′	52°40.0′
4	12°34.7′	N 21°01.6′	12.0′	-8.6′	55.0′	92°06.2′	69°37.2′	69°07.9′	15°29.6′	21°43.8′	28°21.0′	50°20.7′	52°55.8′
5	27°05.6′	N 20°53.0′	12.0′	-8.7′	55.0′	91°48.3′	69°10.5′	68°37.4′	15°00.5′	22°14.2′	28°42.1′	50°48.7′	53°11.7′
6	41°36.6′	N 20°44.3′	12.0′	-8.8′	55.0′	91°30.4′	68°43.9′	68°06.9′	14°31.4′	22°44.7′	29°03.5′	51°16.7′	53°27.8′
7	56°07.7′	N 20°35.5′	12.1′	-8.9′	55.0′	91°12.5′	68°17.2′	67°36.3′	14°02.5′	23°15.2′	29°25.1′	51°44.8′	53°44.1′
8	70°38.8′	N 20°26.6′	12.1′	-9.0′	55.1′	90°54.6′	67°50.6′	67°05.8′	13°33.7′	23°45.7′	29°47.1′	52°12.9′	54°00.5′
9	85°09.9′	N 20°17.6′	12.2′	-9.1′	55.1′	90°36.7′	67°24.0′	66°35.2′	13°05.0′	24°16.2′	30°09.2′	52°41.1′	54°17.1′
10	99°41.0′	N 20°08.5′	12.2′	-9.2′	55.1′	90°18.8′	66°57.4′	66°04.6′	12°36.5′	24°46.8′	30°31.6′	53°09.4′	54°33.8′
11	114°12.2′	N 19°59.3′	12.2′	-9.3′	55.1′	90°00.8′	66°30.8′	65°34.0′	12°08.1′	25°17.4′	30°54.2′	53°37.7′	54°50.7′
12	128°43.5′	N 19°50.0′	12.3′	-9.4′	55.1′	89°42.8′	66°04.2′	65°03.3′	11°39.9′	25°48.0′	31°17.1′	54°06.0′	55°07.7′
13	143°14.8′	N 19°40.6′	12.3′	-9.5′	55.2′	89°24.9′	65°37.6′	64°32.7′	11°11.9′	26°18.7′	31°40.1′	54°34.4′	55°24.8′
14	157°46.1′	N 19°31.1′	12.4′	-9.6′	55.2′	89°06.9′	65°11.1′	64°02.0′	10°44.2′	26°49.3′	32°03.4′	55°02.8′	55°42.1′
15	172°17.5′	N 19°21.5′	12.4′	-9.7′	55.2′	88°48.9′	64°44.5′	63°31.3′	10°16.7′	27°20.0′	32°26.9′	55°31.3′	55°59.5′
16	186°48.9′	N 19°11.9′	12.5′	-9.8′	55.2′	88°30.9′	64°18.0′	63°00.6′	9°49.5′	27°50.8′	32°50.5′	55°59.8′	56°17.1′
17	201°20.4′	N 19°02.1′	12.5′	-9.9′	55.2′	88°12.9′	63°51.5′	62°29.9′	9°22.7′	28°21.5′	33°14.4′	56°28.4′	56°34.8′
18	215°51.8′	N 18°52.2′	12.5′	-10.0′	55.3′	87°54.8′	63°25.0′	61°59.2′	8°56.3′	28°52.3′	33°38.4′	56°57.0′	56°52.7′
19	230°23.4′	N 18°42.3′	12.6′	-10.0′	55.3′	87°36.8′	62°58.6′	61°28.4′	8°30.3′	29°23.1′	34°02.7′	57°25.7′	57°10.6′
20	244°55.0′	N 18°32.2′	12.6′	-10.1′	55.3′	87°18.8′	62°32.1′	60°57.6′	8°05.0′	29°53.9′	34°27.1′	57°54.4′	57°28.7′
21	259°26.6′	N 18°22.1′	12.7′	-10.2′	55.3′	87°00.8′	62°05.7′	60°26.8′	7°40.3′	30°24.7′	34°51.6′	58°23.2′	57°47.0′
22	273°58.2′	N 18°11.9′	12.7′	-10.3′	55.3′	86°42.7′	61°39.3′	59°56.0′		30°55.6′	35°16.4′	58°52.0′	58°05.3′
23	288°29.9′	N 18°01.6′	12.7′	-10.4′	55.4′	86°24.7′	61°13.0′	59°25.2′		31°26.5′	35°41.3′	59°20.8′	58°23.8′
Mer. pass. 3 h 8 m SD 15.0′ phase 87%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.5′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.3′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°49.9′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.9′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Friday 24 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	92°44.5′	180°09.1′	S 23°25.0′	154°51.1′	S 20°06.3′	121°12.9′	S 12°45.2′	138°59.3′	S 18°14.4′	207°07.0′	S 21°35.6′
1	107°46.9′	195°08.8′	S 23°24.9′	169°54.2′	S 20°05.8′	136°14.9′	S 12°45.0′	154°01.5′	S 18°14.4′	222°07.6′	S 21°35.9′
2	122°49.4′	210°08.5′	S 23°24.9′	184°57.3′	S 20°05.3′	151°16.9′	S 12°44.8′	169°03.7′	S 18°14.3′	237°08.2′	S 21°36.2′
3	137°51.9′	225°08.2′	S 23°24.8′	200°00.4′	S 20°04.8′	166°19.0′	S 12°44.7′	184°05.9′	S 18°14.2′	252°08.8′	S 21°36.6′
4	152°54.3′	240°07.8′	S 23°24.8′	215°03.5′	S 20°04.3′	181°21.0′	S 12°44.5′	199°08.1′	S 18°14.2′	267°09.4′	S 21°36.9′
5	167°56.8′	255°07.5′	S 23°24.7′	230°06.6′	S 20°03.8′	196°23.0′	S 12°44.3′	214°10.3′	S 18°14.1′	282°10.0′	S 21°37.2′
6	182°59.3′	270°07.2′	S 23°24.7′	245°09.7′	S 20°03.3′	211°25.0′	S 12°44.2′	229°12.5′	S 18°14.0′	297°10.6′	S 21°37.5′
7	198°01.7′	285°06.9′	S 23°24.6′	260°12.8′	S 20°02.8′	226°27.1′	S 12°44.0′	244°14.7′	S 18°14.0′	312°11.2′	S 21°37.8′
8	213°04.2′	300°06.6′	S 23°24.6′	275°15.9′	S 20°02.3′	241°29.1′	S 12°43.9′	259°17.0′	S 18°13.9′	327°11.8′	S 21°38.1′
9	228°06.6′	315°06.3′	S 23°24.5′	290°19.0′	S 20°01.8′	256°31.1′	S 12°43.7′	274°19.2′	S 18°13.8′	342°12.4′	S 21°38.4′
10	243°09.1′	330°06.0′	S 23°24.5′	305°22.1′	S 20°01.3′	271°33.1′	S 12°43.5′	289°21.4′	S 18°13.7′	357°13.0′	S 21°38.8′
11	258°11.6′	345°05.7′	S 23°24.4′	320°25.2′	S 20°00.8′	286°35.2′	S 12°43.4′	304°23.6′	S 18°13.7′	12°13.6′	S 21°39.1′
12	273°14.0′	0°05.4′	S 23°24.4′	335°28.4′	S 20°00.3′	301°37.2′	S 12°43.2′	319°25.8′	S 18°13.6′	27°14.2′	S 21°39.4′
13	288°16.5′	15°05.1′	S 23°24.3′	350°31.5′	S 19°59.8′	316°39.2′	S 12°43.0′	334°28.0′	S 18°13.5′	42°14.8′	S 21°39.7′
14	303°19.0′	30°04.7′	S 23°24.2′	5°34.7′	S 19°59.3′	331°41.3′	S 12°42.9′	349°30.2′	S 18°13.5′	57°15.4′	S 21°40.0′
15	318°21.4′	45°04.4′	S 23°24.2′	20°37.8′	S 19°58.8′	346°43.3′	S 12°42.7′	4°32.4′	S 18°13.4′	72°16.0′	S 21°40.3′
16	333°23.9′	60°04.1′	S 23°24.1′	35°40.9′	S 19°58.3′	1°45.3′	S 12°42.6′	19°34.6′	S 18°13.3′	87°16.6′	S 21°40.6′
17	348°26.4′	75°03.8′	S 23°24.1′	50°44.1′	S 19°57.8′	16°47.3′	S 12°42.4′	34°36.8′	S 18°13.3′	102°17.2′	S 21°40.9′
18	3°28.8′	90°03.5′	S 23°24.0′	65°47.3′	S 19°57.3′	31°49.4′	S 12°42.2′	49°39.0′	S 18°13.2′	117°17.8′	S 21°41.2′
19	18°31.3′	105°03.2′	S 23°24.0′	80°50.4′	S 19°56.8′	46°51.4′	S 12°42.1′	64°41.2′	S 18°13.1′	132°18.4′	S 21°41.6′
20	33°33.8′	120°02.9′	S 23°23.9′	95°53.6′	S 19°56.3′	61°53.4′	S 12°41.9′	79°43.4′	S 18°13.0′	147°18.9′	S 21°41.9′
21	48°36.2′	135°02.6′	S 23°23.8′	110°56.8′	S 19°55.8′	76°55.4′	S 12°41.7′	94°45.6′	S 18°13.0′	162°19.5′	S 21°42.2′
22	63°38.7′	150°02.3′	S 23°23.8′	125°59.9′	S 19°55.3′	91°57.5′	S 12°41.6′	109°47.8′	S 18°12.9′	177°20.1′	S 21°42.5′
23	78°41.1′	165°02.0′	S 23°23.7′	141°03.1′	S 19°54.8′	106°59.5′	S 12°41.4′	124°50.0′	S 18°12.8′	192°20.7′	S 21°42.8′
		SD 16.3′ *d* 0.1′		*v* 3.1′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		11 h 59 m 40 s		13 h 38 m		15 h 53 m		14 h 42 m		10 h 11 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	|−Arcturus|	−Spica	−Regulus	+Pollux	+Procyon	+Sirius	+Betelgeuse
0	303°01.7′	N 17°51.2′	12.8′	-10.5′	55.4′		60°46.6′	58°54.3′		31°57.4′	36°06.3′	58°42.4′	59°49.7′
1	317°33.4′	N 17°40.7′	12.8′	-10.6′	55.4′		60°20.3′	58°23.4′		32°28.4′	36°31.5′	59°01.2′	60°18.6′
2	332°05.2′	N 17°30.1′	12.8′	-10.7′	55.4′		59°54.0′	57°52.5′		32°59.3′	36°56.8′	59°20.0′	60°47.6′
3	346°37.1′	N 17°19.4′	12.9′	-10.7′	55.5′		59°27.7′	57°21.6′		33°30.3′	37°22.3′	59°39.0′	61°16.6′
4	1°09.0′	N 17°08.7′	12.9′	-10.8′	55.5′		59°01.5′	56°50.7′		34°01.4′	37°47.9′	59°58.1′	61°45.6′
5	15°40.9′	N 16°57.9′	13.0′	-10.9′	55.5′		58°35.3′	56°19.7′		34°32.4′	38°13.7′	60°17.3′	62°14.7′
6	30°12.8′	N 16°47.0′	13.0′	-11.0′	55.5′		58°09.1′	55°48.7′		35°03.5′	38°39.6′	60°36.6′	62°43.8′
7	44°44.8′	N 16°36.0′	13.0′	-11.1′	55.6′		57°42.9′	55°17.7′		35°34.6′	39°05.6′	60°56.0′	63°13.0′
8	59°16.9′	N 16°24.9′	13.1′	-11.2′	55.6′		57°16.8′	54°46.7′		36°05.7′	39°31.7′	61°15.5′	63°42.2′
9	73°48.9′	N 16°13.7′	13.1′	-11.2′	55.6′		56°50.7′	54°15.6′		36°36.8′	39°58.0′	61°35.2′	64°11.4′
10	88°21.0′	N 16°02.5′	13.1′	-11.3′	55.6′		56°24.7′	53°44.6′		37°08.0′	40°24.4′	61°54.9′	64°40.7′
11	102°53.1′	N 15°51.1′	13.2′	-11.4′	55.6′		55°58.7′	53°13.5′		37°39.2′	40°50.9′	62°14.8′	65°10.1′
12	117°25.3′	N 15°39.7′	13.2′	-11.5′	55.7′		55°32.7′	52°42.4′		38°10.5′	41°17.5′	62°34.8′	65°39.4′
13	131°57.5′	N 15°28.3′	13.2′	-11.6′	55.7′		55°06.8′	52°11.3′		38°41.7′	41°44.2′	62°54.8′	66°08.8′
14	146°29.7′	N 15°16.7′	13.3′	-11.6′	55.7′	119°54.2′	54°40.9′	51°40.1′		39°13.0′	42°11.0′	63°15.0′	66°38.3′
15	161°02.0′	N 15°05.1′	13.3′	-11.7′	55.7′	119°25.4′	54°15.1′	51°08.9′		39°44.3′	42°38.0′	63°35.3′	67°07.8′
16	175°34.3′	N 14°53.4′	13.3′	-11.8′	55.8′	118°56.5′	53°49.3′	50°37.7′		40°15.6′	43°05.0′	63°55.7′	67°37.3′
17	190°06.6′	N 14°41.6′	13.4′	-11.9′	55.8′	118°27.7′	53°23.6′	50°06.5′		40°47.0′	43°32.2′	64°16.1′	68°06.8′
18	204°39.0′	N 14°29.7′	13.4′	-11.9′	55.8′	117°58.8′	52°57.9′	49°35.3′		41°18.4′	43°59.4′	64°36.7′	68°36.4′
19	219°11.3′	N 14°17.8′	13.4′	-12.0′	55.8′	117°29.9′	52°32.2′	49°04.0′		41°49.8′	44°26.7′	64°57.4′	69°06.1′
20	233°43.7′	N 14°05.8′	13.4′	-12.1′	55.9′	117°00.9′	52°06.6′	48°32.7′		42°21.3′	44°54.2′	65°18.1′	69°35.7′
21	248°16.2′	N 13°53.7′	13.5′	-12.2′	55.9′	116°32.0′	51°41.1′	48°01.4′	8°00.7′	42°52.7′	45°21.7′	65°39.0′	70°05.4′
22	262°48.6′	N 13°41.5′	13.5′	-12.2′	55.9′	116°03.0′	51°15.6′	47°30.1′	8°26.5′	43°24.2′	45°49.3′	65°59.9′	70°35.2′
23	277°21.1′	N 13°29.3′	13.5′	-12.3′	55.9′	115°34.0′	50°50.2′	46°58.7′	8°52.9′	43°55.8′	46°17.0′	66°20.9′	71°05.0′
Mer. pass. 3 h 55 m SD 15.1′ phase 80%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.1′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.3′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°50.2′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Saturday 25 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	93°43.6′	180°01.6′	S 23°23.6′	156°06.3′	S 19°54.3′	122°01.5′	S 12°41.2′	139°52.2′	S 18°12.8′	207°21.3′	S 21°43.1′
1	108°46.1′	195°01.3′	S 23°23.6′	171°09.5′	S 19°53.8′	137°03.5′	S 12°41.1′	154°54.4′	S 18°12.7′	222°21.9′	S 21°43.4′
2	123°48.5′	210°01.0′	S 23°23.5′	186°12.7′	S 19°53.3′	152°05.6′	S 12°40.9′	169°56.6′	S 18°12.6′	237°22.5′	S 21°43.7′
3	138°51.0′	225°00.7′	S 23°23.4′	201°15.9′	S 19°52.8′	167°07.6′	S 12°40.7′	184°58.8′	S 18°12.6′	252°23.1′	S 21°44.0′
4	153°53.5′	240°00.4′	S 23°23.4′	216°19.1′	S 19°52.3′	182°09.6′	S 12°40.6′	200°01.0′	S 18°12.5′	267°23.7′	S 21°44.3′
5	168°55.9′	255°00.1′	S 23°23.3′	231°22.3′	S 19°51.8′	197°11.6′	S 12°40.4′	215°03.2′	S 18°12.4′	282°24.3′	S 21°44.6′
6	183°58.4′	269°59.8′	S 23°23.2′	246°25.5′	S 19°51.3′	212°13.7′	S 12°40.3′	230°05.4′	S 18°12.3′	297°24.9′	S 21°44.9′
7	199°00.9′	284°59.5′	S 23°23.2′	261°28.7′	S 19°50.8′	227°15.7′	S 12°40.1′	245°07.6′	S 18°12.3′	312°25.5′	S 21°45.2′
8	214°03.3′	299°59.2′	S 23°23.1′	276°31.9′	S 19°50.3′	242°17.7′	S 12°39.9′	260°09.8′	S 18°12.2′	327°26.1′	S 21°45.6′
9	229°05.8′	314°58.9′	S 23°23.0′	291°35.2′	S 19°49.8′	257°19.7′	S 12°39.8′	275°12.1′	S 18°12.1′	342°26.6′	S 21°45.9′
10	244°08.3′	329°58.6′	S 23°22.9′	306°38.4′	S 19°49.3′	272°21.7′	S 12°39.6′	290°14.3′	S 18°12.1′	357°27.2′	S 21°46.2′
11	259°10.7′	344°58.2′	S 23°22.9′	321°41.6′	S 19°48.9′	287°23.8′	S 12°39.4′	305°16.5′	S 18°12.0′	12°27.8′	S 21°46.5′
12	274°13.2′	359°57.9′	S 23°22.8′	336°44.9′	S 19°48.4′	302°25.8′	S 12°39.3′	320°18.7′	S 18°11.9′	27°28.4′	S 21°46.8′
13	289°15.6′	14°57.6′	S 23°22.7′	351°48.1′	S 19°47.9′	317°27.8′	S 12°39.1′	335°20.9′	S 18°11.9′	42°29.0′	S 21°47.1′
14	304°18.1′	29°57.3′	S 23°22.6′	6°51.4′	S 19°47.4′	332°29.8′	S 12°38.9′	350°23.1′	S 18°11.8′	57°29.6′	S 21°47.4′
15	319°20.6′	44°57.0′	S 23°22.6′	21°54.6′	S 19°46.9′	347°31.9′	S 12°38.8′	5°25.3′	S 18°11.7′	72°30.2′	S 21°47.7′
16	334°23.0′	59°56.7′	S 23°22.5′	36°57.9′	S 19°46.4′	2°33.9′	S 12°38.6′	20°27.5′	S 18°11.6′	87°30.8′	S 21°48.0′
17	349°25.5′	74°56.4′	S 23°22.4′	52°01.1′	S 19°45.9′	17°35.9′	S 12°38.4′	35°29.7′	S 18°11.6′	102°31.4′	S 21°48.3′
18	4°28.0′	89°56.1′	S 23°22.3′	67°04.4′	S 19°45.4′	32°37.9′	S 12°38.3′	50°31.9′	S 18°11.5′	117°32.0′	S 21°48.6′
19	19°30.4′	104°55.8′	S 23°22.2′	82°07.7′	S 19°44.9′	47°39.9′	S 12°38.1′	65°34.1′	S 18°11.4′	132°32.5′	S 21°48.9′
20	34°32.9′	119°55.5′	S 23°22.2′	97°10.9′	S 19°44.4′	62°42.0′	S 12°37.9′	80°36.3′	S 18°11.4′	147°33.1′	S 21°49.2′
21	49°35.4′	134°55.2′	S 23°22.1′	112°14.2′	S 19°43.9′	77°44.0′	S 12°37.8′	95°38.5′	S 18°11.3′	162°33.7′	S 21°49.5′
22	64°37.8′	149°54.8′	S 23°22.0′	127°17.5′	S 19°43.4′	92°46.0′	S 12°37.6′	110°40.7′	S 18°11.2′	177°34.3′	S 21°49.8′
23	79°40.3′	164°54.5′	S 23°21.9′	142°20.8′	S 19°42.9′	107°48.0′	S 12°37.4′	125°42.9′	S 18°11.2′	192°34.9′	S 21°50.1′
		SD 16.3′ *d* 0.1′		*v* 3.2′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 0 m 9 s		13 h 33 m		15 h 50 m		14 h 38 m		10 h 10 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	−Acrux	−Arcturus	−Spica	+Regulus	+Pollux	+Procyon	+Sirius
0	291°53.6′	N 13°17.0′	13.5′	-12.4′	56.0′	115°04.9′	78°55.8′	50°24.9′	46°27.3′	9°19.8′	44°27.3′	46°44.8′	66°42.0′
1	306°26.2′	N 13°04.6′	13.6′	-12.4′	56.0′	114°35.8′	78°38.1′	49°59.6′	45°55.9′	9°47.3′	44°58.9′	47°12.7′	67°03.2′
2	320°58.7′	N 12°52.2′	13.6′	-12.5′	56.0′	114°06.7′	78°20.3′	49°34.4′	45°24.5′	10°15.1′	45°30.5′	47°40.6′	67°24.5′
3	335°31.3′	N 12°39.7′	13.6′	-12.6′	56.1′	113°37.6′	78°02.6′	49°09.2′	44°53.0′	10°43.4′	46°02.2′	48°08.7′	67°45.9′
4	350°03.9′	N 12°27.2′	13.6′	-12.6′	56.1′	113°08.5′	77°44.9′	48°44.1′	44°21.6′	11°12.0′	46°33.9′	48°36.8′	68°07.4′
5	4°36.6′	N 12°14.5′	13.6′	-12.7′	56.1′	112°39.3′	77°27.3′	48°19.1′	43°50.1′	11°40.8′	47°05.6′	49°05.0′	68°28.9′
6	19°09.2′	N 12°01.8′	13.7′	-12.8′	56.1′	112°10.0′	77°09.6′	47°54.2′	43°18.6′	12°10.0′	47°37.3′	49°33.3′	68°50.5′
7	33°41.9′	N 11°49.1′	13.7′	-12.8′	56.2′	111°40.8′	76°52.0′	47°29.3′	42°47.0′	12°39.4′	48°09.1′	50°01.7′	69°12.3′
8	48°14.6′	N 11°36.2′	13.7′	-12.9′	56.2′	111°11.5′	76°34.5′	47°04.6′	42°15.4′	13°08.9′	48°40.9′	50°30.1′	69°34.0′
9	62°47.3′	N 11°23.3′	13.7′	-13.0′	56.2′	110°42.2′	76°16.9′	46°39.9′	41°43.9′	13°38.7′	49°12.7′	50°58.6′	69°55.9′
10	77°20.0′	N 11°10.4′	13.7′	-13.0′	56.2′	110°12.9′	75°59.5′	46°15.3′	41°12.2′	14°08.7′	49°44.6′	51°27.2′	70°17.9′
11	91°52.7′	N 10°57.4′	13.8′	-13.1′	56.3′	109°43.5′	75°42.0′	45°50.8′	40°40.6′	14°38.8′	50°16.4′	51°55.9′	70°39.9′
12	106°25.5′	N 10°44.3′	13.8′	-13.1′	56.3′	109°14.1′	75°24.6′	45°26.4′	40°08.9′	15°09.1′	50°48.4′	52°24.6′	71°02.0′
13	120°58.2′	N 10°31.2′	13.8′	-13.2′	56.3′	108°44.7′	75°07.2′	45°02.1′	39°37.3′	15°39.5′	51°20.3′	52°53.4′	71°24.1′
14	135°31.0′	N 10°18.0′	13.8′	-13.2′	56.4′	108°15.2′	74°49.8′	44°37.9′	39°05.5′	16°10.0′	51°52.3′	53°22.3′	71°46.4′
15	150°03.8′	N 10°04.7′	13.8′	-13.3′	56.4′	107°45.8′	74°32.5′	44°13.8′	38°33.8′	16°40.7′	52°24.3′	53°51.3′	72°08.7′
16	164°36.6′	N 9°51.4′	13.8′	-13.4′	56.4′	107°16.2′	74°15.2′	43°49.9′	38°02.1′	17°11.5′	52°56.4′	54°20.3′	72°31.1′
17	179°09.4′	N 9°38.1′	13.8′	-13.4′	56.4′	106°46.7′	73°58.0′	43°26.0′	37°30.3′	17°42.4′	53°28.4′	54°49.4′	72°53.5′
18	193°42.3′	N 9°24.7′	13.8′	-13.5′	56.5′	106°17.1′	73°40.8′	43°02.3′	36°58.5′	18°13.4′	54°00.6′	55°18.5′	73°16.1′
19	208°15.1′	N 9°11.2′	13.8′	-13.5′	56.5′	105°47.5′	73°23.7′	42°38.7′	36°26.7′	18°44.4′	54°32.7′	55°47.7′	73°38.7′
20	222°47.9′	N 8°57.7′	13.8′	-13.6′	56.5′	105°17.8′	73°06.6′	42°15.2′	35°54.8′	19°15.6′	55°04.9′	56°17.0′	74°01.3′
21	237°20.8′	N 8°44.1′	13.9′	-13.6′	56.6′	104°48.2′	72°49.6′	41°51.8′	35°22.9′	19°46.9′	55°37.1′	56°46.4′	74°24.1′
22	251°53.6′	N 8°30.4′	13.9′	-13.7′	56.6′	104°18.4′	72°32.6′	41°28.6′	34°51.0′	20°18.2′	56°09.3′	57°15.8′	74°46.9′
23	266°26.5′	N 8°16.8′	13.9′	-13.7′	56.6′	103°48.7′	72°15.7′	41°05.5′	34°19.1′	20°49.6′	56°41.6′	57°45.2′	75°09.7′
Mer. pass. 4 h 41 m SD 15.3′ phase 71%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.8′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°50.6′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Sunday 26 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	94°42.7′	179°54.2′	S 23°21.8′	157°24.1′	S 19°42.4′	122°50.1′	S 12°37.3′	140°45.1′	S 18°11.1′	207°35.5′	S 21°50.4′
1	109°45.2′	194°53.9′	S 23°21.7′	172°27.4′	S 19°41.9′	137°52.1′	S 12°37.1′	155°47.3′	S 18°11.0′	222°36.1′	S 21°50.7′
2	124°47.7′	209°53.6′	S 23°21.7′	187°30.7′	S 19°41.5′	152°54.1′	S 12°37.0′	170°49.5′	S 18°10.9′	237°36.7′	S 21°51.0′
3	139°50.1′	224°53.3′	S 23°21.6′	202°34.0′	S 19°41.0′	167°56.1′	S 12°36.8′	185°51.7′	S 18°10.9′	252°37.2′	S 21°51.3′
4	154°52.6′	239°53.0′	S 23°21.5′	217°37.3′	S 19°40.5′	182°58.1′	S 12°36.6′	200°53.9′	S 18°10.8′	267°37.8′	S 21°51.6′
5	169°55.1′	254°52.7′	S 23°21.4′	232°40.6′	S 19°40.0′	198°00.2′	S 12°36.5′	215°56.1′	S 18°10.7′	282°38.4′	S 21°51.9′
6	184°57.5′	269°52.4′	S 23°21.3′	247°43.9′	S 19°39.5′	213°02.2′	S 12°36.3′	230°58.3′	S 18°10.7′	297°39.0′	S 21°52.2′
7	199°60.0′	284°52.1′	S 23°21.2′	262°47.2′	S 19°39.0′	228°04.2′	S 12°36.1′	246°00.5′	S 18°10.6′	312°39.6′	S 21°52.5′
8	215°02.5′	299°51.8′	S 23°21.1′	277°50.6′	S 19°38.5′	243°06.2′	S 12°36.0′	261°02.7′	S 18°10.5′	327°40.2′	S 21°52.8′
9	230°04.9′	314°51.5′	S 23°21.0′	292°53.9′	S 19°38.0′	258°08.2′	S 12°35.8′	276°04.9′	S 18°10.4′	342°40.8′	S 21°53.1′
10	245°07.4′	329°51.1′	S 23°20.9′	307°57.2′	S 19°37.5′	273°10.2′	S 12°35.6′	291°07.1′	S 18°10.4′	357°41.3′	S 21°53.4′
11	260°09.9′	344°50.8′	S 23°20.9′	323°00.6′	S 19°37.1′	288°12.3′	S 12°35.5′	306°09.3′	S 18°10.3′	12°41.9′	S 21°53.7′
12	275°12.3′	359°50.5′	S 23°20.8′	338°03.9′	S 19°36.6′	303°14.3′	S 12°35.3′	321°11.5′	S 18°10.2′	27°42.5′	S 21°54.0′
13	290°14.8′	14°50.2′	S 23°20.7′	353°07.3′	S 19°36.1′	318°16.3′	S 12°35.1′	336°13.7′	S 18°10.2′	42°43.1′	S 21°54.3′
14	305°17.2′	29°49.9′	S 23°20.6′	8°10.6′	S 19°35.6′	333°18.3′	S 12°35.0′	351°15.9′	S 18°10.1′	57°43.7′	S 21°54.6′
15	320°19.7′	44°49.6′	S 23°20.5′	23°14.0′	S 19°35.1′	348°20.3′	S 12°34.8′	6°18.1′	S 18°10.0′	72°44.3′	S 21°54.9′
16	335°22.2′	59°49.3′	S 23°20.4′	38°17.3′	S 19°34.6′	3°22.4′	S 12°34.6′	21°20.3′	S 18°09.9′	87°44.9′	S 21°55.1′
17	350°24.6′	74°49.0′	S 23°20.3′	53°20.7′	S 19°34.1′	18°24.4′	S 12°34.5′	36°22.5′	S 18°09.9′	102°45.4′	S 21°55.4′
18	5°27.1′	89°48.7′	S 23°20.2′	68°24.1′	S 19°33.6′	33°26.4′	S 12°34.3′	51°24.7′	S 18°09.8′	117°46.0′	S 21°55.7′
19	20°29.6′	104°48.4′	S 23°20.1′	83°27.4′	S 19°33.2′	48°28.4′	S 12°34.1′	66°26.9′	S 18°09.7′	132°46.6′	S 21°56.0′
20	35°32.0′	119°48.1′	S 23°20.0′	98°30.8′	S 19°32.7′	63°30.4′	S 12°34.0′	81°29.1′	S 18°09.7′	147°47.2′	S 21°56.3′
21	50°34.5′	134°47.8′	S 23°19.9′	113°34.2′	S 19°32.2′	78°32.4′	S 12°33.8′	96°31.3′	S 18°09.6′	162°47.8′	S 21°56.6′
22	65°37.0′	149°47.4′	S 23°19.8′	128°37.6′	S 19°31.7′	93°34.5′	S 12°33.6′	111°33.5′	S 18°09.5′	177°48.4′	S 21°56.9′
23	80°39.4′	164°47.1′	S 23°19.7′	143°41.0′	S 19°31.2′	108°36.5′	S 12°33.4′	126°35.7′	S 18°09.5′	192°48.9′	S 21°57.2′
		SD 16.3′ *d* 0.1′		*v* 3.3′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 0 m 39 s		13 h 27 m		15 h 47 m		14 h 35 m		10 h 9 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	−Acrux	−Arcturus	−Spica	+Regulus	+Pollux	+Procyon	+Sirius
0	280°59.4′	N 8°03.0′	13.9′	-13.8′	56.7′	103°18.9′	71°58.8′	40°42.6′	33°47.2′	21°21.1′	57°13.9′	58°14.8′	75°32.6′
1	295°32.2′	N 7°49.2′	13.9′	-13.8′	56.7′	102°49.1′	71°41.9′	40°19.8′	33°15.2′	21°52.7′	57°46.3′	58°44.4′	75°55.6′
2	310°05.1′	N 7°35.4′	13.9′	-13.9′	56.7′	102°19.3′	71°25.2′	39°57.2′	32°43.3′	22°24.3′	58°18.7′	59°14.0′	76°18.7′
3	324°38.0′	N 7°21.5′	13.9′	-13.9′	56.8′	101°49.4′	71°08.5′	39°34.8′	32°11.3′	22°56.0′	58°51.1′	59°43.8′	76°41.8′
4	339°10.8′	N 7°07.6′	13.9′	-14.0′	56.8′	101°19.5′	70°51.8′	39°12.5′	31°39.3′	23°27.8′	59°23.5′	60°13.5′	77°05.0′
5	353°43.7′	N 6°53.6′	13.9′	-14.0′	56.8′	100°49.5′	70°35.2′	38°50.4′	31°07.2′	23°59.6′	59°56.0′	60°43.4′	77°28.2′
6	8°16.6′	N 6°39.6′	13.9′	-14.1′	56.8′	100°19.5′	70°18.7′	38°28.5′	30°35.2′	24°31.5′	60°28.5′	61°13.3′	77°51.5′
7	22°49.4′	N 6°25.5′	13.9′	-14.1′	56.9′	99°49.5′	70°02.2′	38°06.8′	30°03.1′	25°03.5′	61°01.1′	61°43.3′	78°14.8′
8	37°22.3′	N 6°11.4′	13.8′	-14.2′	56.9′	99°19.4′	69°45.8′	37°45.3′	29°31.0′	25°35.5′	61°33.7′	62°13.3′	78°38.2′
9	51°55.1′	N 5°57.3′	13.8′	-14.2′	56.9′	98°49.4′	69°29.5′	37°23.9′	28°58.9′	26°07.6′	62°06.3′	62°43.3′	79°01.7′
10	66°28.0′	N 5°43.1′	13.8′	-14.2′	57.0′	98°19.2′	69°13.2′	37°02.8′	28°26.8′	26°39.7′	62°39.0′	63°13.5′	79°25.2′
11	81°00.8′	N 5°28.9′	13.8′	-14.3′	57.0′	97°49.1′	68°57.0′	36°42.0′	27°54.6′	27°11.9′	63°11.7′	63°43.7′	79°48.8′
12	95°33.6′	N 5°14.6′	13.8′	-14.3′	57.0′	97°18.9′	68°40.9′	36°21.3′	27°22.5′	27°44.2′	63°44.4′	64°13.9′	80°12.4′
13	110°06.5′	N 5°00.3′	13.8′	-14.4′	57.1′	96°48.6′	68°24.9′	36°00.9′	26°50.3′	28°16.5′	64°17.2′	64°44.2′	80°36.1′
14	124°39.3′	N 4°45.9′	13.8′	-14.4′	57.1′	96°18.4′	68°08.9′	35°40.7′	26°18.1′	28°48.8′	64°50.0′	65°14.6′	80°59.8′
15	139°12.0′	N 4°31.5′	13.8′	-14.4′	57.1′	95°48.1′	67°53.0′	35°20.8′	25°46.0′	29°21.2′	65°22.9′	65°45.0′	81°23.6′
16	153°44.8′	N 4°17.1′	13.8′	-14.5′	57.2′	95°17.7′	67°37.2′	35°01.1′	25°13.8′	29°53.7′	65°55.8′	66°15.5′	81°47.4′
17	168°17.6′	N 4°02.7′	13.7′	-14.5′	57.2′	94°47.3′	67°21.5′	34°41.7′	24°41.6′	30°26.2′	66°28.7′	66°46.0′	82°11.3′
18	182°50.3′	N 3°48.2′	13.7′	-14.5′	57.2′	94°16.9′	67°05.8′	34°22.6′	24°09.4′	30°58.8′	67°01.6′	67°16.6′	82°35.2′
19	197°23.1′	N 3°33.6′	13.7′	-14.6′	57.3′	93°46.4′	66°50.3′	34°03.8′	23°37.1′	31°31.4′	67°34.6′	67°47.2′	82°59.2′
20	211°55.8′	N 3°19.1′	13.7′	-14.6′	57.3′	93°15.9′	66°34.8′	33°45.2′	23°04.9′	32°04.1′	68°07.7′	68°17.9′	83°23.2′
21	226°28.5′	N 3°04.5′	13.7′	-14.6′	57.3′	92°45.4′	66°19.4′	33°27.0′	22°32.7′	32°36.8′	68°40.8′	68°48.6′	83°47.2′
22	241°01.1′	N 2°49.9′	13.6′	-14.7′	57.4′	92°14.8′	66°04.1′	33°09.1′	22°00.5′	33°09.5′	69°13.9′	69°19.4′	84°11.3′
23	255°33.8′	N 2°35.2′	13.6′	-14.7′	57.4′	91°44.2′	65°48.9′	32°51.6′	21°28.3′	33°42.4′	69°47.0′	69°50.3′	84°35.5′
Mer. pass. 5 h 26 m SD 15.5′ phase 62%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.9′	S 63°12.9′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°50.9′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Monday 27 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	95°41.9′	179°46.8′	S 23°19.6′	158°44.4′	S 19°30.7′	123°38.5′	S 12°33.3′	141°37.9′	S 18°09.4′	207°49.5′	S 21°57.5′
1	110°44.3′	194°46.5′	S 23°19.5′	173°47.8′	S 19°30.2′	138°40.5′	S 12°33.1′	156°40.1′	S 18°09.3′	222°50.1′	S 21°57.8′
2	125°46.8′	209°46.2′	S 23°19.4′	188°51.2′	S 19°29.8′	153°42.5′	S 12°32.9′	171°42.3′	S 18°09.2′	237°50.7′	S 21°58.1′
3	140°49.3′	224°45.9′	S 23°19.2′	203°54.6′	S 19°29.3′	168°44.5′	S 12°32.8′	186°44.5′	S 18°09.2′	252°51.3′	S 21°58.4′
4	155°51.7′	239°45.6′	S 23°19.1′	218°58.0′	S 19°28.8′	183°46.6′	S 12°32.6′	201°46.7′	S 18°09.1′	267°51.9′	S 21°58.7′
5	170°54.2′	254°45.3′	S 23°19.0′	234°01.4′	S 19°28.3′	198°48.6′	S 12°32.4′	216°48.9′	S 18°09.0′	282°52.4′	S 21°58.9′
6	185°56.7′	269°45.0′	S 23°18.9′	249°04.8′	S 19°27.8′	213°50.6′	S 12°32.3′	231°51.1′	S 18°09.0′	297°53.0′	S 21°59.2′
7	200°59.1′	284°44.7′	S 23°18.8′	264°08.2′	S 19°27.3′	228°52.6′	S 12°32.1′	246°53.3′	S 18°08.9′	312°53.6′	S 21°59.5′
8	216°01.6′	299°44.4′	S 23°18.7′	279°11.7′	S 19°26.9′	243°54.6′	S 12°31.9′	261°55.5′	S 18°08.8′	327°54.2′	S 21°59.8′
9	231°04.1′	314°44.1′	S 23°18.6′	294°15.1′	S 19°26.4′	258°56.6′	S 12°31.8′	276°57.7′	S 18°08.7′	342°54.8′	S 22°00.1′
10	246°06.5′	329°43.8′	S 23°18.5′	309°18.5′	S 19°25.9′	273°58.7′	S 12°31.6′	291°59.9′	S 18°08.7′	357°55.3′	S 22°00.4′
11	261°09.0′	344°43.4′	S 23°18.4′	324°22.0′	S 19°25.4′	289°00.7′	S 12°31.4′	307°02.1′	S 18°08.6′	12°55.9′	S 22°00.7′
12	276°11.5′	359°43.1′	S 23°18.3′	339°25.4′	S 19°24.9′	304°02.7′	S 12°31.3′	322°04.3′	S 18°08.5′	27°56.5′	S 22°01.0′
13	291°13.9′	14°42.8′	S 23°18.1′	354°28.9′	S 19°24.5′	319°04.7′	S 12°31.1′	337°06.5′	S 18°08.4′	42°57.1′	S 22°01.3′
14	306°16.4′	29°42.5′	S 23°18.0′	9°32.3′	S 19°24.0′	334°06.7′	S 12°30.9′	352°08.7′	S 18°08.4′	57°57.7′	S 22°01.5′
15	321°18.8′	44°42.2′	S 23°17.9′	24°35.8′	S 19°23.5′	349°08.7′	S 12°30.8′	7°10.9′	S 18°08.3′	72°58.2′	S 22°01.8′
16	336°21.3′	59°41.9′	S 23°17.8′	39°39.2′	S 19°23.0′	4°10.7′	S 12°30.6′	22°13.1′	S 18°08.2′	87°58.8′	S 22°02.1′
17	351°23.8′	74°41.6′	S 23°17.7′	54°42.7′	S 19°22.5′	19°12.8′	S 12°30.4′	37°15.3′	S 18°08.2′	102°59.4′	S 22°02.4′
18	6°26.2′	89°41.3′	S 23°17.6′	69°46.2′	S 19°22.1′	34°14.8′	S 12°30.3′	52°17.5′	S 18°08.1′	117°60.0′	S 22°02.7′
19	21°28.7′	104°41.0′	S 23°17.4′	84°49.7′	S 19°21.6′	49°16.8′	S 12°30.1′	67°19.7′	S 18°08.0′	133°00.6′	S 22°03.0′
20	36°31.2′	119°40.7′	S 23°17.3′	99°53.1′	S 19°21.1′	64°18.8′	S 12°29.9′	82°21.9′	S 18°07.9′	148°01.1′	S 22°03.3′
21	51°33.6′	134°40.4′	S 23°17.2′	114°56.6′	S 19°20.6′	79°20.8′	S 12°29.7′	97°24.1′	S 18°07.9′	163°01.7′	S 22°03.5′
22	66°36.1′	149°40.1′	S 23°17.1′	130°00.1′	S 19°20.1′	94°22.8′	S 12°29.6′	112°26.3′	S 18°07.8′	178°02.3′	S 22°03.8′
23	81°38.6′	164°39.8′	S 23°16.9′	145°03.6′	S 19°19.7′	109°24.8′	S 12°29.4′	127°28.5′	S 18°07.7′	193°02.9′	S 22°04.1′
		SD 16.3′ *d* 0.1′		*v* 3.4′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 1 m 9 s		13 h 22 m		15 h 43 m		14 h 31 m		10 h 8 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	−Mars	−Arcturus	−Spica	+Regulus	+Pollux	+Procyon	+Adhara
0	270°06.4′	N 2°20.5′	13.6′	-14.7′	57.4′	91°13.6′	65°26.0′	32°34.3′	20°56.2′	34°15.2′	70°20.2′	70°21.2′	83°02.4′
1	284°39.0′	N 2°05.8′	13.6′	-14.7′	57.5′	90°42.9′	64°54.5′	32°17.4′	20°24.0′	34°48.1′	70°53.5′	70°52.1′	83°21.1′
2	299°11.6′	N 1°51.1′	13.5′	-14.8′	57.5′	90°12.2′	64°23.0′	32°00.9′	19°51.9′	35°21.1′	71°26.7′	71°23.1′	83°39.8′
3	313°44.1′	N 1°36.3′	13.5′	-14.8′	57.5′	89°41.4′	63°51.4′	31°44.8′	19°19.7′	35°54.1′	72°00.1′	71°54.2′	83°58.6′
4	328°16.6′	N 1°21.5′	13.5′	-14.8′	57.6′	89°10.6′	63°19.7′	31°29.0′	18°47.7′	36°27.2′	72°33.4′	72°25.3′	84°17.5′
5	342°49.1′	N 1°06.7′	13.5′	-14.8′	57.6′	88°39.7′	62°48.1′		18°15.6′	37°00.3′	73°06.8′	72°56.4′	84°36.4′
6	357°21.6′	N 0°51.9′	13.4′	-14.9′	57.6′	88°08.9′	62°16.4′		17°43.6′	37°33.4′	73°40.2′	73°27.6′	84°55.3′
7	11°54.0′	N 0°37.0′	13.4′	-14.9′	57.7′	87°37.9′	61°44.6′		17°11.6′	38°06.7′	74°13.7′	73°58.9′	85°14.3′
8	26°26.4′	N 0°22.1′	13.4′	-14.9′	57.7′	87°07.0′	61°12.9′		16°39.8′	38°39.9′	74°47.2′	74°30.2′	85°33.3′
9	40°58.7′	N 0°07.2′	13.3′	-14.9′	57.7′	86°36.0′	60°41.0′		16°07.9′	39°13.2′	75°20.8′	75°01.5′	85°52.4′
10	55°31.1′	S 0°07.7′	13.3′	-14.9′	57.8′	86°04.9′	60°09.2′		15°36.2′	39°46.6′	75°54.4′	75°32.9′	86°11.5′
11	70°03.3′	S 0°22.6′	13.2′	-15.0′	57.8′	85°33.8′	59°37.3′		15°04.5′	40°19.9′	76°28.0′	76°04.4′	86°30.6′
12	84°35.6′	S 0°37.6′	13.2′	-15.0′	57.9′	85°02.7′	59°05.3′		14°33.0′	40°53.4′	77°01.7′	76°35.9′	86°49.8′
13	99°07.8′	S 0°52.5′	13.2′	-15.0′	57.9′	84°31.5′	58°33.3′		14°01.6′	41°26.9′	77°35.4′	77°07.4′	87°09.0′
14	113°39.9′	S 1°07.5′	13.1′	-15.0′	57.9′	84°00.3′	58°01.3′		13°30.3′	42°00.4′	78°09.2′	77°39.0′	87°28.2′
15	128°12.1′	S 1°22.5′	13.1′	-15.0′	58.0′	83°29.1′	57°29.2′		12°59.2′	42°34.0′	78°43.0′	78°10.7′	87°47.5′
16	142°44.1′	S 1°37.5′	13.0′	-15.0′	58.0′	82°57.8′	56°57.1′		12°28.3′	43°07.6′	79°16.8′	78°42.4′	88°06.8′
17	157°16.2′	S 1°52.5′	13.0′	-15.0′	58.0′	82°26.4′	56°25.0′		11°57.7′	43°41.3′	79°50.7′	79°14.1′	88°26.1′
18	171°48.2′	S 2°07.5′	12.9′	-15.0′	58.1′	81°55.1′	55°52.8′		11°27.2′	44°15.0′	80°24.7′	79°45.9′	88°45.5′
19	186°20.1′	S 2°22.6′	12.9′	-15.0′	58.1′	81°23.6′	55°20.5′		10°57.1′	44°48.8′	80°58.6′	80°17.7′	89°04.9′
20	200°52.0′	S 2°37.6′	12.8′	-15.0′	58.1′	80°52.2′	54°48.2′		10°27.4′	45°22.6′	81°32.7′	80°49.6′	89°24.3′
21	215°23.8′	S 2°52.7′	12.8′	-15.1′	58.2′	80°20.7′	54°15.9′		9°58.1′	45°56.5′	82°06.7′	81°21.6′	89°43.8′
22	229°55.6′	S 3°07.7′	12.7′	-15.1′	58.2′	79°49.1′	53°43.6′		9°29.2′	46°30.4′	82°40.8′	81°53.5′	90°03.3′
23	244°27.3′	S 3°22.8′	12.7′	-15.1′	58.2′	79°17.5′	53°11.2′		9°01.0′	47°04.4′	83°15.0′	82°25.6′	90°22.8′
Mer. pass. 6 h 11 m SD 15.7′ phase 51%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.8′	S 63°12.9′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°51.3′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Tuesday 28 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	96°41.0′	179°39.5′	S 23°16.8′	160°07.1′	S 19°19.2′	124°26.9′	S 12°29.2′	142°30.7′	S 18°07.7′	208°03.5′	S 22°04.4′
1	111°43.5′	194°39.2′	S 23°16.7′	175°10.6′	S 19°18.7′	139°28.9′	S 12°29.1′	157°32.9′	S 18°07.6′	223°04.0′	S 22°04.7′
2	126°46.0′	209°38.9′	S 23°16.6′	190°14.1′	S 19°18.2′	154°30.9′	S 12°28.9′	172°35.1′	S 18°07.5′	238°04.6′	S 22°05.0′
3	141°48.4′	224°38.5′	S 23°16.4′	205°17.6′	S 19°17.8′	169°32.9′	S 12°28.7′	187°37.3′	S 18°07.4′	253°05.2′	S 22°05.2′
4	156°50.9′	239°38.2′	S 23°16.3′	220°21.1′	S 19°17.3′	184°34.9′	S 12°28.6′	202°39.5′	S 18°07.4′	268°05.8′	S 22°05.5′
5	171°53.3′	254°37.9′	S 23°16.2′	235°24.6′	S 19°16.8′	199°36.9′	S 12°28.4′	217°41.7′	S 18°07.3′	283°06.3′	S 22°05.8′
6	186°55.8′	269°37.6′	S 23°16.1′	250°28.1′	S 19°16.3′	214°38.9′	S 12°28.2′	232°43.9′	S 18°07.2′	298°06.9′	S 22°06.1′
7	201°58.3′	284°37.3′	S 23°15.9′	265°31.7′	S 19°15.9′	229°40.9′	S 12°28.1′	247°46.1′	S 18°07.2′	313°07.5′	S 22°06.4′
8	217°00.7′	299°37.0′	S 23°15.8′	280°35.2′	S 19°15.4′	244°42.9′	S 12°27.9′	262°48.2′	S 18°07.1′	328°08.1′	S 22°06.7′
9	232°03.2′	314°36.7′	S 23°15.7′	295°38.7′	S 19°14.9′	259°45.0′	S 12°27.7′	277°50.4′	S 18°07.0′	343°08.6′	S 22°06.9′
10	247°05.7′	329°36.4′	S 23°15.5′	310°42.2′	S 19°14.4′	274°47.0′	S 12°27.5′	292°52.6′	S 18°06.9′	358°09.2′	S 22°07.2′
11	262°08.1′	344°36.1′	S 23°15.4′	325°45.8′	S 19°14.0′	289°49.0′	S 12°27.4′	307°54.8′	S 18°06.9′	13°09.8′	S 22°07.5′
12	277°10.6′	359°35.8′	S 23°15.3′	340°49.3′	S 19°13.5′	304°51.0′	S 12°27.2′	322°57.0′	S 18°06.8′	28°10.4′	S 22°07.8′
13	292°13.1′	14°35.5′	S 23°15.1′	355°52.9′	S 19°13.0′	319°53.0′	S 12°27.0′	337°59.2′	S 18°06.7′	43°10.9′	S 22°08.1′
14	307°15.5′	29°35.2′	S 23°15.0′	10°56.4′	S 19°12.5′	334°55.0′	S 12°26.9′	353°01.4′	S 18°06.7′	58°11.5′	S 22°08.3′
15	322°18.0′	44°34.9′	S 23°14.9′	25°60.0′	S 19°12.1′	349°57.0′	S 12°26.7′	8°03.6′	S 18°06.6′	73°12.1′	S 22°08.6′
16	337°20.4′	59°34.6′	S 23°14.7′	41°03.5′	S 19°11.6′	4°59.0′	S 12°26.5′	23°05.8′	S 18°06.5′	88°12.7′	S 22°08.9′
17	352°22.9′	74°34.3′	S 23°14.6′	56°07.1′	S 19°11.1′	20°01.0′	S 12°26.3′	38°08.0′	S 18°06.4′	103°13.2′	S 22°09.2′
18	7°25.4′	89°34.0′	S 23°14.5′	71°10.7′	S 19°10.7′	35°03.1′	S 12°26.2′	53°10.2′	S 18°06.4′	118°13.8′	S 22°09.4′
19	22°27.8′	104°33.7′	S 23°14.3′	86°14.2′	S 19°10.2′	50°05.1′	S 12°26.0′	68°12.4′	S 18°06.3′	133°14.4′	S 22°09.7′
20	37°30.3′	119°33.4′	S 23°14.2′	101°17.8′	S 19°09.7′	65°07.1′	S 12°25.8′	83°14.6′	S 18°06.2′	148°15.0′	S 22°10.0′
21	52°32.8′	134°33.1′	S 23°14.0′	116°21.4′	S 19°09.2′	80°09.1′	S 12°25.7′	98°16.8′	S 18°06.1′	163°15.5′	S 22°10.3′
22	67°35.2′	149°32.7′	S 23°13.9′	131°25.0′	S 19°08.8′	95°11.1′	S 12°25.5′	113°19.0′	S 18°06.1′	178°16.1′	S 22°10.5′
23	82°37.7′	164°32.4′	S 23°13.8′	146°28.6′	S 19°08.3′	110°13.1′	S 12°25.3′	128°21.2′	S 18°06.0′	193°16.7′	S 22°10.8′
		SD 16.3′ *d* 0.1′		*v* 3.5′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 1 m 38 s		13 h 16 m		15 h 40 m		14 h 28 m		10 h 7 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	−Hadar	−Antares	−Mars	+Regulus	+Procyon	+Pollux	+Adhara
0	258°59.0′	S 3°37.8′	12.6′	-15.1′	58.3′	78°45.9′	57°47.2′	52°56.2′	52°38.7′	47°38.4′	82°57.6′	83°49.2′	90°42.3′
1	273°30.6′	S 3°52.9′	12.6′	-15.1′	58.3′	78°14.2′	57°28.1′	52°22.1′	52°06.2′	48°12.4′	83°29.7′	84°23.4′	91°01.9′
2	288°02.2′	S 4°08.0′	12.5′	-15.1′	58.3′	77°42.5′	57°09.1′	51°47.9′	51°33.7′	48°46.5′	84°01.9′	84°57.7′	91°21.4′
3	302°33.7′	S 4°23.0′	12.4′	-15.1′	58.4′	77°10.8′	56°50.3′	51°13.7′	51°01.1′	49°20.7′	84°34.1′	85°32.0′	91°41.0′
4	317°05.1′	S 4°38.1′	12.4′	-15.1′	58.4′	76°39.0′	56°31.6′	50°39.4′	50°28.5′	49°54.8′	85°06.3′	86°06.3′	92°00.6′
5	331°36.5′	S 4°53.1′	12.3′	-15.0′	58.5′	76°07.1′	56°13.1′	50°05.1′	49°55.8′	50°29.1′	85°38.6′	86°40.7′	92°20.2′
6	346°07.8′	S 5°08.2′	12.3′	-15.0′	58.5′	75°35.2′	55°54.7′	49°30.7′	49°23.1′	51°03.4′	86°11.0′	87°15.2′	92°39.9′
7	0°39.1′	S 5°23.2′	12.2′	-15.0′	58.5′	75°03.3′	55°36.4′	48°56.3′	48°50.3′	51°37.7′	86°43.4′	87°49.7′	92°59.5′
8	15°10.3′	S 5°38.3′	12.1′	-15.0′	58.6′	74°31.3′	55°18.3′	48°21.9′	48°17.5′	52°12.1′	87°15.8′	88°24.2′	93°19.2′
9	29°41.4′	S 5°53.3′	12.1′	-15.0′	58.6′	73°59.3′	55°00.3′	47°47.4′	47°44.7′	52°46.5′	87°48.2′	88°58.8′	93°38.9′
10	44°12.5′	S 6°08.3′	12.0′	-15.0′	58.6′	73°27.2′	54°42.5′	47°12.9′	47°11.8′	53°21.0′	88°20.8′	89°33.4′	93°58.6′
11	58°43.5′	S 6°23.3′	11.9′	-15.0′	58.7′	72°55.1′	54°24.9′	46°38.3′	46°38.9′	53°55.5′	88°53.3′	90°08.1′	94°18.2′
12	73°14.4′	S 6°38.3′	11.8′	-15.0′	58.7′	72°23.0′	54°07.4′	46°03.7′	46°05.9′	54°30.1′	89°25.9′	90°42.8′	94°37.9′
13	87°45.2′	S 6°53.3′	11.8′	-15.0′	58.7′	71°50.8′	53°50.1′	45°29.1′	45°32.9′	55°04.7′	89°58.5′	91°17.5′	94°57.7′
14	102°16.0′	S 7°08.2′	11.7′	-14.9′	58.8′	71°18.6′	53°32.9′	44°54.4′	44°59.9′	55°39.3′	90°31.2′	91°52.3′	95°17.4′
15	116°46.7′	S 7°23.2′	11.6′	-14.9′	58.8′	70°46.3′	53°16.0′	44°19.7′	44°26.8′	56°14.0′	91°03.9′	92°27.2′	95°37.1′
16	131°17.3′	S 7°38.1′	11.5′	-14.9′	58.8′	70°14.0′	52°59.2′	43°44.9′	43°53.6′	56°48.8′	91°36.7′	93°02.1′	95°56.8′
17	145°47.9′	S 7°53.0′	11.5′	-14.9′	58.9′	69°41.6′	52°42.6′	43°10.1′	43°20.4′	57°23.6′	92°09.5′	93°37.0′	96°16.5′
18	160°18.3′	S 8°07.9′	11.4′	-14.9′	58.9′	69°09.2′	52°26.2′	42°35.3′	42°47.2′	57°58.4′	92°42.3′	94°12.0′	96°36.2′
19	174°48.7′	S 8°22.8′	11.3′	-14.8′	59.0′	68°36.7′	52°10.0′	42°00.4′	42°13.9′	58°33.3′	93°15.2′	94°47.0′	96°55.9′
20	189°19.0′	S 8°37.6′	11.2′	-14.8′	59.0′	68°04.3′	51°54.0′	41°25.5′	41°40.6′	59°08.2′	93°48.1′	95°22.0′	97°15.6′
21	203°49.2′	S 8°52.4′	11.1′	-14.8′	59.0′	67°31.7′	51°38.2′	40°50.5′	41°07.2′	59°43.2′	94°21.1′	95°57.1′	97°35.3′
22	218°19.4′	S 9°07.2′	11.1′	-14.8′	59.1′	66°59.1′	51°22.6′	40°15.5′	40°33.8′	60°18.2′	94°54.1′	96°32.3′	97°55.0′
23	232°49.4′	S 9°21.9′	11.0′	-14.7′	59.1′	66°26.5′	51°07.2′	39°40.4′	40°00.4′	60°53.3′	95°27.1′	97°07.5′	98°14.7′
Mer. pass. 6 h 57 m SD 15.9′ phase 40%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.8′	S 63°12.9′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.6′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°51.6′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.1′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Wednesday 29 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	97°40.2′	179°32.1′	S 23°13.6′	161°32.1′	S 19°07.8′	125°15.1′	S 12°25.2′	143°23.4′	S 18°05.9′	208°17.3′	S 22°11.1′
1	112°42.6′	194°31.8′	S 23°13.5′	176°35.7′	S 19°07.4′	140°17.1′	S 12°25.0′	158°25.6′	S 18°05.9′	223°17.8′	S 22°11.4′
2	127°45.1′	209°31.5′	S 23°13.3′	191°39.3′	S 19°06.9′	155°19.1′	S 12°24.8′	173°27.8′	S 18°05.8′	238°18.4′	S 22°11.6′
3	142°47.6′	224°31.2′	S 23°13.2′	206°42.9′	S 19°06.4′	170°21.1′	S 12°24.6′	188°30.0′	S 18°05.7′	253°19.0′	S 22°11.9′
4	157°50.0′	239°30.9′	S 23°13.0′	221°46.5′	S 19°06.0′	185°23.1′	S 12°24.5′	203°32.2′	S 18°05.6′	268°19.6′	S 22°12.2′
5	172°52.5′	254°30.6′	S 23°12.9′	236°50.1′	S 19°05.5′	200°25.2′	S 12°24.3′	218°34.4′	S 18°05.6′	283°20.1′	S 22°12.5′
6	187°54.9′	269°30.3′	S 23°12.7′	251°53.8′	S 19°05.0′	215°27.2′	S 12°24.1′	233°36.6′	S 18°05.5′	298°20.7′	S 22°12.7′
7	202°57.4′	284°30.0′	S 23°12.6′	266°57.4′	S 19°04.6′	230°29.2′	S 12°24.0′	248°38.8′	S 18°05.4′	313°21.3′	S 22°13.0′
8	217°59.9′	299°29.7′	S 23°12.4′	282°01.0′	S 19°04.1′	245°31.2′	S 12°23.8′	263°41.0′	S 18°05.3′	328°21.8′	S 22°13.3′
9	233°02.3′	314°29.4′	S 23°12.3′	297°04.6′	S 19°03.6′	260°33.2′	S 12°23.6′	278°43.2′	S 18°05.3′	343°22.4′	S 22°13.6′
10	248°04.8′	329°29.1′	S 23°12.1′	312°08.2′	S 19°03.2′	275°35.2′	S 12°23.4′	293°45.4′	S 18°05.2′	358°23.0′	S 22°13.8′
11	263°07.3′	344°28.8′	S 23°12.0′	327°11.9′	S 19°02.7′	290°37.2′	S 12°23.3′	308°47.5′	S 18°05.1′	13°23.6′	S 22°14.1′
12	278°09.7′	359°28.5′	S 23°11.8′	342°15.5′	S 19°02.2′	305°39.2′	S 12°23.1′	323°49.7′	S 18°05.1′	28°24.1′	S 22°14.4′
13	293°12.2′	14°28.2′	S 23°11.7′	357°19.2′	S 19°01.8′	320°41.2′	S 12°22.9′	338°51.9′	S 18°05.0′	43°24.7′	S 22°14.6′
14	308°14.7′	29°27.9′	S 23°11.5′	12°22.8′	S 19°01.3′	335°43.2′	S 12°22.8′	353°54.1′	S 18°04.9′	58°25.3′	S 22°14.9′
15	323°17.1′	44°27.6′	S 23°11.4′	27°26.4′	S 19°00.8′	350°45.2′	S 12°22.6′	8°56.3′	S 18°04.8′	73°25.8′	S 22°15.2′
16	338°19.6′	59°27.3′	S 23°11.2′	42°30.1′	S 19°00.4′	5°47.2′	S 12°22.4′	23°58.5′	S 18°04.8′	88°26.4′	S 22°15.5′
17	353°22.1′	74°27.0′	S 23°11.1′	57°33.7′	S 18°59.9′	20°49.2′	S 12°22.2′	39°00.7′	S 18°04.7′	103°27.0′	S 22°15.7′
18	8°24.5′	89°26.7′	S 23°10.9′	72°37.4′	S 18°59.5′	35°51.2′	S 12°22.1′	54°02.9′	S 18°04.6′	118°27.6′	S 22°16.0′
19	23°27.0′	104°26.4′	S 23°10.7′	87°41.1′	S 18°59.0′	50°53.3′	S 12°21.9′	69°05.1′	S 18°04.5′	133°28.1′	S 22°16.3′
20	38°29.4′	119°26.1′	S 23°10.6′	102°44.7′	S 18°58.5′	65°55.3′	S 12°21.7′	84°07.3′	S 18°04.5′	148°28.7′	S 22°16.5′
21	53°31.9′	134°25.8′	S 23°10.4′	117°48.4′	S 18°58.1′	80°57.3′	S 12°21.5′	99°09.5′	S 18°04.4′	163°29.3′	S 22°16.8′
22	68°34.4′	149°25.5′	S 23°10.3′	132°52.1′	S 18°57.6′	95°59.3′	S 12°21.4′	114°11.7′	S 18°04.3′	178°29.8′	S 22°17.1′
23	83°36.8′	164°25.2′	S 23°10.1′	147°55.7′	S 18°57.1′	111°01.3′	S 12°21.2′	129°13.9′	S 18°04.3′	193°30.4′	S 22°17.3′
		SD 16.3′ *d* 0.2′		*v* 3.6′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 2 m 7 s		13 h 11 m		15 h 37 m		14 h 24 m		10 h 6 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	−Rigil Kent	−Mars	−Antares	+Spica	+Arcturus	+Regulus	+Procyon
0	247°19.4′	S 9°36.7′	10.9′	-14.7′	59.1′	65°53.8′	51°50.0′	39°26.9′	39°05.4′			61°28.4′	96°00.2′
1	261°49.3′	S 9°51.3′	10.8′	-14.7′	59.2′	65°21.1′	51°32.0′	38°53.3′	38°30.2′	9°15.4′		62°03.6′	96°33.3′
2	276°19.1′	S 10°06.0′	10.7′	-14.6′	59.2′	64°48.4′	51°14.3′	38°19.8′	37°55.1′	9°45.0′		62°38.8′	97°06.4′
3	290°48.8′	S 10°20.6′	10.6′	-14.6′	59.2′	64°15.6′	50°56.7′	37°46.1′	37°19.9′	10°15.2′		63°14.0′	97°39.6′
4	305°18.4′	S 10°35.2′	10.5′	-14.5′	59.3′	63°42.8′	50°39.4′	37°12.5′	36°44.6′	10°46.0′		63°49.3′	98°12.8′
5	319°47.9′	S 10°49.7′	10.4′	-14.5′	59.3′	63°09.9′	50°22.2′	36°38.8′	36°09.4′	11°17.3′		64°24.7′	98°46.0′
6	334°17.3′	S 11°04.2′	10.3′	-14.5′	59.3′	62°37.0′	50°05.3′	36°05.0′	35°34.0′	11°49.0′		65°00.0′	99°19.3′
7	348°46.6′	S 11°18.7′	10.2′	-14.4′	59.4′	62°04.0′	49°48.6′	35°31.2′	34°58.7′	12°21.1′		65°35.5′	99°52.6′
8	3°15.9′	S 11°33.1′	10.1′	-14.4′	59.4′	61°31.0′	49°32.1′	34°57.4′	34°23.3′	12°53.5′	30°37.5′	66°10.9′	100°26.0′
9	17°45.0′	S 11°47.5′	10.0′	-14.3′	59.4′	60°57.9′	49°15.9′	34°23.5′	33°47.9′	13°26.3′	30°52.7′	66°46.5′	100°59.4′
10	32°14.0′	S 12°01.8′	9.9′	-14.3′	59.5′	60°24.8′	48°59.8′	33°49.6′	33°12.4′	13°59.3′	31°08.5′	67°22.0′	101°32.8′
11	46°43.0′	S 12°16.1′	9.8′	-14.2′	59.5′	59°51.7′	48°44.1′	33°15.6′	32°36.9′	14°32.5′	31°24.8′	67°57.6′	102°06.2′
12	61°11.8′	S 12°30.3′	9.7′	-14.2′	59.5′	59°18.5′	48°28.5′	32°41.6′	32°01.4′	15°06.0′	31°41.6′	68°33.3′	102°39.7′
13	75°40.5′	S 12°44.5′	9.6′	-14.1′	59.6′	58°45.3′	48°13.2′	32°07.5′	31°25.9′	15°39.7′	31°58.9′	69°09.0′	103°13.2′
14	90°09.2′	S 12°58.6′	9.5′	-14.1′	59.6′	58°12.0′		31°33.4′	30°50.3′	16°13.6′	32°16.6′	69°44.7′	103°46.7′
15	104°37.7′	S 13°12.6′	9.4′	-14.0′	59.6′	57°38.7′		30°59.3′	30°14.7′	16°47.7′	32°34.8′	70°20.5′	104°20.2′
16	119°06.1′	S 13°26.6′	9.3′	-13.9′	59.7′	57°05.4′		30°25.1′	29°39.0′	17°21.9′	32°53.5′	70°56.3′	104°53.8′
17	133°34.4′	S 13°40.6′	9.2′	-13.9′	59.7′	56°32.0′		29°50.9′	29°03.3′	17°56.2′	33°12.6′	71°32.2′	105°27.4′
18	148°02.6′	S 13°54.4′	9.1′	-13.8′	59.7′	55°58.6′		29°16.6′	28°27.6′	18°30.8′	33°32.2′	72°08.1′	106°01.1′
19	162°30.7′	S 14°08.3′	9.0′	-13.7′	59.8′	55°25.1′		28°42.3′	27°51.9′	19°05.4′	33°52.2′	72°44.1′	106°34.7′
20	176°58.7′	S 14°22.0′	8.9′	-13.7′	59.8′	54°51.6′		28°08.0′	27°16.1′	19°40.2′	34°12.5′	73°20.1′	107°08.4′
21	191°26.6′	S 14°35.7′	8.8′	-13.6′	59.8′	54°18.1′		27°33.6′	26°40.3′	20°15.0′	34°33.3′	73°56.1′	107°42.1′
22	205°54.4′	S 14°49.3′	8.7′	-13.5′	59.9′	53°44.5′		26°59.2′	26°04.5′	20°50.0′	34°54.5′	74°32.2′	108°15.9′
23	220°22.0′	S 15°02.8′	8.5′	-13.5′	59.9′	53°10.9′		26°24.7′	25°28.7′	21°25.1′	35°16.1′	75°08.3′	108°49.6′
Mer. pass. 7 h 47 m SD 16.1′ phase 30%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.8′	S 63°12.9′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.7′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°52.0′	N 89°21.6′
Rigil Kent	−0.0	139°44.1′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.0′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Thursday 30 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	98°39.3′	179°24.9′	S 23°09.9′	162°59.4′	S 18°56.7′	126°03.3′	S 12°21.0′	144°16.1′	S 18°04.2′	208°31.0′	S 22°17.6′
1	113°41.8′	194°24.6′	S 23°09.8′	178°03.1′	S 18°56.2′	141°05.3′	S 12°20.9′	159°18.3′	S 18°04.1′	223°31.5′	S 22°17.9′
2	128°44.2′	209°24.3′	S 23°09.6′	193°06.8′	S 18°55.8′	156°07.3′	S 12°20.7′	174°20.5′	S 18°04.0′	238°32.1′	S 22°18.1′
3	143°46.7′	224°24.0′	S 23°09.5′	208°10.5′	S 18°55.3′	171°09.3′	S 12°20.5′	189°22.7′	S 18°04.0′	253°32.7′	S 22°18.4′
4	158°49.2′	239°23.6′	S 23°09.3′	223°14.2′	S 18°54.8′	186°11.3′	S 12°20.3′	204°24.9′	S 18°03.9′	268°33.2′	S 22°18.7′
5	173°51.6′	254°23.3′	S 23°09.1′	238°17.9′	S 18°54.4′	201°13.3′	S 12°20.2′	219°27.0′	S 18°03.8′	283°33.8′	S 22°18.9′
6	188°54.1′	269°23.0′	S 23°09.0′	253°21.6′	S 18°53.9′	216°15.3′	S 12°20.0′	234°29.2′	S 18°03.7′	298°34.4′	S 22°19.2′
7	203°56.6′	284°22.7′	S 23°08.8′	268°25.3′	S 18°53.5′	231°17.3′	S 12°19.8′	249°31.4′	S 18°03.7′	313°34.9′	S 22°19.5′
8	218°59.0′	299°22.4′	S 23°08.6′	283°29.0′	S 18°53.0′	246°19.3′	S 12°19.6′	264°33.6′	S 18°03.6′	328°35.5′	S 22°19.7′
9	234°01.5′	314°22.1′	S 23°08.4′	298°32.7′	S 18°52.6′	261°21.3′	S 12°19.5′	279°35.8′	S 18°03.5′	343°36.1′	S 22°20.0′
10	249°03.9′	329°21.8′	S 23°08.3′	313°36.4′	S 18°52.1′	276°23.3′	S 12°19.3′	294°38.0′	S 18°03.4′	358°36.6′	S 22°20.3′
11	264°06.4′	344°21.5′	S 23°08.1′	328°40.1′	S 18°51.6′	291°25.3′	S 12°19.1′	309°40.2′	S 18°03.4′	13°37.2′	S 22°20.5′
12	279°08.9′	359°21.2′	S 23°07.9′	343°43.8′	S 18°51.2′	306°27.3′	S 12°19.0′	324°42.4′	S 18°03.3′	28°37.8′	S 22°20.8′
13	294°11.3′	14°20.9′	S 23°07.8′	358°47.6′	S 18°50.7′	321°29.3′	S 12°18.8′	339°44.6′	S 18°03.2′	43°38.3′	S 22°21.0′
14	309°13.8′	29°20.6′	S 23°07.6′	13°51.3′	S 18°50.3′	336°31.3′	S 12°18.6′	354°46.8′	S 18°03.1′	58°38.9′	S 22°21.3′
15	324°16.3′	44°20.3′	S 23°07.4′	28°55.0′	S 18°49.8′	351°33.3′	S 12°18.4′	9°49.0′	S 18°03.1′	73°39.5′	S 22°21.6′
16	339°18.7′	59°20.0′	S 23°07.2′	43°58.8′	S 18°49.4′	6°35.3′	S 12°18.3′	24°51.2′	S 18°03.0′	88°40.0′	S 22°21.8′
17	354°21.2′	74°19.7′	S 23°07.1′	59°02.5′	S 18°48.9′	21°37.3′	S 12°18.1′	39°53.4′	S 18°02.9′	103°40.6′	S 22°22.1′
18	9°23.7′	89°19.4′	S 23°06.9′	74°06.2′	S 18°48.5′	36°39.4′	S 12°17.9′	54°55.6′	S 18°02.9′	118°41.2′	S 22°22.3′
19	24°26.1′	104°19.1′	S 23°06.7′	89°10.0′	S 18°48.0′	51°41.4′	S 12°17.7′	69°57.8′	S 18°02.8′	133°41.7′	S 22°22.6′
20	39°28.6′	119°18.8′	S 23°06.5′	104°13.7′	S 18°47.5′	66°43.4′	S 12°17.6′	84°59.9′	S 18°02.7′	148°42.3′	S 22°22.9′
21	54°31.0′	134°18.5′	S 23°06.3′	119°17.5′	S 18°47.1′	81°45.4′	S 12°17.4′	100°02.1′	S 18°02.6′	163°42.9′	S 22°23.1′
22	69°33.5′	149°18.2′	S 23°06.2′	134°21.2′	S 18°46.6′	96°47.4′	S 12°17.2′	115°04.3′	S 18°02.6′	178°43.4′	S 22°23.4′
23	84°36.0′	164°17.9′	S 23°06.0′	149°25.0′	S 18°46.2′	111°49.4′	S 12°17.0′	130°06.5′	S 18°02.5′	193°44.0′	S 22°23.6′
		SD 16.3′ *d* 0.2′		*v* 3.7′ *d* 0.5′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 2 m 36 s		13 h 5 m		15 h 34 m		14 h 21 m		10 h 6 m	

h	Moon					Lunar distance							
	GHA	dec	*v*	*d*	HP	−Sun	−Mars	−Antares	+Spica	+Arcturus	+Regulus	+Adhara	+Procyon
0	234°49.6′	S 15°16.3′	8.4′	-13.4′	59.9′	52°37.2′	25°50.2′	24°52.8′	22°00.3′	35°38.0′	75°44.5′	106°18.3′	109°23.4′
1	249°17.0′	S 15°29.7′	8.3′	-13.3′	60.0′	52°03.5′	25°15.7′	24°16.9′	22°35.6′	36°00.3′	76°20.7′	106°37.0′	109°57.2′
2	263°44.3′	S 15°43.0′	8.2′	-13.2′	60.0′	51°29.8′	24°41.1′	23°41.0′	23°11.0′	36°22.9′	76°56.9′	106°55.7′	110°31.0′
3	278°11.5′	S 15°56.2′	8.1′	-13.1′	60.0′	50°56.0′	24°06.5′	23°05.1′	23°46.5′	36°45.9′	77°33.2′	107°14.4′	111°04.8′
4	292°38.6′	S 16°09.4′	8.0′	-13.1′	60.1′	50°22.2′	23°31.8′	22°29.2′	24°22.0′	37°09.2′	78°09.5′	107°32.9′	111°38.6′
5	307°05.5′	S 16°22.4′	7.9′	-13.0′	60.1′	49°48.3′	22°57.1′	21°53.2′	24°57.6′	37°32.8′	78°45.9′	107°51.5′	112°12.5′
6	321°32.4′	S 16°35.4′	7.7′	-12.9′	60.1′	49°14.5′	22°22.4′	21°17.3′	25°33.3′	37°56.8′	79°22.3′	108°09.9′	112°46.4′
7	335°59.1′	S 16°48.3′	7.6′	-12.8′	60.1′	48°40.5′	21°47.6′	20°41.3′	26°09.1′	38°21.1′	79°58.7′	108°28.2′	113°20.3′
8	350°25.7′	S 17°01.1′	7.5′	-12.7′	60.2′	48°06.6′	21°12.8′	20°05.4′	26°45.0′	38°45.6′	80°35.2′	108°46.5′	113°54.2′
9	4°52.2′	S 17°13.8′	7.4′	-12.6′	60.2′	47°32.6′	20°38.0′	19°29.4′	27°20.9′	39°10.5′	81°11.7′	109°04.7′	114°28.1′
10	19°18.6′	S 17°26.4′	7.3′	-12.5′	60.2′	46°58.5′	20°03.1′	18°53.5′	27°56.9′	39°35.6′	81°48.3′	109°22.8′	115°02.0′
11	33°44.9′	S 17°38.9′	7.1′	-12.4′	60.3′	46°24.5′	19°28.2′	18°17.5′	28°32.9′	40°01.0′	82°24.9′	109°40.9′	115°35.9′
12	48°11.0′	S 17°51.4′	7.0′	-12.3′	60.3′	45°50.4′	18°53.2′	17°41.6′	29°09.0′	40°26.7′	83°01.5′	109°58.8′	116°09.8′
13	62°37.0′	S 18°03.7′	6.9′	-12.2′	60.3′	45°16.2′	18°18.3′	17°05.7′	29°45.2′	40°52.6′	83°38.2′	110°16.6′	116°43.8′
14	77°02.9′	S 18°15.9′	6.8′	-12.1′	60.3′	44°42.1′	17°43.2′	16°29.8′	30°21.4′	41°18.8′	84°14.9′	110°34.4′	117°17.7′
15	91°28.7′	S 18°28.0′	6.7′	-12.0′	60.4′	44°07.9′	17°08.2′	15°54.0′	30°57.7′	41°45.3′	84°51.6′	110°52.0′	117°51.6′
16	105°54.3′	S 18°40.0′	6.5′	-11.9′	60.4′	43°33.6′	16°33.1′	15°18.2′	31°34.1′	42°11.9′	85°28.4′	111°09.6′	118°25.6′
17	120°19.9′	S 18°51.9′	6.4′	-11.8′	60.4′	42°59.3′	15°58.0′	14°42.5′	32°10.5′	42°38.8′	86°05.2′	111°27.1′	118°59.5′
18	134°45.3′	S 19°03.7′	6.3′	-11.7′	60.4′	42°25.0′	15°22.9′	14°06.8′	32°46.9′	43°06.0′	86°42.1′	111°44.4′	119°33.5′
19	149°10.6′	S 19°15.4′	6.2′	-11.6′	60.5′	41°50.7′	14°47.7′	13°31.2′	33°23.4′	43°33.3′	87°18.9′	112°01.7′	
20	163°35.7′	S 19°26.9′	6.0′	-11.4′	60.5′	41°16.4′	14°12.5′	12°55.7′	33°59.9′	44°00.9′	87°55.8′	112°18.8′	
21	178°00.8′	S 19°38.4′	5.9′	-11.3′	60.5′	40°42.0′	13°37.3′	12°20.3′	34°36.5′	44°28.7′	88°32.8′	112°35.8′	
22	192°25.7′	S 19°49.7′	5.8′	-11.2′	60.5′	40°07.5′	13°02.0′	11°45.1′	35°13.2′	44°56.6′	89°09.8′	112°52.7′	
23	206°50.5′	S 20°00.9′	5.7′	-11.1′	60.6′		12°26.7′	11°10.1′	35°49.9′	45°24.8′	89°46.8′	113°09.5′	
Mer. pass. 8 h 40 m SD 16.3′ phase 20%													

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.8′	S 63°12.9′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.7′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°52.3′	N 89°21.6′
Rigil Kent	−0.0	139°44.0′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.0′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.8′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.4′				

Friday 31 December 2021 UT1

h	Aries	Sun		Venus		Jupiter		Saturn		Mars	
	GHA	GHA	dec	GHA	dec	GHA	dec	GHA	dec	GHA	dec
0	99°38.4′	179°17.6′	S 23°05.8′	164°28.8′	S 18°45.7′	126°51.4′	S 12°16.9′	145°08.7′	S 18°02.4′	208°44.6′	S 22°23.9′
1	114°40.9′	194°17.3′	S 23°05.6′	179°32.5′	S 18°45.3′	141°53.4′	S 12°16.7′	160°10.9′	S 18°02.3′	223°45.1′	S 22°24.2′
2	129°43.4′	209°17.0′	S 23°05.4′	194°36.3′	S 18°44.8′	156°55.4′	S 12°16.5′	175°13.1′	S 18°02.3′	238°45.7′	S 22°24.4′
3	144°45.8′	224°16.7′	S 23°05.3′	209°40.1′	S 18°44.4′	171°57.4′	S 12°16.3′	190°15.3′	S 18°02.2′	253°46.2′	S 22°24.7′
4	159°48.3′	239°16.4′	S 23°05.1′	224°43.9′	S 18°43.9′	186°59.4′	S 12°16.2′	205°17.5′	S 18°02.1′	268°46.8′	S 22°24.9′
5	174°50.8′	254°16.1′	S 23°04.9′	239°47.6′	S 18°43.5′	202°01.4′	S 12°16.0′	220°19.7′	S 18°02.0′	283°47.4′	S 22°25.2′
6	189°53.2′	269°15.8′	S 23°04.7′	254°51.4′	S 18°43.0′	217°03.4′	S 12°15.8′	235°21.9′	S 18°02.0′	298°47.9′	S 22°25.4′
7	204°55.7′	284°15.5′	S 23°04.5′	269°55.2′	S 18°42.6′	232°05.4′	S 12°15.6′	250°24.1′	S 18°01.9′	313°48.5′	S 22°25.7′
8	219°58.2′	299°15.2′	S 23°04.3′	284°59.0′	S 18°42.1′	247°07.4′	S 12°15.5′	265°26.3′	S 18°01.8′	328°49.1′	S 22°26.0′
9	235°00.6′	314°14.9′	S 23°04.1′	300°02.8′	S 18°41.7′	262°09.4′	S 12°15.3′	280°28.4′	S 18°01.7′	343°49.6′	S 22°26.2′
10	250°03.1′	329°14.6′	S 23°03.9′	315°06.6′	S 18°41.2′	277°11.4′	S 12°15.1′	295°30.6′	S 18°01.7′	358°50.2′	S 22°26.5′
11	265°05.5′	344°14.3′	S 23°03.8′	330°10.4′	S 18°40.8′	292°13.4′	S 12°14.9′	310°32.8′	S 18°01.6′	13°50.7′	S 22°26.7′
12	280°08.0′	359°14.0′	S 23°03.6′	345°14.2′	S 18°40.4′	307°15.4′	S 12°14.8′	325°35.0′	S 18°01.5′	28°51.3′	S 22°27.0′
13	295°10.5′	14°13.7′	S 23°03.4′	0°18.0′	S 18°39.9′	322°17.4′	S 12°14.6′	340°37.2′	S 18°01.5′	43°51.9′	S 22°27.2′
14	310°12.9′	29°13.5′	S 23°03.2′	15°21.8′	S 18°39.5′	337°19.4′	S 12°14.4′	355°39.4′	S 18°01.4′	58°52.4′	S 22°27.5′
15	325°15.4′	44°13.2′	S 23°03.0′	30°25.6′	S 18°39.0′	352°21.4′	S 12°14.2′	10°41.6′	S 18°01.3′	73°53.0′	S 22°27.7′
16	340°17.9′	59°12.9′	S 23°02.8′	45°29.4′	S 18°38.6′	7°23.4′	S 12°14.1′	25°43.8′	S 18°01.2′	88°53.5′	S 22°28.0′
17	355°20.3′	74°12.6′	S 23°02.6′	60°33.2′	S 18°38.1′	22°25.4′	S 12°13.9′	40°46.0′	S 18°01.2′	103°54.1′	S 22°28.2′
18	10°22.8′	89°12.3′	S 23°02.4′	75°37.1′	S 18°37.7′	37°27.4′	S 12°13.7′	55°48.2′	S 18°01.1′	118°54.7′	S 22°28.5′
19	25°25.3′	104°12.0′	S 23°02.2′	90°40.9′	S 18°37.2′	52°29.4′	S 12°13.5′	70°50.4′	S 18°01.0′	133°55.2′	S 22°28.7′
20	40°27.7′	119°11.7′	S 23°02.0′	105°44.7′	S 18°36.8′	67°31.4′	S 12°13.4′	85°52.6′	S 18°00.9′	148°55.8′	S 22°29.0′
21	55°30.2′	134°11.4′	S 23°01.8′	120°48.5′	S 18°36.4′	82°33.4′	S 12°13.2′	100°54.7′	S 18°00.9′	163°56.4′	S 22°29.2′
22	70°32.7′	149°11.1′	S 23°01.6′	135°52.4′	S 18°35.9′	97°35.4′	S 12°13.0′	115°56.9′	S 18°00.8′	178°56.9′	S 22°29.5′
23	85°35.1′	164°10.8′	S 23°01.4′	150°56.2′	S 18°35.5′	112°37.4′	S 12°12.8′	130°59.1′	S 18°00.7′	193°57.5′	S 22°29.7′
		SD 16.3′ *d* 0.2′		*v* 3.8′ *d* 0.4′		*v* 2.0′ *d* 0.2′		*v* 2.2′ *d* 0.1′		*v* 0.6′ *d* -0.3′	
Mer. pass.		12 h 3 m 5 s		12 h 59 m		15 h 31 m		14 h 17 m		10 h 5 m	

h	Moon					Lunar distance					
	GHA	dec	*v*	*d*	HP	−Mars	−Antares	+Spica	+Arcturus	+Regulus	+Adhara
0	221°15.2′	S 20°12.0′	5.6′	-11.0′	60.6′	11°51.4′	10°35.2′	36°26.6′	45°53.2′	90°23.8′	113°26.2′
1	235°39.7′	S 20°22.9′	5.4′	-10.8′	60.6′	11°16.1′	10°00.6′	37°03.4′	46°21.7′	91°00.9′	113°42.7′
2	250°04.2′	S 20°33.7′	5.3′	-10.7′	60.6′	10°40.8′	9°26.3′	37°40.2′	46°50.4′	91°38.0′	113°59.1′
3	264°28.5′	S 20°44.4′	5.2′	-10.6′	60.7′	10°05.4′	8°52.3′	38°17.1′	47°19.4′	92°15.2′	114°15.4′
4	278°52.7′	S 20°55.0′	5.1′	-10.4′	60.7′	9°30.1′	8°18.8′	38°54.0′	47°48.4′	92°52.3′	114°31.5′
5	293°16.7′	S 21°05.4′	5.0′	-10.3′	60.7′	8°54.7′	7°45.8′	39°30.9′	48°17.7′	93°29.5′	114°47.5′
6	307°40.7′	S 21°15.7′	4.8′	-10.1′	60.7′	8°19.3′		40°07.9′	48°47.1′	94°06.8′	115°03.4′
7	322°04.5′	S 21°25.8′	4.7′	-10.0′	60.7′	7°44.0′		40°44.9′	49°16.6′	94°44.0′	115°19.1′
8	336°28.2′	S 21°35.9′	4.6′	-9.9′	60.8′	7°08.6′		41°22.0′	49°46.3′	95°21.3′	115°34.7′
9	350°51.8′	S 21°45.7′	4.5′	-9.7′	60.8′	6°33.3′		41°59.1′	50°16.2′	95°58.6′	115°50.1′
10	5°15.3′	S 21°55.4′	4.4′	-9.6′	60.8′	5°58.0′		42°36.2′	50°46.2′	96°35.9′	116°05.4′
11	19°38.7′	S 22°05.0′	4.3′	-9.4′	60.8′	5°22.7′		43°13.4′	51°16.3′	97°13.3′	
12	34°01.9′	S 22°14.4′	4.1′	-9.3′	60.8′	4°47.6′		43°50.6′	51°46.6′	97°50.7′	
13	48°25.1′	S 22°23.7′	4.0′	-9.1′	60.9′	4°12.6′		44°27.8′	52°17.0′	98°28.1′	
14	62°48.1′	S 22°32.8′	3.9′	-9.0′	60.9′	3°37.8′		45°05.0′	52°47.6′	99°05.5′	
15	77°11.0′	S 22°41.8′	3.8′	-8.8′	60.9′	3°03.4′		45°42.3′	53°18.2′	99°43.0′	
16	91°33.8′	S 22°50.6′	3.7′	-8.6′	60.9′			46°19.6′	53°49.0′	100°20.5′	
17	105°56.5′	S 22°59.3′	3.6′	-8.5′	60.9′			46°57.0′	54°19.9′	100°58.0′	
18	120°19.1′	S 23°07.8′	3.5′	-8.3′	60.9′			47°34.4′	54°50.9′	101°35.5′	
19	134°41.6′	S 23°16.1′	3.4′	-8.2′	61.0′			48°11.8′	55°22.1′	102°13.1′	
20	149°04.0′	S 23°24.2′	3.3′	-8.0′	61.0′			48°49.2′	55°53.3′	102°50.6′	
21	163°26.2′	S 23°32.2′	3.2′	-7.8′	61.0′			49°26.6′	56°24.6′	103°28.2′	
22	177°48.4′	S 23°40.1′	3.1′	-7.7′	61.0′			50°04.1′	56°56.1′	104°05.8′	
23	192°10.5′	S 23°47.7′	3.0′	-7.5′	61.0′			50°41.6′	57°27.6′	104°43.5′	
Mer. pass. 9 h 38 m SD 16.5′ phase 11%											

Star	mag	SHA	dec	Star	mag	SHA	dec	Star	mag	SHA	dec
Fomalhaut	+1.2	15°17.4′	S 29°30.6′	Spica	+1.0	158°25.0′	S 11°16.4′	Betelgeuse	+0.5	270°54.4′	N 7°24.6′
Deneb	+1.2	49°27.9′	N 45°21.6′	Acrux	+0.8	173°02.8′	S 63°12.9′	Capella	+0.1	280°25.1′	N 46°01.2′
Altair	+0.8	62°02.7′	N 8°55.6′	Regulus	+1.4	207°36.9′	N 11°51.6′	Rigel	+0.2	281°05.9′	S 8°10.7′
Vega	+0.0	80°35.3′	N 38°48.2′	Pollux	+1.2	243°20.0′	N 27°58.3′	Aldebaran	+0.9	290°42.2′	N 16°33.2′
Antares	+1.1	112°19.2′	S 26°28.7′	Procyon	+0.4	244°53.1′	N 5°10.1′	Polaris	+2.0	314°52.5′	N 89°21.6′
Rigil Kent	−0.0	139°44.0′	S 60°55.2′	Adhara	+1.5	255°07.4′	S 29°00.1′	Achernar	+0.5	335°21.9′	S 57°07.9′
Arcturus	−0.1	145°50.4′	N 19°04.0′	Sirius	−1.4	258°28.1′	S 16°44.8′				
Hadar	+0.6	148°39.7′	S 60°28.4′	Canopus	−0.6	263°52.9′	S 52°42.5′				