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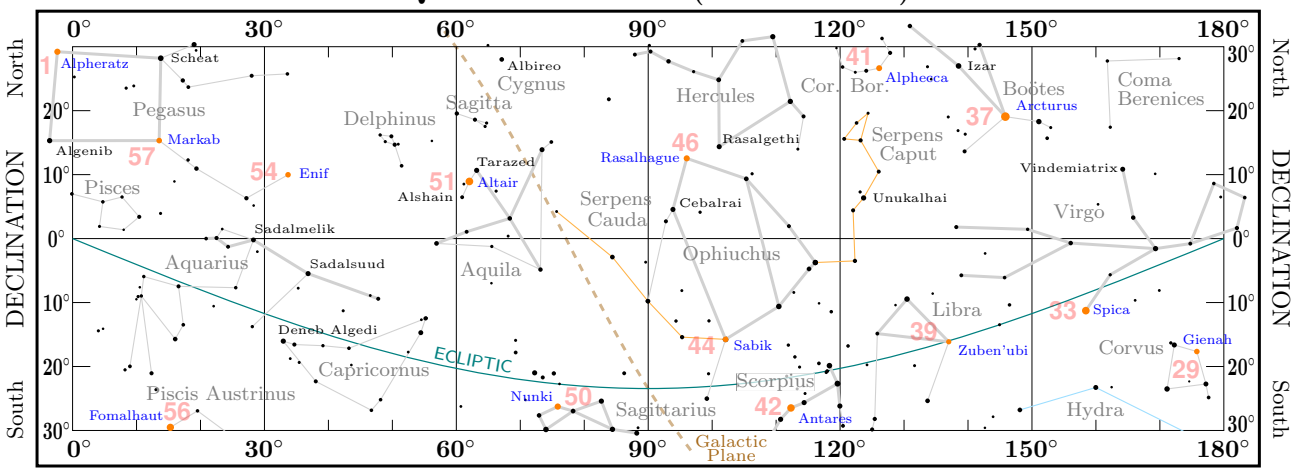
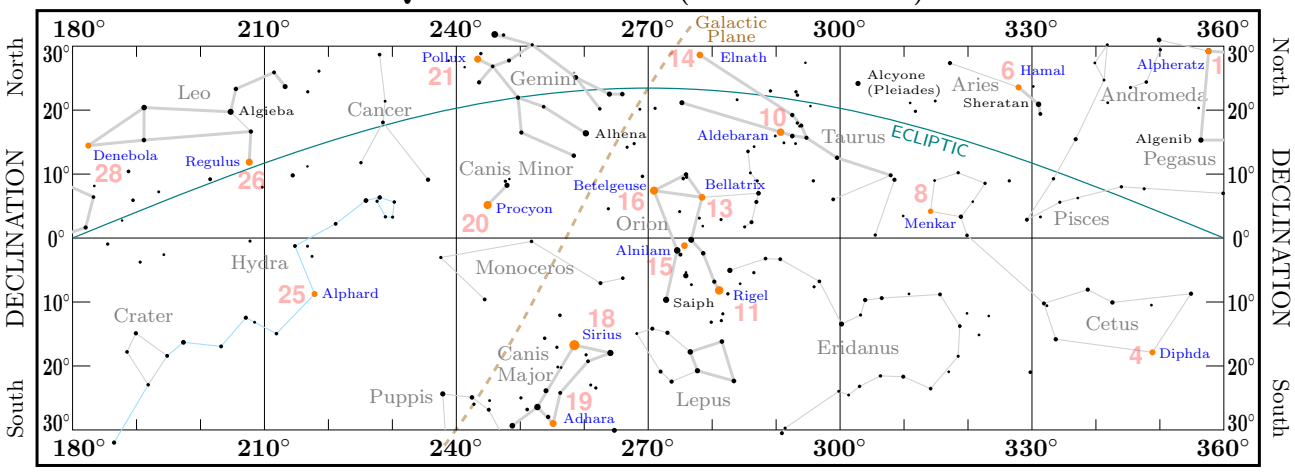
EQUATORIAL STARS (SHA 0° to 180°)



EQUATORIAL STARS (SHA 180° to 360°)



Lunar Distance

November 2022

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Lunar Distance

The Lunar Distance method (or the old method of "lunars") is an 18th century technique to find the time, typically to reset ship's clocks or as an emergency procedure. The method uses the Moon's apparent motion relative to the Sun, planets or stars like a clock to find a reference time (e.g. GMT). "Until 1906, the Nautical Almanac included lunar distance tables showing predicted geocentric angular distances between the Moon and selected bodies in 3-hour intervals. After the tables were dropped, lunar distances fell more or less into oblivion."[1]

"The methods are a good deal more laborious than the more commonplace procedures of celestial navigation. It is perhaps the most difficult possible operation within the discipline of celestial navigation. However, one argument for maintaining celestial skills is the utility of celestial navigation as an emergency substitute for electronic navigation."[2] "Nothing else comes close to the lunar for developing skill with a sextant - and the observation is demanding enough to hold one's interest for a lifetime."[3] Thus it is still a valuable process to learn and indeed worthwhile mastering. (A practised user can routinely find the correct time to within ±30 seconds.)

"Because the Moon moves much slower across the sky than the stars, its changing position can be used in sort of a reverse process of sight reduction to find the time."[4] "The basic idea of the lunar distance method is easy to comprehend. Since the Moon moves across the celestial sphere at a rate of about 0.5° per hour, the angular distance between the Moon and a celestial body in her path varies at a similar rate and rapidly enough to be used to measure the time. The time corresponding with an observed lunar distance can be found by comparison with tabulated values."[5] (The continuous motion of the Moon through the sky day-by-day implies that different celestial bodies will be selected for LD measurements on different days.)

The following Lunar Distance tables can contain up to 8 celestial bodies per day (due to the page width limitation). Generally, an attempt is made to include an even number of objects to the east and west of the Moon. The maximum LD angle chosen for inclusion in the tables is 120°, which is about the maximum angle a sextant can measure.

The celestial bodies available for LD measurement include the Sun, four planets (Venus, Mars, Jupiter, Saturn), 21 navigational stars (with magnitude ≤ 1.5) and Polaris.

Three different strategies are available to select suitable celestial bodies for inclusion in a daily LD table:

- pick celestial bodies closest to the Moon
- pick celestial bodies with the highest hourly LD delta (for best accuracy in time determination)
- pick the brightest celestial bodies (possibly easier to locate in the sky)

The celestial body LD angle at a particular hour of day still needs to fulfill several requirements:

- the LD of the Sun is >10° as the Moon is hardly visible during New Moon. (This applies to <u>all</u> celestial bodies)
- the LD of the Sun is >40° (otherwise the Moon is not visible)
- only LD angles <120° are tabulated
- the angle between the celestial body and the Sun ("Solar Distance") is >10° (otherwise the celestial body might not be visible)
- the Sun is not between the celestial body and the Moon (based on the Right Ascenscion of all three)
- the hourly LD delta is $>15'$ of arc (to avoid measurement errors). "The rate of change of LD becomes zero when LD passes through a minimum or maximum, making an observation useless."[6]
- the rate of change of the hourly LD delta does not exceed 0.016° (= 0.96′). This empirical figure removes LD values where linear interpolation (between hours) becomes unreliable.

Suggested further reading: "Stark Tables: For Clearing the Lunar Distance and Finding Universal Time by Sextant Observation" by Bruce Stark, ISBN 978-0-914025-21-4

[1] Henning Umland, Chapter 7 - Finding Time and Longitude by Lunar Distances
[2] Eric Romelczyk, The Journal of Navigation, Volume 72, Issue 6
[3] Bruce Stark, page vi, Tables For Clearing the Lunar Distance and Finding Universal Time by Sextant Observation
[4] Bruce Stark, https://www.celestaire.com/product/tables-for-clearing-the-lunar-distance/
[5] Henning Umland, Chapter 7 - Finding Time and Longitude by Lunar Distances
[6] Henning Umland, Chapter 7 - Finding Time and Longitude by Lunar Distances

DUT1 = UT1-UTC = -0.0055 sec ΔT = TT-UT1 = +69.1895 sec

2022 November 01 to Nov. 03 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Rigel	-Aldebaran	-Jupiter	-Fomalhaut	-Saturn	+Antares	+Rigil Kent.	+Sun
0	91°37.9	5.9′	S24°06.2	8.4′	59.1′			54°47.6	32°32.1	14°16.5	54°37.3	68°18.4	86°22.9
1	106°02.8	6.0′	23°57.8	8.6′	59.1′			54°12.1	32°02.0	13°42.7	55°12.6	68°43.5	86°55.7
2	120°27.8	6.1′	23°49.2	8.7′	59.1′			53°36.7	31°32.0	13°09.0	55°47.9	69°08.6	87°28.5
3	134°52.9	6.2′	23°40.5	8.9′	59.1′			53°01.2	31°02.3	12°35.5	56°23.2	69°33.8	88°01.3
4	149°18.0	6.3′	23°31.6	9.0′	59.1′	119°57.2		52°25.8	30°32.7	12°02.2	56°58.4	69°59.1	88°34.2
5	163°43.3	6.4′	23°22.6	9.2′	59.1′	119°30.1		51°50.3	30°03.2	11°29.0	57°33.7	70°24.4	89°06.9
6	178°08.7	6.5′	S23°13.5	9.3′	59.1′	119°03.1		51°14.9	29°34.0	10°56.1	58°08.9	70°49.8	89°39.7
7	192°34.2	6.6′	23°04.2	9.4′	59.1′	118°35.9		50°39.5	29°05.1	10°23.4	58°44.1	71°15.3	90°12.5
8	206°59.7	6.7′	22°54.8	9.6′	59.1′	118°08.6	119°36.2	50°04.1	28°36.3	9°51.1	59°19.3	71°40.7	90°45.3
9	221°25.4	6.8′	22°45.2	9.7′	59.0′	117°41.3	119°01.4	49°28.7	28°07.8	9°19.1	59°54.5	72°06.3	91°18.0
10	235°51.2	6.9′	22°35.5	9.8′	59.0′	117°14.0	118°26.6	48°53.4	27°39.5	8°47.5	60°29.7	72°31.9	91°50.7
11	250°17.0	7.0′	22°25.6	10.0′	59.0′	116°46.5	117°51.8	48°18.0	27°11.5	8°16.4	61°04.9	72°57.5	92°23.4
12	264°43.0	7.1′	S22°15.7	10.1′	59.0′	116°19.0	117°17.1	47°42.7	26°43.7	7°45.9	61°40.1	73°23.1	92°56.1
13	279°09.1	7.2′	22°05.6	10.2′	59.0′	115°51.5	116°42.3	47°07.4	26°16.3	7°16.1	62°15.2	73°48.8	93°28.8
14	293°35.3	7.3′	21°55.3	10.4′	59.0′	115°23.9	116°07.5	46°32.1	25°49.1	6°47.1	62°50.3	74°14.6	94°01.5
15	308°01.5	7.4′	21°45.0	10.5′	59.0′	114°56.2	115°32.8	45°56.8	25°22.2		63°25.5	74°40.4	94°34.2
16	322°27.9	7.5′	21°34.5	10.6′	59.0′	114°28.5	114°58.1	45°21.5	24°55.7		64°00.6	75°06.2	95°06.8
17	336°54.4	7.6′	21°23.8	10.7′	59.0′	114°00.7	114°23.3	44°46.2	24°29.6		64°35.7	75°32.0	95°39.5
18	351°21.0	7.7′	S21°13.1	10.9′	58.9′	113°32.9	113°48.6	44°11.0	24°03.7		65°10.7	75°57.9	96°12.1
19	5°47.7	7.8′	21°02.2	11.0′	58.9′	113°05.0	113°13.9	43°35.7	23°38.3		65°45.8	76°23.8	96°44.7
20	20°14.4	7.9′	20°51.3	11.1′	58.9′	112°37.1	112°39.2	43°00.5	23°13.3		66°20.9	76°49.8	97°17.3
21	34°41.3	8.0′	20°40.2	11.2′	58.9′	112°09.2	112°04.5	42°25.3	22°48.7		66°55.9	77°15.7	97°49.9
22	49°08.3	8.1′	20°28.9	11.3′	58.9′	111°41.2	111°29.8	41°50.1	22°24.6		67°30.9	77°41.7	98°22.4
23	63°35.4	8.2′	20°17.6	11.4′	58.9′	111°13.1	110°55.2	41°15.0	22°00.9		68°06.0	78°07.8	98°55.0
	SD = 16.1′		Mer. pass. 18:36			Sun SD = 16.1′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Capella	-Mars	-Aldebaran	-Jupiter	+Saturn	+Antares	+Rigil Kent.	+Sun
0	78°02.6	8.3′	S20°06.2	11.6′	58.9′			110°20.5	40°39.8		68°41.0	78°33.8	99°27.5
1	92°29.9	8.4′	19°54.6	11.7′	58.9′			109°45.8	40°04.7		69°15.9	78°59.9	100°00.0
2	106°57.3	8.5′	19°42.9	11.8′	58.8′			109°11.2	39°29.6		69°50.9	79°25.9	100°32.6
3	121°24.8	8.6′	19°31.2	11.9′	58.8′			108°36.6	38°54.4		70°25.9	79°52.1	101°05.1
4	135°52.3	8.7′	19°19.3	12.0′	58.8′			108°02.0	38°19.4		71°00.8	80°18.2	101°37.5
5	150°20.0	8.8′	19°07.3	12.1′	58.8′	119°48.4		107°27.4	37°44.3		71°35.8	80°44.3	102°10.0
6	164°47.8	8.9′	S18°55.2	12.2′	58.8′	119°16.1		106°52.8	37°09.2		72°10.7	81°10.5	102°42.5
7	179°15.7	9.0′	18°43.0	12.3′	58.8′	118°43.8		106°18.2	36°34.2		72°45.6	81°36.6	103°14.9
8	193°43.7	9.1′	18°30.7	12.4′	58.8′	118°11.5		105°43.6	35°59.2		73°20.5	82°02.8	103°47.3
9	208°11.8	9.2′	18°18.3	12.5′	58.8′	117°39.2		105°09.1	35°24.1		73°55.3	82°29.0	104°19.7
10	222°39.9	9.3′	18°05.8	12.6′	58.7′	117°06.9		104°34.6	34°49.2		74°30.2	82°55.2	104°52.1
11	237°08.2	9.4′	17°53.2	12.7′	58.7′	116°34.6		104°00.0	34°14.2	7°48.7	75°05.0	83°21.4	105°24.5
12	251°36.6	9.5′	S17°40.6	12.8′	58.7′	116°02.2	119°25.3	103°25.5	33°39.2	8°19.0	75°39.9	83°47.6	105°56.9
13	266°05.0	9.6′	17°27.8	12.9′	58.7′	115°29.9	118°50.4	102°51.0	33°04.3	8°49.8	76°14.7	84°13.8	106°29.2
14	280°33.6	9.6′	17°14.9	13.0′	58.7′	114°57.5	118°15.5	102°16.5	32°29.4	9°21.1	76°49.5	84°40.1	107°01.6
15	295°02.2	9.7′	17°02.0	13.0′	58.7′	114°25.1	117°40.7	101°42.1	31°54.5	9°52.7	77°24.3	85°06.3	107°33.9
16	309°31.0	9.8′	16°48.9	13.1′	58.7′	113°52.7	117°05.9	101°07.6	31°19.6	10°24.6	77°59.0	85°32.5	108°06.2
17	323°59.8	9.9′	16°35.8	13.2′	58.6′	113°20.3	116°31.0	100°33.1	30°44.7	10°56.9	78°33.8	85°58.7	108°38.5
18	338°28.7	10.0′	S16°22.6	13.3′	58.6′	112°47.9	115°56.2	99°58.7	30°09.8	11°29.3	79°08.5	86°25.0	109°10.8
19	352°57.7	10.1′	16°09.3	13.4′	58.6′	112°15.5	115°21.4	99°24.3	29°35.0	12°02.0	79°43.3	86°51.2	109°43.0
20	7°26.8	10.2′	15°55.9	13.5′	58.6′	111°43.1	114°46.6	98°49.9	29°00.2	12°34.8	80°18.0	87°17.4	110°15.3
21	21°56.0	10.3′	15°42.5	13.5′	58.6′	111°10.7	114°11.9	98°15.5	28°25.4	13°07.7	80°52.7	87°43.6	110°47.5
22	36°25.3	10.4′	15°29.0	13.6′	58.6′	110°38.3	113°37.1	97°41.1	27°50.6	13°40.8	81°27.3	88°09.9	111°19.7
23	50°54.7	10.5′	15°15.4	13.7′	58.6′	110°05.9	113°02.3	97°06.8	27°15.9	14°14.0	82°02.0	88°36.1	111°51.9
	SD = 16.1′		Mer. pass. 19:29			Sun SD = 16.1′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Thu	GHA	ν	Dec	d	HP	-Mars	-Capella	-Aldebaran	-Jupiter	+Saturn	+Antares	+Rigil Kent.	+Sun
0	65°24.1	10.5′	S15°01.7	13.8′	58.5′	112°27.6	109°33.4	96°32.4	26°41.2	14°47.3	82°36.7	89°02.3	112°24.1
1	79°53.7	10.6′	14°47.9	13.8′	58.5′	111°52.9	109°01.0	95°58.1	26°06.4	15°20.6	83°11.3	89°28.4	112°56.3
2	94°23.3	10.7′	14°34.1	13.9′	58.5′	111°18.2	108°28.6	95°23.8	25°31.8	15°54.1	83°45.9	89°54.6	113°28.4
3	108°53.0	10.8′	14°20.2	14.0′	58.5′	110°43.5	107°56.2	94°49.4	24°57.1	16°27.6	84°20.5	90°20.8	114°00.6
4	123°22.8	10.9′	14°06.2	14.0′	58.5′	110°08.8	107°23.8	94°15.2	24°22.4	17°01.1	84°55.1	90°46.9	114°32.7
5	137°52.7	11.0′	13°52.2	14.1′	58.5′	109°34.1	106°51.3	93°40.9	23°47.8	17°34.7	85°29.7	91°13.1	115°04.8
6	152°22.6	11.0′	S13°38.1	14.2′	58.5′	108°59.5	106°18.9	93°06.6	23°13.2	18°08.4	86°04.2	91°39.2	115°36.9
7	166°52.7	11.1′	13°24.0	14.2′	58.4′	108°24.8	105°46.5	92°32.4	22°38.6	18°42.0	86°38.8	92°05.3	116°08.9
8	181°22.8	11.2′	13°09.7	14.3′	58.4′	107°50.2	105°14.1	91°58.1	22°04.1	19°15.7	87°13.3	92°31.4	116°41.0
9	195°53.0	11.3′	12°55.4	14.3′	58.4′	107°15.6	104°41.7	91°23.9	21°29.5	19°49.5	87°47.8	92°57.5	117°13.0
10	210°23.2	11.3′	12°41.1	14.4′	58.4′	106°41.0	104°09.3	90°49.7	20°55.0	20°23.3	88°22.3	93°23.5	117°45.1
11	224°53.6	11.4′	12°26.7	14.5′	58.4′	106°06.4	103°36.9	90°15.6	20°20.5	20°57.0	88°56.8	93°49.6	118°17.1
12	239°24.0	11.5′	S12°12.3	14.5′	58.4′	105°31.8	103°04.5	89°41.4	19°46.1	21°30.8	89°31.3	94°15.6	118°49.1
13	253°54.5	11.6′	11°57.7	14.6′	58.3′	104°57.3	102°32.1	89°07.2	19°11.7	22°04.7	90°05.7	94°41.6	119°21.1
14	268°25.0	11.6′	11°43.2	14.6′	58.3′	104°22.7	101°59.7	88°33.1	18°37.3	22°38.5	90°40.1	95°07.5	119°53.0
15	282°55.7	11.7′	11°28.6	14.7′	58.3′	103°48.2	101°27.3	87°59.0	18°02.9	23°12.3	91°14.5	95°33.5	
16	297°26.4	11.8′	11°13.9	14.7′	58.3′	103°13.7	100°55.0	87°24.9	17°28.6	23°46.2	91°48.9	95°59.4	
17	311°57.1	11.8′	10°59.2	14.8′	58.3′	102°39.2	100°22.6	86°50.8	16°54.3	24°20.0	92°23.3	96°25.3	
18	326°28.0	11.9′	S10°44.4	14.8′	58.3′	102°04.7	99°50.3	86°16.7	16°20.0	24°53.9	92°57.7	96°51.1	
19	340°58.9	12.0′	10°29.6	14.9′	58.2′	101°30.3	99°17.9	85°42.7	15°45.8	25°27.8	93°32.0	97°16.9	
20	355°29.8	12.0′	10°14.8	14.9′	58.2′	100°55.8	98°45.6	85°08.6	15°11.6	26°01.6	94°06.4	97°42.7	
21	10°00.9	12.1′	09°59.9	14.9′	58.2′	100°21.4	98°13.3	84°34.6	14°37.4	26°35.5	94°40.7	98°08.5	
22	24°32.0	12.2′	09°44.9	15.0′	58.2′	99°46.9	97°40.9	84°00.6	14°03.3	27°09.4	95°15.0	98°34.2	
23	39°03.1	12.2′	09°29.9	15.0′	58.2′	99°12.5	97°08.6	83°26.6	13°29.3	27°43.2	95°49.3	98°59.9	
	SD = 16.0′		Mer. pass. 20:19			Sun SD = 16.1′							

DUT1 = UT1-UTC = -0.0064 sec ΔT = TT-UT1 = +69.1904 sec

2022 November 04 to Nov. 06 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Fri	GHA	ν	Dec	d	HP	-Pollux	-Mars	-Aldebaran	-Jupiter	+Fomalhaut	+Saturn	+Altair	+Antares
0	53°34.4	12.3′	S09°14.9	15.1′	58.2′		98°38.1	82°52.7	12°55.3	20°46.3	28°17.1	54°34.5	96°23.5
1	68°05.6	12.3′	08°59.9	15.1′	58.2′		98°03.7	82°18.7	12°21.4	21°07.8	28°51.0	54°59.2	96°57.8
2	82°37.0	12.4′	08°44.8	15.1′	58.1′		97°29.4	81°44.8	11°47.5	21°29.8	29°24.8	55°24.0	97°32.0
3	97°08.4	12.5′	08°29.7	15.2′	58.1′		96°55.0	81°10.9	11°13.7	21°52.2	29°58.7	55°48.9	98°06.2
4	111°39.8	12.5′	08°14.5	15.2′	58.1′		96°20.7	80°37.0	10°40.0	22°15.2	30°32.5	56°13.9	98°40.4
5	126°11.3	12.6′	07°59.3	15.2′	58.1′		95°46.4	80°03.1	10°06.3	22°38.5	31°06.4	56°39.0	99°14.6
6	140°42.9	12.6′	S07°44.1	15.3′	58.1′		95°12.1	79°29.2	9°32.8	23°02.3	31°40.2	57°04.2	99°48.8
7	155°14.5	12.7′	07°28.8	15.3′	58.1′		94°37.8	78°55.4	8°59.4	23°26.5	32°14.0	57°29.5	100°22.9
8	169°46.2	12.7′	07°13.5	15.3′	58.0′		94°03.5	78°21.6	8°26.1	23°51.0	32°47.8	57°54.8	100°57.0
9	184°17.9	12.8′	06°58.2	15.3′	58.0′		93°29.3	77°47.8	7°53.0	24°15.9	33°21.6	58°20.3	101°31.1
10	198°49.7	12.8′	06°42.9	15.4′	58.0′		92°55.0	77°14.0	7°20.1	24°41.2	33°55.4	58°45.8	102°05.2
11	213°21.5	12.9′	06°27.6	15.4′	58.0′		92°20.8	76°40.2	6°47.5	25°06.7	34°29.2	59°11.4	102°39.3
12	227°53.3	12.9′	S06°12.2	15.4′	58.0′		91°46.6	76°06.5	6°15.1	25°32.6	35°03.0	59°37.1	103°13.4
13	242°25.2	13.0′	05°56.8	15.4′	57.9′	119°29.7	91°12.4	75°32.8	5°43.1	25°58.7	35°36.8	60°02.8	103°47.4
14	256°57.2	13.0′	05°41.4	15.4′	57.9′	118°55.7	90°38.2	74°59.0	5°11.7	26°25.1	36°10.5	60°28.6	104°21.4
15	271°29.2	13.0′	05°25.9	15.5′	57.9′	118°21.7	90°04.0	74°25.4	4°40.8	26°51.7	36°44.3	60°54.5	104°55.4
16	286°01.2	13.1′	05°10.5	15.5′	57.9′	117°47.7	89°29.9	73°51.7	4°10.9	27°18.6	37°18.0	61°20.5	105°29.4
17	300°33.3	13.1′	04°55.0	15.5′	57.9′	117°13.7	88°55.8	73°18.0		27°45.7	37°51.7	61°46.5	106°03.4
18	315°05.4	13.2′	S04°39.5	15.5′	57.9′	116°39.7	88°21.7	72°44.4		28°13.1	38°25.4	62°12.5	106°37.3
19	329°37.6	13.2′	04°24.0	15.5′	57.8′	116°05.8	87°47.6	72°10.8		28°40.6	38°59.1	62°38.7	107°11.3
20	344°09.8	13.2′	04°08.5	15.5′	57.8′	115°31.9	87°13.5	71°37.2		29°08.3	39°32.8	63°04.9	107°45.2
21	358°42.0	13.3′	03°53.0	15.5′	57.8′	114°58.0	86°39.4	71°03.6		29°36.2	40°06.5	63°31.1	108°19.1
22	13°14.3	13.3′	03°37.4	15.5′	57.8′	114°24.1	86°05.4	70°30.1		30°04.3	40°40.1	63°57.4	108°52.9
23	27°46.6	13.3′	03°21.9	15.5′	57.8′	113°50.2	85°31.3	69°56.6		30°32.5	41°13.8	64°23.7	109°26.8
	SD = 15.9′		Mer. pass. 21:05										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	-Pollux	-Mars	-Capella	-Aldebaran	+Jupiter	+Fomalhaut	+Saturn	+Antares
0	42°18.9	13.4′	S03°06.4	15.6′	57.8′	113°16.4	84°57.3	83°45.7	69°23.1		31°00.9	41°47.4	110°00.6
1	56°51.2	13.4′	02°50.8	15.6′	57.7′	112°42.5	84°23.3	83°13.8	68°49.6		31°29.5	42°21.0	110°34.4
2	71°23.6	13.4′	02°35.2	15.6′	57.7′	112°08.7	83°49.4	82°42.0	68°16.1		31°58.2	42°54.6	111°08.2
3	85°56.1	13.4′	02°19.7	15.6′	57.7′	111°34.9	83°15.4	82°10.1	67°42.7		32°27.0	43°28.2	111°42.0
4	100°28.5	13.5′	02°04.1	15.6′	57.7′	111°01.2	82°41.5	81°38.3	67°09.2		32°55.9	44°01.7	112°15.8
5	115°01.0	13.5′	01°48.6	15.6′	57.7′	110°27.4	82°07.5	81°06.5	66°35.8		33°25.0	44°35.3	112°49.5
6	129°33.5	13.5′	S01°33.0	15.6′	57.6′	109°53.7	81°33.6	80°34.8	66°02.5		33°54.1	45°08.8	113°23.3
7	144°06.0	13.5′	01°17.4	15.6′	57.6′	109°20.0	80°59.7	80°03.0	65°29.1	5°20.8	34°23.4	45°42.3	113°57.0
8	158°38.6	13.6′	01°01.9	15.6′	57.6′	108°46.3	80°25.9	79°31.3	64°55.8	5°52.2	34°52.8	46°15.8	114°30.6
9	173°11.1	13.6′	00°46.3	15.5′	57.6′	108°12.6	79°52.0	78°59.6	64°22.5	6°23.9	35°22.3	46°49.3	115°04.3
10	187°43.7	13.6′	00°30.8	15.5′	57.6′	107°38.9	79°18.2	78°27.9	63°49.2	6°55.9	35°51.8	47°22.8	115°38.0
11	202°16.3	13.6′	S00°15.2	15.5′	57.5′	107°05.3	78°44.3	77°56.3	63°15.9	7°28.2	36°21.5	47°56.3	116°11.6
12	216°49.0	13.6′	N00°00.3	15.5′	57.5′	106°31.7	78°10.5	77°24.7	62°42.7	8°00.7	36°51.2	48°29.7	116°45.2
13	231°21.6	13.7′	00°15.8	15.5′	57.5′	105°58.1	77°36.8	76°53.1	62°09.5	8°33.3	37°21.0	49°03.1	117°18.8
14	245°54.3	13.7′	00°31.3	15.5′	57.5′	105°24.5	77°03.0	76°21.6	61°36.3	9°06.1	37°50.9	49°36.5	117°52.3
15	260°26.9	13.7′	00°46.8	15.5′	57.5′	104°50.9	76°29.2	75°50.0	61°03.1	9°38.9	38°20.9	50°09.9	118°25.9
16	274°59.6	13.7′	01°02.3	15.5′	57.5′	104°17.4	75°55.5	75°18.5	60°29.9	10°11.8	38°50.9	50°43.2	118°59.4
17	289°32.3	13.7′	01°17.8	15.5′	57.4′	103°43.9	75°21.8	74°47.0	59°56.8	10°44.8	39°21.0	51°16.6	119°32.9
18	304°05.1	13.7′	N01°33.3	15.4′	57.4′	103°10.4	74°48.1	74°15.6	59°23.7	11°17.8	39°51.1	51°49.9	
19	318°37.8	13.7′	01°48.7	15.4′	57.4′	102°36.9	74°14.4	73°44.2	58°50.6	11°50.9	40°21.3	52°23.2	
20	333°10.5	13.7′	02°04.1	15.4′	57.4′	102°03.4	73°40.8	73°12.8	58°17.6	12°24.0	40°51.5	52°56.5	
21	347°43.3	13.8′	02°19.5	15.4′	57.4′	101°30.0	73°07.1	72°41.5	57°44.6	12°57.1	41°21.8	53°29.8	
22	2°16.0	13.8′	02°34.9	15.4′	57.3′	100°56.6	72°33.5	72°10.1	57°11.6	13°30.3	41°52.2	54°03.0	
23	16°48.8	13.8′	02°50.3	15.3′	57.3′	100°23.2	71°59.9	71°38.9	56°38.6	14°03.4	42°22.6	54°36.3	
	SD = 15.8′		Mer. pass. 21:51										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Pollux	-Betelgeuse	-Mars	-Aldebaran	+Jupiter	+Fomalhaut	+Saturn	+Altair
0	31°21.5	13.8′	N03°05.6	15.3′	57.3′	99°49.8	75°00.3	71°26.4	56°05.7	14°36.6	42°53.0	55°09.5	75°33.8
1	45°54.3	13.8′	03°21.0	15.3′	57.3′	99°16.4	74°29.1	70°52.8	55°32.7	15°09.8	43°23.5	55°42.7	76°00.9
2	60°27.1	13.8′	03°36.3	15.3′	57.3′	98°43.1	73°57.8	70°19.3	54°59.8	15°42.9	43°54.0	56°15.9	76°28.0
3	74°59.9	13.8′	03°51.5	15.2′	57.2′	98°09.8	73°26.6	69°45.7	54°27.0	16°16.1	44°24.5	56°49.0	76°55.1
4	89°32.6	13.8′	04°06.8	15.2′	57.2′	97°36.5	72°55.5	69°12.2	53°54.1	16°49.3	44°55.1	57°22.2	77°22.3
5	104°05.4	13.8′	04°22.0	15.2′	57.2′	97°03.2	72°24.3	68°38.8	53°21.3	17°22.5	45°25.7	57°55.3	77°49.4
6	118°38.2	13.8′	N04°37.2	15.2′	57.2′	96°30.0	71°53.2	68°05.3	52°48.5	17°55.6	45°56.4	58°28.4	78°16.5
7	133°10.9	13.8′	04°52.3	15.1′	57.2′	95°56.7	71°22.2	67°31.9	52°15.8	18°28.8	46°27.0	59°01.5	78°43.7
8	147°43.7	13.8′	05°07.5	15.1′	57.1′	95°23.5	70°51.1	66°58.4	51°43.1	19°01.9	46°57.7	59°34.5	79°10.8
9	162°16.5	13.8′	05°22.6	15.1′	57.1′	94°50.3	70°20.1	66°25.0	51°10.4	19°35.1	47°28.4	60°07.6	79°37.9
10	176°49.2	13.8′	05°37.6	15.0′	57.1′	94°17.2	69°49.2	65°51.7	50°37.7	20°08.2	47°59.2	60°40.6	80°05.1
11	191°22.0	13.7′	05°52.6	15.0′	57.1′	93°44.0	69°18.3	65°18.3	50°05.1	20°41.3	48°29.9	61°13.6	80°32.2
12	205°54.7	13.7′	N06°07.6	15.0′	57.1′	93°10.9	68°47.4	64°45.0	49°32.4	21°14.4	49°00.7	61°46.5	80°59.4
13	220°27.5	13.7′	06°22.6	14.9′	57.0′	92°37.8	68°16.5	64°11.6	48°59.9	21°47.5	49°31.5	62°19.5	81°26.5
14	235°00.2	13.7′	06°37.5	14.9′	57.0′	92°04.7	67°45.7	63°38.3	48°27.3	22°20.6	50°02.3	62°52.4	81°53.7
15	249°32.9	13.7′	06°52.4	14.8′	57.0′	91°31.6	67°14.9	63°05.1	47°54.8	22°53.7	50°33.2	63°25.4	82°20.8
16	264°05.6	13.7′	07°07.2	14.8′	57.0′	90°58.6	66°44.2	62°31.8	47°22.3	23°26.7	51°04.0	63°58.2	82°48.0
17	278°38.3	13.7′	07°22.0	14.7′	57.0′	90°25.6	66°13.5	61°58.6	46°49.9	23°59.7	51°34.8	64°31.1	83°15.1
18	293°11.0	13.7′	N07°36.7	14.7′	56.9′	89°52.6	65°42.8	61°25.4	46°17.4	24°32.8	52°05.7	65°04.0	83°42.2
19	307°43.7	13.7′	07°51.5	14.7′	56.9′	89°19.6	65°12.2	60°52.2	45°45.0	25°05.8	52°36.6	65°36.8	84°09.3
20	322°16.3	13.6′	08°06.1	14.6′	56.9′	88°46.7	64°41.6	60°19.0	45°12.7	25°38.7	53°07.5	66°09.6	84°36.4
21	336°48.9	13.6′	08°20.7	14.6′	56.9′	88°13.7	64°11.1	59°45.8	44°40.4	26°11.7	53°38.4	66°42.4	85°03.5
22	351°21.6	13.6′	08°35.3	14.5′	56.9′	87°40.8	63°40.6	59°12.7	44°08.1	26°44.7	54°09.2	67°15.1	85°30.6
23	5°54.2	13.6′	08°49.8	14.5′	56.8′	87°08.0	63°10.1	58°39.6	43°35.8	27°17.6	54°40.1	67°47.9	85°57.7
	SD = 15.6′		Mer. pass. 22:36										

DUT1 = UT1-UTC = -0.0083 sec ΔT = TT-UT1 = +69.1923 sec

2022 November 07 to Nov. 09 UT

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Mon	**GHA**	ν	**Dec**	d	**HP**	**-Regulus**	**-Pollux**	**-Mars**	**-Aldebaran**	**+Jupiter**	**+Fomalhaut**	**+Saturn**	**+Altair**
0	20°26.7	13.6′	N09°04.3	14.4′	56.8′		86°35.1	58°06.5	43°03.6	27°50.5	55°11.1	68°20.6	86°24.8
1	34°59.3	13.5′	09°18.7	14.4′	56.8′		86°02.3	57°33.4	42°31.4	28°23.4	55°42.0	68°53.3	86°51.9
2	49°31.8	13.5′	09°33.1	14.3′	56.8′		85°29.5	57°00.4	41°59.3	28°56.3	56°12.9	69°26.0	87°18.9
3	64°04.4	13.5′	09°47.4	14.3′	56.7′		84°56.7	56°27.4	41°27.1	29°29.1	56°43.8	69°58.6	87°45.9
4	78°36.9	13.5′	10°01.6	14.2′	56.7′		84°23.9	55°54.4	40°55.1	30°01.9	57°14.7	70°31.3	88°12.9
5	93°09.3	13.5′	10°15.9	14.2′	56.7′		83°51.1	55°21.4	40°23.0	30°34.8	57°45.6	71°03.9	88°39.9
6	107°41.8	13.4′	N10°30.0	14.1′	56.7′	119°44.1	83°18.4	54°48.4	39°51.0	31°07.5	58°16.6	71°36.4	89°06.9
7	122°14.2	13.4′	10°44.1	14.0′	56.7′	119°11.5	82°45.7	54°15.5	39°19.1	31°40.3	58°47.5	72°09.0	89°33.9
8	136°46.6	13.4′	10°58.1	14.0′	56.6′	118°38.9	82°13.1	53°42.6	38°47.2	32°13.1	59°18.4	72°41.5	90°00.8
9	151°19.0	13.4′	11°12.1	13.9′	56.6′	118°06.4	81°40.4	53°09.7	38°15.3	32°45.8	59°49.3	73°14.1	90°27.8
10	165°51.4	13.3′	11°26.0	13.9′	56.6′	117°33.9	81°07.8	52°36.8	37°43.4	33°18.5	60°20.2	73°46.6	90°54.7
11	180°23.7	13.3′	11°39.9	13.8′	56.6′	117°01.4	80°35.2	52°04.0	37°11.6	33°51.2	60°51.1	74°19.0	91°21.6
12	194°56.0	13.3′	N11°53.7	13.7′	56.6′	116°28.9	80°02.6	51°31.2	36°39.9	34°23.8	61°22.0	74°51.5	91°48.4
13	209°28.2	13.2′	12°07.4	13.7′	56.5′	115°56.5	79°30.0	50°58.4	36°08.2	34°56.5	61°52.9	75°23.9	92°15.3
14	224°00.5	13.2′	12°21.1	13.6′	56.5′	115°24.1	78°57.5	50°25.6	35°36.5	35°29.1	62°23.8	75°56.3	92°42.1
15	238°32.7	13.2′	12°34.7	13.5′	56.5′	114°51.7	78°25.0	49°52.9	35°04.9	36°01.7	62°54.7	76°28.7	93°08.9
16	253°04.9	13.1′	12°48.2	13.5′	56.5′	114°19.3	77°52.5	49°20.1	34°33.4	36°34.3	63°25.5	77°01.0	93°35.6
17	267°37.0	13.1′	13°01.7	13.4′	56.4′	113°47.0	77°20.0	48°47.4	34°01.8	37°06.8	63°56.4	77°33.3	94°02.4
18	282°09.1	13.1′	N13°15.1	13.3′	56.4′	113°14.6	76°47.6	48°14.7	33°30.4	37°39.3	64°27.3	78°05.7	94°29.1
19	296°41.2	13.0′	13°28.4	13.3′	56.4′	112°42.3	76°15.2	47°42.1	32°59.0	38°11.8	64°58.1	78°37.9	94°55.8
20	311°13.2	13.0′	13°41.6	13.2′	56.4′	112°10.0	75°42.8	47°09.4	32°27.6	38°44.3	65°28.9	79°10.2	95°22.5
21	325°45.2	13.0′	13°54.8	13.1′	56.4′	111°37.8	75°10.4	46°36.8	31°56.3	39°16.8	65°59.8	79°42.4	95°49.1
22	340°17.2	12.9′	14°07.9	13.0′	56.3′	111°05.5	74°38.1	46°04.2	31°25.0	39°49.2	66°30.6	80°14.6	96°15.7
23	354°49.2	12.9′	14°21.0	13.0′	56.3′	110°33.3	74°05.8	45°31.7	30°53.8	40°21.6	67°01.4	80°46.8	96°42.3
	SD = 15.5′		Mer. pass. 23:21										

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Tue	**GHA**	ν	**Dec**	d	**HP**	**-Regulus**	**-Pollux**	**-Mars**	**-Aldebaran**	**+Jupiter**	**+Fomalhaut**	**+Saturn**	**+Altair**
0	9°21.1	12.9′	N14°33.9	12.9′	56.3′	110°01.1	73°33.5	44°59.1	30°22.7	40°54.0	67°32.2	81°19.0	97°08.8
1	23°52.9	12.8′	14°46.8	12.8′	56.3′	109°29.0	73°01.2	44°26.6	29°51.6	41°26.4	68°03.0	81°51.1	97°35.3
2	38°24.7	12.8′	14°59.6	12.7′	56.3′	108°56.8	72°29.0	43°54.1	29°20.6	41°58.7	68°33.8	82°23.2	98°01.8
3	52°56.5	12.8′	15°12.4	12.7′	56.2′	108°24.7	71°56.8	43°21.6	28°49.7	42°31.1	69°04.5	82°55.3	98°28.2
4	67°28.3	12.7′	15°25.0	12.6′	56.2′	107°52.6	71°24.6	42°49.2	28°18.8	43°03.3	69°35.3	83°27.4	98°54.6
5	82°00.0	12.7′	15°37.6	12.5′	56.2′	107°20.5	70°52.4	42°16.8	27°48.0	43°35.6	70°06.0	83°59.4	99°21.0
6	96°31.7	12.6′	N15°50.1	12.4′	56.2′	106°48.5	70°20.3	41°44.4	27°17.3	44°07.9	70°36.7	84°31.4	99°47.3
7	111°03.3	12.6′	16°02.5	12.3′	56.1′	106°16.5	69°48.1	41°12.0	26°46.6	44°40.1	71°07.4	85°03.4	100°13.6
8	125°34.9	12.6′	16°14.8	12.2′	56.1′	105°44.5	69°16.0	40°39.7	26°16.0	45°12.3	71°38.1	85°35.4	100°39.9
9	140°06.5	12.5′	16°27.0	12.2′	56.1′	105°12.5	68°44.0	40°07.3	25°45.5	45°44.5	72°08.8	86°07.3	101°06.1
10	154°38.0	12.5′	16°39.2	12.1′	56.1′	104°40.5	68°11.9	39°35.0	25°15.1	46°16.6	72°39.4	86°39.2	101°32.3
11	169°09.4	12.4′	16°51.3	12.0′	56.1′	104°08.6	67°39.9	39°02.8	24°44.7	46°48.7	73°10.1	87°11.1	101°58.4
12	183°40.9	12.4′	N17°03.3	11.9′	56.0′	103°36.7	67°07.9	38°30.5	24°14.5	47°20.8	73°40.7	87°43.0	102°24.5
13	198°12.3	12.3′	17°15.1	11.8′	56.0′	103°04.8	66°35.9	37°58.3	23°44.4	47°52.9	74°11.3	88°14.8	102°50.6
14	212°43.6	12.3′	17°27.0	11.7′	56.0′	102°33.0	66°04.0	37°26.1	23°14.3	48°25.0	74°41.9	88°46.7	103°16.6
15	227°14.9	12.3′	17°38.7	11.6′	56.0′	102°01.1	65°32.1	36°53.9	22°44.4	48°57.0	75°12.5	89°18.5	103°42.6
16	241°46.2	12.2′	17°50.3	11.5′	56.0′	101°29.3	65°00.2	36°21.8	22°14.5	49°29.0	75°43.1	89°50.2	104°08.5
17	256°17.4	12.2′	18°01.8	11.4′	55.9′	100°57.5	64°28.3	35°49.6	21°44.8	50°01.0	76°13.6	90°22.0	104°34.4
18	270°48.6	12.1′	N18°13.3	11.3′	55.9′	100°25.8	63°56.4	35°17.5	21°15.2	50°32.9	76°44.1	90°53.7	105°00.2
19	285°19.7	12.1′	18°24.6	11.3′	55.9′	99°54.1	63°24.6	34°45.5	20°45.8	51°04.9	77°14.6	91°25.4	105°26.0
20	299°50.8	12.0′	18°35.9	11.2′	55.9′	99°22.3	62°52.8	34°13.4	20°16.5	51°36.8	77°45.1	91°57.0	105°51.7
21	314°21.8	12.0′	18°47.0	11.1′	55.8′	98°50.7	62°21.1	33°41.4	19°47.3	52°08.7	78°15.6	92°28.7	106°17.4
22	328°52.8	11.9′	18°58.1	11.0′	55.8′	98°19.0	61°49.3	33°09.4	19°18.3	52°40.5	78°46.1	93°00.3	106°43.0
23	343°23.7	11.9′	19°09.1	10.9′	55.8′	97°47.4	61°17.6	32°37.4	18°49.4	53°12.4	79°16.5	93°31.9	107°08.6
	SD = 15.4′		Mer. pass. –:–										

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Wed	**GHA**	ν	**Dec**	d	**HP**	**-Regulus**	**-Procyon**	**-Pollux**	**-Mars**	**+Jupiter**	**+Fomalhaut**	**+Saturn**	**+Altair**
0	357°54.7	11.9′	N19°19.9	10.8′	55.8′	97°15.8	64°36.9	60°45.9	32°05.5	53°44.2	79°46.9	94°03.5	107°34.2
1	12°25.5	11.8′	19°30.7	10.7′	55.8′	96°44.2	64°07.9	60°14.2	31°33.6	54°15.9	80°17.3	94°35.0	107°59.6
2	26°56.3	11.8′	19°41.4	10.6′	55.7′	96°12.6	63°38.8	59°42.6	31°01.7	54°47.7	80°47.7	95°06.5	108°25.1
3	41°27.1	11.7′	19°51.9	10.5′	55.7′	95°41.1	63°09.9	59°11.0	30°29.8	55°19.4	81°18.0	95°38.0	108°50.5
4	55°57.8	11.7′	20°02.4	10.4′	55.7′	95°09.6	62°40.9	58°39.4	29°58.0	55°51.1	81°48.4	96°09.5	109°15.8
5	70°28.5	11.6′	20°12.8	10.3′	55.7′	94°38.1	62°12.1	58°07.8	29°26.2	56°22.8	82°18.7	96°40.9	109°41.0
6	84°59.1	11.6′	N20°23.0	10.2′	55.7′	94°06.6	61°43.2	57°36.2	28°54.4	56°54.5	82°49.0	97°12.3	110°06.2
7	99°29.7	11.5′	20°33.2	10.0′	55.6′	93°35.2	61°14.4	57°04.7	28°22.6	57°26.1	83°19.2	97°43.7	110°31.4
8	114°00.3	11.5′	20°43.2	9.9′	55.6′	93°03.7	60°45.7	56°33.2	27°50.9	57°57.7	83°49.5	98°15.1	110°56.5
9	128°30.8	11.5′	20°53.2	9.8′	55.6′	92°32.4	60°17.0	56°01.8	27°19.2	58°29.3	84°19.7	98°46.4	111°21.5
10	143°01.2	11.4′	21°03.0	9.7′	55.6′	92°01.0	59°48.4	55°30.3	26°47.5	59°00.9	84°49.9	99°17.8	111°46.5
11	157°31.6	11.4′	21°12.7	9.6′	55.5′	91°29.6	59°19.8	54°58.9	26°15.9	59°32.4	85°20.1	99°49.0	112°11.4
12	172°02.0	11.3′	N21°22.3	9.5′	55.5′	90°58.3	58°51.3	54°27.5	25°44.3	60°03.9	85°50.3	100°20.3	112°36.2
13	186°32.3	11.3′	21°31.8	9.4′	55.5′	90°27.0	58°22.8	53°56.1	25°12.7	60°35.4	86°20.4	100°51.6	113°01.0
14	201°02.6	11.2′	21°41.2	9.3′	55.5′	89°55.8	57°54.4	53°24.8	24°41.1	61°06.9	86°50.5	101°22.8	113°25.7
15	215°32.8	11.2′	21°50.5	9.2′	55.5′	89°24.5	57°26.0	52°53.4	24°09.6	61°38.3	87°20.6	101°54.0	113°50.3
16	230°03.0	11.1′	21°59.7	9.1′	55.4′	88°53.3	56°57.7	52°22.1	23°38.1	62°09.7	87°50.7	102°25.1	114°14.9
17	244°33.1	11.1′	22°08.8	9.0′	55.4′	88°22.1	56°29.4	51°50.9	23°06.6	62°41.1	88°20.8	102°56.3	114°39.4
18	259°03.2	11.1′	N22°17.7	8.8′	55.4′	87°50.9	56°01.2	51°19.6	22°35.2	63°12.5	88°50.8	103°27.4	115°03.9
19	273°33.3	11.0′	22°26.6	8.7′	55.4′	87°19.8	55°33.1	50°48.4	22°03.8	63°43.8	89°20.8	103°58.5	115°28.2
20	288°03.3	11.0′	22°35.3	8.6′	55.4′	86°48.7	55°05.0	50°17.2	21°32.4	64°15.1	89°50.8	104°29.5	115°52.5
21	302°33.3	10.9′	22°43.9	8.5′	55.3′	86°17.6	54°37.0	49°46.0	21°01.1	64°46.4	90°20.7	105°00.6	116°16.7
22	317°03.2	10.9′	22°52.4	8.4′	55.3′	85°46.5	54°09.0	49°14.9	20°29.7	65°17.7	90°50.7	105°31.6	116°40.9
23	331°33.1	10.8′	23°00.8	8.3′	55.3′	85°15.5	53°41.1	48°43.8	19°58.5	65°48.9	91°20.6	106°02.6	117°05.0
	SD = 15.2′		Mer. pass. 00:09										

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Thu	**GHA**	ν	**Dec**	d	**HP**	**-Regulus**	**-Procyon**	**-Pollux**	**-Mars**	**+Jupiter**	**+Fomalhaut**	**+Saturn**	**+Altair**
0	346°02.9	10.8′	N23°09.0	8.1′	55.3′	84°44.4	53°13.3	48°12.7	19°27.2	66°20.1	91°50.5	106°33.6	117°29.0
1	0°32.7	10.8′	23°17.1	8.0′	55.3′	84°13.4	52°45.5	47°41.6	18°56.0	66°51.3	92°20.4	107°04.5	117°52.9
2	15°02.5	10.7′	23°25.2	7.9′	55.2′	83°42.5	52°17.8	47°10.5	18°24.9	67°22.5	92°50.2	107°35.4	118°16.7
3	29°32.2	10.7′	23°33.1	7.8′	55.2′	83°11.5	51°50.2	46°39.5	17°53.7	67°53.6	93°20.0	108°06.3	118°40.5
4	44°01.9	10.6′	23°40.8	7.7′	55.2′	82°40.6	51°22.6	46°08.5	17°22.6	68°24.8	93°49.8	108°37.2	119°04.2
5	58°31.5	10.6′	23°48.5	7.5′	55.2′	82°09.7	50°55.1	45°37.5	16°51.6	68°55.9	94°19.6	109°08.0	119°27.7
6	73°01.1	10.6′	N23°56.0	7.4′	55.2′	81°38.8	50°27.6	45°06.6	16°20.6	69°26.9	94°49.3	109°38.9	119°51.3
7	87°30.7	10.5′	24°03.4	7.3′	55.1′	81°07.9	50°00.3	44°35.6	15°49.6	69°58.0	95°19.0	110°09.7	
8	102°00.2	10.5′	24°10.7	7.2′	55.1′	80°37.1	49°33.0	44°04.7	15°18.7	70°29.0	95°48.7	110°40.4	
9	116°29.7	10.4′	24°17.9	7.0′	55.1′	80°06.3	49°05.7	43°33.8	14°47.8	71°00.0	96°18.4	111°11.2	
10	130°59.1	10.4′	24°24.9	6.9′	55.1′	79°35.5	48°38.6	43°03.0	14°17.0	71°31.0	96°48.1	111°41.9	
11	145°28.6	10.4′	24°31.9	6.8′	55.1′	79°04.7	48°11.5	42°32.2	13°46.3	72°01.9	97°17.7	112°12.6	
12	159°57.9	10.3′	N24°38.6	6.7′	55.1′	78°34.0	47°44.5	42°01.3	13°15.6	72°32.9	97°47.3	112°43.3	
13	174°27.3	10.3′	24°45.3	6.5′	55.0′	78°03.3	47°17.6	41°30.6	12°44.9	73°03.8	98°16.8	113°13.9	
14	188°56.6	10.3′	24°51.9	6.4′	55.0′	77°32.6	46°50.8	40°59.8	12°14.4	73°34.7	98°46.4	113°44.6	
15	203°25.9	10.2′	24°58.3	6.3′	55.0′	77°01.9	46°24.0	40°29.0	11°43.9	74°05.5	99°15.9	114°15.2	
16	217°55.1	10.2′	25°04.6	6.2′	55.0′	76°31.3	45°57.4	39°58.3	11°13.4	74°36.4	99°45.4	114°45.8	
17	232°24.3	10.2′	25°10.7	6.0′	55.0′	76°00.6	45°30.8	39°27.6	10°43.1	75°07.2	100°14.9	115°16.3	
18	246°53.5	10.1′	N25°16.7	5.9′	54.9′	75°30.0	45°04.3	38°57.0	10°12.9	75°38.0	100°44.3	115°46.9	
19	261°22.7	10.1′	25°22.6	5.8′	54.9′	74°59.5	44°37.9	38°26.3	9°42.8	76°08.8	101°13.7	116°17.4	
20	275°51.8	10.1′	25°28.4	5.6′	54.9′	74°28.9	44°11.6	37°55.7	9°12.8	76°39.5	101°43.1	116°47.9	
21	290°20.9	10.1′	25°34.0	5.5′	54.9′	73°58.4	43°45.4	37°25.1	8°42.9	77°10.2	102°12.5	117°18.3	
22	304°49.9	10.0′	25°39.6	5.4′	54.9′	73°27.9	43°19.2	36°54.5	8°13.2	77°41.0	102°41.9	117°48.8	
23	319°19.0	10.0′	25°44.9	5.2′	54.9′	72°57.4	42°53.2	36°23.9	7°43.8	78°11.6	103°11.2	118°19.2	
	SD = 15.1′		Mer. pass. 00:58										

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Fri	**GHA**	ν	**Dec**	d	**HP**	**-Spica**	**-Regulus**	**-Pollux**	**±Mars**	**+Aldebaran**	**+Jupiter**	**+Fomalhaut**	**+Saturn**
0	333°48.0	10.0′	N25°50.2	5.1′	54.8′		72°26.9	35°53.4	7°14.5	11°20.7	78°42.3	103°40.5	118°49.6
1	348°17.0	10.0′	25°55.3	5.0′	54.8′		71°56.5	35°22.9	6°45.5	11°43.1	79°12.9	104°09.7	119°20.0
2	2°45.9	9.9′	26°00.3	4.9′	54.8′		71°26.0	34°52.4	6°16.9	12°06.0	79°43.6	104°39.0	119°50.3
3	17°14.9	9.9′	26°05.1	4.7′	54.8′		70°55.6	34°21.9	5°48.6	12°29.5	80°14.2	105°08.2	
4	31°43.8	9.9′	26°09.9	4.6′	54.8′		70°25.3	33°51.5	5°20.9	12°53.5	80°44.7	105°37.4	
5	46°12.7	9.9′	26°14.5	4.5′	54.8′		69°54.9	33°21.1	4°53.8	13°17.8	81°15.3	106°06.5	
6	60°41.5	9.9′	N26°18.9	4.3′	54.7′		69°24.6	32°50.7	4°27.5	13°42.6	81°45.8	106°35.7	
7	75°10.4	9.8′	26°23.2	4.2′	54.7′		68°54.2	32°20.3		14°07.7	82°16.3	107°04.8	
8	89°39.2	9.8′	26°27.4	4.1′	54.7′		68°24.0	31°49.9		14°33.1	82°46.8	107°33.9	
9	104°08.0	9.8′	26°31.5	3.9′	54.7′		67°53.7	31°19.6		14°58.8	83°17.3	108°02.9	
10	118°36.8	9.8′	26°35.4	3.8′	54.7′		67°23.4	30°49.3		15°24.7	83°47.8	108°31.9	
11	133°05.6	9.8′	26°39.2	3.6′	54.7′		66°53.2	30°19.0		15°50.9	84°18.2	109°00.9	
12	147°34.4	9.8′	N26°42.8	3.5′	54.6′		66°23.0	29°48.7		16°17.3	84°48.6	109°29.9	
13	162°03.1	9.7′	26°46.3	3.4′	54.6′	119°56.1	65°52.8	29°18.5		16°43.9	85°19.0	109°58.9	
14	176°31.9	9.7′	26°49.7	3.2′	54.6′	119°25.9	65°22.6	28°48.2		17°10.7	85°49.4	110°27.8	
15	191°00.6	9.7′	26°53.0	3.1′	54.6′	118°55.7	64°52.5	28°18.0		17°37.7	86°19.7	110°56.7	
16	205°29.3	9.7′	26°56.1	3.0′	54.6′	118°25.5	64°22.3	27°47.8		18°04.8	86°50.0	111°25.5	
17	219°58.0	9.7′	26°59.0	2.8′	54.6′	117°55.4	63°52.2	27°17.7		18°32.0	87°20.4	111°54.4	
18	234°26.8	9.7′	N27°01.9	2.7′	54.6′	117°25.2	63°22.1	26°47.5		18°59.4	87°50.6	112°23.2	
19	248°55.4	9.7′	27°04.6	2.6′	54.5′	116°55.1	62°52.1	26°17.4		19°26.9	88°20.9	112°52.0	
20	263°24.1	9.7′	27°07.1	2.4′	54.5′	116°25.0	62°22.0	25°47.3		19°54.5	88°51.2	113°20.7	
21	277°52.8	9.7′	27°09.6	2.3′	54.5′	115°55.0	61°52.0	25°17.2		20°22.2	89°21.4	113°49.4	
22	292°21.5	9.7′	27°11.9	2.2′	54.5′	115°24.9	61°22.0	24°47.1	5°05.5	20°50.0	89°51.6	114°18.1	
23	306°50.2	9.7′	27°14.0	2.0′	54.5′	114°54.9	60°52.0	24°17.1	5°32.6	21°17.9	90°21.8	114°46.8	
	SD = 15.0′		Mer. pass. 01:49										

h	Moon					Lunar Distance (objects with largest hourly LD delta)							
Sat	**GHA**	ν	**Dec**	d	**HP**	**-Spica**	**-Arcturus**	**-Regulus**	**-Pollux**	**+Mars**	**+Aldebaran**	**+Jupiter**	**+Fomalhaut**
0	321°18.9	9.7′	N27°16.0	1.9′	54.5′	114°24.8	108°56.9	60°22.0	23°47.1	6°00.2	21°45.9	90°52.0	115°15.5
1	335°47.5	9.7′	27°17.9	1.7′	54.5′	113°54.8	108°31.0	59°52.0	23°17.1	6°28.3	22°13.9	91°22.2	115°44.1
2	350°16.2	9.7′	27°19.7	1.6′	54.4′	113°24.8	108°05.1	59°22.1	22°47.1	6°56.7	22°42.0	91°52.3	116°12.7
3	4°44.9	9.7′	27°21.3	1.5′	54.4′	112°54.9	107°39.2	58°52.2	22°17.1	7°25.3	23°10.1	92°22.5	116°41.2
4	19°13.6	9.7′	27°22.7	1.3′	54.4′	112°24.9	107°13.3	58°22.3	21°47.2	7°54.2	23°38.4	92°52.6	117°09.7
5	33°42.3	9.7′	27°24.1	1.2′	54.4′	111°54.9	106°47.4	57°52.4	21°17.3	8°23.3	24°06.6	93°22.7	117°38.2
6	48°11.0	9.7′	N27°25.3	1.1′	54.4′	111°25.0	106°21.5	57°22.5	20°47.4	8°52.5	24°35.0	93°52.8	118°06.7
7	62°39.7	9.7′	27°26.3	0.9′	54.4′	110°55.1	105°55.6	56°52.7	20°17.5	9°21.8	25°03.3	94°22.8	118°35.2
8	77°08.4	9.7′	27°27.3	0.8′	54.4′	110°25.2	105°29.7	56°22.8	19°47.6	9°51.2	25°31.7	94°52.9	119°03.6
9	91°37.1	9.7′	27°28.1	0.7′	54.4′	109°55.3	105°03.7	55°53.0	19°17.8	10°20.7	26°00.2	95°22.9	119°32.0
10	106°05.8	9.7′	27°28.7	0.5′	54.3′	109°25.5	104°37.8	55°23.2	18°48.0	10°50.2	26°28.7	95°52.9	
11	120°34.5	9.7′	27°29.2	0.4′	54.3′	108°55.6	104°11.9	54°53.4	18°18.2	11°19.9	26°57.2	96°22.9	
12	135°03.3	9.8′	N27°29.6	0.2′	54.3′	108°25.8	103°45.9	54°23.7	17°48.4	11°49.5	27°25.8	96°52.9	
13	149°32.0	9.8′	27°29.9	0.1′	54.3′	107°55.9	103°20.0	53°53.9	17°18.7	12°19.2	27°54.4	97°22.9	
14	164°00.8	9.8′	27°30.0	-0.0′	54.3′	107°26.1	102°54.0	53°24.2	16°48.9	12°49.0	28°23.0	97°52.9	
15	178°29.6	9.8′	27°30.0	-0.2′	54.3′	106°56.3	102°28.1	52°54.4	16°19.2	13°18.8	28°51.6	98°22.8	
16	192°58.4	9.8′	27°29.8	-0.3′	54.3′	106°26.5	102°02.1	52°24.7	15°49.6	13°48.6	29°20.3	98°52.7	
17	207°27.2	9.8′	27°29.5	-0.4′	54.3′	105°56.8	101°36.2	51°55.1	15°19.9	14°18.4	29°49.0	99°22.7	
18	221°56.1	9.9′	N27°29.1	-0.6′	54.3′	105°27.0	101°10.2	51°25.4	14°50.3	14°48.3	30°17.7	99°52.6	
19	236°24.9	9.9′	27°28.5	-0.7′	54.3′	104°57.3	100°44.3	50°55.7	14°20.7	15°18.2	30°46.4	100°22.4	
20	250°53.8	9.9′	27°27.8	-0.8′	54.2′	104°27.5	100°18.3	50°26.1	13°51.1	15°48.1	31°15.1	100°52.3	
21	265°22.7	9.9′	27°27.0	-1.0′	54.2′	103°57.8	99°52.4	49°56.5	13°21.6	16°18.0	31°43.9	101°22.2	
22	279°51.7	10.0′	27°26.1	-1.1′	54.2′	103°28.1	99°26.4	49°26.8	12°52.0	16°47.9	32°12.7	101°52.0	
23	294°20.6	10.0′	27°25.0	-1.2′	54.2′	102°58.4	99°00.5	48°57.2	12°22.6	17°17.8	32°41.5	102°21.9	
	SD = 14.9′		Mer. pass. 02:40										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Sun	-Spica	-Regulus	-Pollux	+Mars	+Capella	+Aldebaran	+Jupiter
0	308°49.6	10.0′	N27°23.7	-1.4′	54.2′		102°28.7	48°27.7	11°53.1	17°47.7	26°23.5	33°10.3	102°51.7
1	323°18.6	10.0′	27°22.4	-1.5′	54.2′		101°59.1	47°58.1	11°23.7	18°17.6	26°43.3	33°39.1	103°21.5
2	337°47.6	10.1′	27°20.9	-1.6′	54.2′		101°29.4	47°28.5	10°54.3	18°47.6	27°03.3	34°07.9	103°51.3
3	352°16.7	10.1′	27°19.3	-1.8′	54.2′		100°59.7	46°59.0	10°25.0	19°17.5	27°23.6	34°36.8	104°21.1
4	6°45.8	10.1′	27°17.5	-1.9′	54.2′		100°30.1	46°29.5	9°55.7	19°47.5	27°44.2	35°05.6	104°50.9
5	21°14.9	10.1′	27°15.6	-2.0′	54.2′		100°00.5	45°59.9	9°26.5	20°17.4	28°05.0	35°34.5	105°20.6
6	35°44.0	10.2′	N27°13.6	-2.1′	54.2′		99°30.8	45°30.4	8°57.3	20°47.4	28°26.1	36°03.4	105°50.4
7	50°13.2	10.2′	27°11.4	-2.3′	54.2′		99°01.2	45°00.9	8°28.2	21°17.3	28°47.4	36°32.3	106°20.1
8	64°42.4	10.2′	27°09.2	-2.4′	54.2′		98°31.6	44°31.5	7°59.2	21°47.3	29°08.9	37°01.1	106°49.9
9	79°11.7	10.3′	27°06.8	-2.5′	54.2′		98°02.0	44°02.0	7°30.3	22°17.2	29°30.6	37°30.0	107°19.6
10	93°40.9	10.3′	27°04.2	-2.7′	54.1′		97°32.4	43°32.5	7°01.5	22°47.2	29°52.5	37°59.0	107°49.3
11	108°10.3	10.4′	27°01.5	-2.8′	54.1′		97°02.9	43°03.1	6°32.8	23°17.2	30°14.6	38°27.9	108°19.0
12	122°39.6	10.4′	N26°58.8	-2.9′	54.1′		96°33.3	42°33.7	6°04.3	23°47.1	30°36.9	38°56.8	108°48.7
13	137°09.0	10.4′	26°55.8	-3.1′	54.1′		96°03.7	42°04.3	5°36.0	24°17.1	30°59.4	39°25.7	109°18.4
14	151°38.4	10.5′	26°52.8	-3.2′	54.1′		95°34.2	41°34.9	5°08.0	24°47.0	31°22.0	39°54.7	109°48.1
15	166°07.9	10.5′	26°49.6	-3.3′	54.1′		95°04.6	41°05.5	4°40.3	25°17.0	31°44.8	40°23.6	110°17.8
16	180°37.4	10.5′	26°46.3	-3.4′	54.1′		94°35.1	40°36.1	4°13.0	25°46.9	32°07.8	40°52.6	110°47.5
17	195°06.9	10.6′	26°42.9	-3.6′	54.1′		94°05.6	40°06.7	3°46.3	26°16.9	32°30.9	41°21.5	111°17.1
18	209°36.5	10.6′	N26°39.3	-3.7′	54.1′		93°36.0	39°37.3	3°20.4	26°46.9	32°54.2	41°50.5	111°46.8
19	224°06.2	10.7′	26°35.6	-3.8′	54.1′		93°06.5	39°08.0		27°16.8	33°17.6	42°19.5	112°16.4
20	238°35.8	10.7′	26°31.8	-3.9′	54.1′	119°35.6	92°37.0	38°38.7		27°46.8	33°41.1	42°48.4	112°46.1
21	253°05.5	10.8′	26°27.9	-4.1′	54.1′	119°08.6	92°07.5	38°09.3		28°16.7	34°04.8	43°17.4	113°15.7
22	267°35.3	10.8′	26°23.8	-4.2′	54.1′	118°41.5	91°38.0	37°40.0		28°46.7	34°28.6	43°46.4	113°45.3
23	282°05.1	10.8′	26°19.6	-4.3′	54.1′	118°14.4	91°08.5	37°10.7		29°16.7	34°52.6	44°15.4	114°14.9
	SD = 14.8′		Mer. pass. 03:32			Sun SD = 16.2′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Sun	-Spica	-Arcturus	-Regulus	+Pollux	+Mars	+Aldebaran	+Jupiter
0	296°34.9	10.9′	N26°15.3	-4.4′	54.1′	117°47.4	90°39.0	88°12.3	36°41.4		29°46.6	44°44.4	114°44.6
1	311°04.8	10.9′	26°10.9	-4.5′	54.1′	117°20.3	90°09.5	87°46.5	36°12.1		30°16.6	45°13.4	115°14.2
2	325°34.8	11.0′	26°06.4	-4.7′	54.1′	116°53.3	89°40.0	87°20.6	35°42.8		30°46.5	45°42.4	115°43.8
3	340°04.7	11.0′	26°01.7	-4.8′	54.1′	116°26.3	89°10.5	86°54.7	35°13.6		31°16.5	46°11.4	116°13.4
4	354°34.8	11.1′	25°56.9	-4.9′	54.1′	115°59.2	88°41.0	86°28.9	34°44.3		31°46.5	46°40.4	116°43.0
5	9°04.9	11.1′	25°52.0	-5.0′	54.1′	115°32.2	88°11.6	86°03.0	34°15.1		32°16.4	47°09.5	117°12.6
6	23°35.0	11.2′	N25°47.0	-5.1′	54.1′	115°05.2	87°42.1	85°37.2	33°45.8		32°46.4	47°38.5	117°42.2
7	38°05.2	11.2′	25°41.8	-5.3′	54.1′	114°38.1	87°12.6	85°11.4	33°16.6		33°16.4	48°07.5	118°11.8
8	52°35.4	11.3′	25°36.6	-5.4′	54.1′	114°11.1	86°43.1	84°45.5	32°47.4	4°23.0	33°46.3	48°36.6	118°41.4
9	67°05.7	11.3′	25°31.2	-5.5′	54.1′	113°44.1	86°13.7	84°19.7	32°18.2	4°50.4	34°16.3	49°05.6	119°11.0
10	81°36.0	11.4′	25°25.7	-5.6′	54.1′	113°17.1	85°44.2	83°53.9	31°49.0	5°18.2	34°46.3	49°34.7	119°40.5
11	96°06.3	11.4′	25°20.1	-5.7′	54.1′	112°50.0	85°14.7	83°28.1	31°19.8	5°46.2	35°16.3	50°03.7	
12	110°36.8	11.5′	N25°14.4	-5.8′	54.1′	112°23.0	84°45.3	83°02.3	30°50.6	6°14.5	35°46.2	50°32.8	
13	125°07.3	11.5′	25°08.5	-6.0′	54.1′	111°56.0	84°15.8	82°36.5	30°21.5	6°43.0	36°16.2	51°01.9	
14	139°37.8	11.6′	25°02.6	-6.1′	54.1′	111°29.0	83°46.4	82°10.7	29°52.3	7°11.6	36°46.2	51°30.9	
15	154°08.4	11.6′	24°56.5	-6.2′	54.1′	111°01.9	83°16.9	81°44.9	29°23.2	7°40.3	37°16.2	52°00.0	
16	168°39.0	11.7′	24°50.3	-6.3′	54.1′	110°34.9	82°47.4	81°19.2	28°54.1	8°09.1	37°46.2	52°29.1	
17	183°09.7	11.7′	24°44.0	-6.4′	54.1′	110°07.9	82°18.0	80°53.4	28°24.9	8°38.0	38°16.2	52°58.2	
18	197°40.4	11.8′	N24°37.6	-6.5′	54.1′	109°40.9	81°48.5	80°27.7	27°55.8	9°07.0	38°46.2	53°27.3	
19	212°11.2	11.8′	24°31.1	-6.6′	54.1′	109°13.8	81°19.0	80°01.9	27°26.7	9°36.0	39°16.2	53°56.4	
20	226°42.0	11.9′	24°24.5	-6.7′	54.1′	108°46.8	80°49.5	79°36.2	26°57.7	10°05.1	39°46.2	54°25.5	
21	241°12.9	11.9′	24°17.7	-6.8′	54.1′	108°19.8	80°20.1	79°10.5	26°28.6	10°34.2	40°16.2	54°54.7	
22	255°43.9	12.0′	24°10.9	-7.0′	54.1′	107°52.8	79°50.6	78°44.8	25°59.5	11°03.4	40°46.3	55°23.8	
23	270°14.9	12.1′	24°03.9	-7.1′	54.1′	107°25.7	79°21.1	78°19.1	25°30.5	11°32.6	41°16.3	55°52.9	
	SD = 14.8′		Mer. pass. 04:22			Sun SD = 16.2′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Sun	-Spica	-Arcturus	-Regulus	+Pollux	+Mars	+Capella	+Aldebaran
0	284°45.9	12.1′	N23°56.9	-7.2′	54.1′	106°58.7	78°51.6	77°53.4	25°01.5	12°01.8	41°46.3	45°22.0	56°22.1
1	299°17.0	12.2′	23°49.7	-7.3′	54.1′	106°31.6	78°22.2	77°27.7	24°32.5	12°31.1	42°16.4	45°48.2	56°51.2
2	313°48.2	12.2′	23°42.4	-7.4′	54.1′	106°04.6	77°52.7	77°02.0	24°03.5	13°00.4	42°46.4	46°14.3	57°20.4
3	328°19.4	12.3′	23°35.0	-7.5′	54.1′	105°37.5	77°23.2	76°36.3	23°34.5	13°29.7	43°16.5	46°40.6	57°49.6
4	342°50.7	12.3′	23°27.5	-7.6′	54.2′	105°10.5	76°53.7	76°10.7	23°05.5	13°59.0	43°46.5	47°06.9	58°18.8
5	357°22.0	12.4′	23°19.9	-7.7′	54.2′	104°43.4	76°24.2	75°45.0	22°36.6	14°28.3	44°16.6	47°33.2	58°48.0
6	11°53.4	12.4′	N23°12.2	-7.8′	54.2′	104°16.3	75°54.6	75°19.4	22°07.7	14°57.7	44°46.7	47°59.6	59°17.2
7	26°24.8	12.5′	23°04.4	-7.9′	54.2′	103°49.3	75°25.1	74°53.8	21°38.8	15°27.1	45°16.8	48°26.1	59°46.4
8	40°56.3	12.5′	22°56.5	-8.0′	54.2′	103°22.2	74°55.6	74°28.2	21°09.9	15°56.5	45°46.9	48°52.6	60°15.6
9	55°27.8	12.6′	22°48.5	-8.1′	54.2′	102°55.1	74°26.1	74°02.6	20°41.0	16°25.9	46°17.0	49°19.2	60°44.8
10	69°59.4	12.6′	22°40.4	-8.2′	54.2′	102°28.0	73°56.5	73°37.0	20°12.2	16°55.4	46°47.1	49°45.8	61°14.1
11	84°31.1	12.7′	22°32.2	-8.3′	54.2′	102°00.9	73°27.0	73°11.4	19°43.4	17°24.8	47°17.2	50°12.4	61°43.3
12	99°02.8	12.7′	N22°23.9	-8.4′	54.2′	101°33.8	72°57.5	72°45.9	19°14.7	17°54.3	47°47.4	50°39.1	62°12.6
13	113°34.5	12.8′	22°15.5	-8.5′	54.2′	101°06.7	72°27.9	72°20.3	18°45.9	18°23.8	48°17.5	51°05.9	62°41.9
14	128°06.3	12.9′	22°07.0	-8.6′	54.2′	100°39.5	71°58.3	71°54.8	18°17.3	18°53.3	48°47.7	51°32.7	63°11.2
15	142°38.2	12.9′	21°58.4	-8.7′	54.2′	100°12.4	71°28.8	71°29.3	17°48.6	19°22.8	49°17.9	51°59.5	63°40.5
16	157°10.1	13.0′	21°49.7	-8.8′	54.3′	99°45.3	70°59.2	71°03.8	17°20.0	19°52.4	49°48.0	52°26.4	64°09.8
17	171°42.0	13.0′	21°40.9	-8.9′	54.3′	99°18.1	70°29.6	70°38.3	16°51.5	20°21.9	50°18.2	52°53.3	64°39.1
18	186°14.1	13.1′	N21°32.0	-9.0′	54.3′	98°50.9	70°00.0	70°12.8	16°23.0	20°51.5	50°48.4	53°20.3	65°08.5
19	200°46.1	13.1′	21°23.0	-9.1′	54.3′	98°23.8	69°30.4	69°47.3	15°54.5	21°21.1	51°18.7	53°47.3	65°37.8
20	215°18.2	13.2′	21°13.9	-9.2′	54.3′	97°56.6	69°00.7	69°21.9	15°26.2	21°50.7	51°48.9	54°14.3	66°07.2
21	229°50.4	13.2′	21°04.7	-9.3′	54.3′	97°29.4	68°31.1	68°56.4	14°57.9	22°20.3	52°19.1	54°41.4	66°36.6
22	244°22.6	13.3′	20°55.5	-9.4′	54.3′	97°02.2	68°01.5	68°31.0	14°29.7	22°49.9	52°49.4	55°08.6	67°05.9
23	258°54.9	13.3′	20°46.1	-9.5′	54.3′	96°34.9	67°31.8	68°05.6	14°01.5	23°19.6	53°19.7	55°35.8	67°35.4
	SD = 14.8′		Mer. pass. 05:11			Sun SD = 16.2′							

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Sun	-Arcturus	-Spica	-Regulus	+Pollux	+Mars	+Capella	+Aldebaran
0	273°27.2	13.4′	N20°36.7	-9.5′	54.3′	96°07.7	67°40.3	67°02.1	13°33.5	23°49.2	53°49.9	56°03.0	68°04.8
1	287°59.6	13.4′	20°27.1	-9.6′	54.4′	95°40.5	67°14.9	66°32.4	13°05.6	24°18.9	54°20.2	56°30.2	68°34.2
2	302°32.0	13.5′	20°17.5	-9.7′	54.4′	95°13.2	66°49.6	66°02.8	12°37.8	24°48.6	54°50.6	56°57.5	69°03.7
3	317°04.4	13.5′	20°07.8	-9.8′	54.4′	94°45.9	66°24.2	65°33.0	12°10.2	25°18.3	55°20.9	57°24.9	69°33.1
4	331°37.0	13.6′	19°57.9	-9.9′	54.4′	94°18.6	65°58.9	65°03.3	11°42.7	25°48.0	55°51.2	57°52.2	70°02.6
5	346°09.5	13.6′	19°48.0	-10.0′	54.4′	93°51.3	65°33.7	64°33.6	11°15.4	26°17.8	56°21.6	58°19.6	70°32.1
6	0°42.1	13.7′	N19°38.0	-10.1′	54.4′	93°24.0	65°08.4	64°03.8	10°48.3	26°47.5	56°52.0	58°47.1	71°01.6
7	15°14.8	13.7′	19°28.0	-10.2′	54.4′	92°56.7	64°43.1	63°34.1	10°21.4	27°17.3	57°22.4	59°14.6	71°31.2
8	29°47.5	13.7′	19°17.8	-10.2′	54.4′	92°29.4	64°17.9	63°04.3	9°54.8	27°47.1	57°52.8	59°42.1	72°00.7
9	44°20.2	13.8′	19°07.6	-10.3′	54.5′	92°02.0	63°52.7	62°34.5	9°28.5	28°16.9	58°23.2	60°09.7	72°30.3
10	58°53.0	13.8′	18°57.2	-10.4′	54.5′	91°34.6	63°27.6	62°04.7	9°02.6	28°46.8	58°53.7	60°37.3	72°59.9
11	73°25.9	13.9′	18°46.8	-10.5′	54.5′	91°07.2	63°02.4	61°34.9	8°37.0	29°16.6	59°24.2	61°04.9	73°29.5
12	87°58.7	13.9′	N18°36.3	-10.6′	54.5′	90°39.8	62°37.3	61°05.0	8°12.0	29°46.5	59°54.6	61°32.6	73°59.1
13	102°31.7	14.0′	18°25.7	-10.7′	54.5′	90°12.4	62°12.2	60°35.2	7°47.5	30°16.4	60°25.2	62°00.3	74°28.7
14	117°04.6	14.0′	18°15.1	-10.7′	54.5′	89°44.9	61°47.1	60°05.3	7°23.6	30°46.3	60°55.7	62°28.0	74°58.4
15	131°37.7	14.1′	18°04.3	-10.8′	54.6′	89°17.5	61°22.1	59°35.4	7°00.5	31°16.2	61°26.2	62°55.8	75°28.1
16	146°10.7	14.1′	17°53.5	-10.9′	54.6′	88°50.0	60°57.0	59°05.5	6°38.4	31°46.1	61°56.8	63°23.6	75°57.8
17	160°43.8	14.1′	17°42.6	-11.0′	54.6′	88°22.5	60°32.1	58°35.6		32°16.1	62°27.4	63°51.5	76°27.5
18	175°16.9	14.2′	N17°31.6	-11.1′	54.6′	87°55.0	60°07.1	58°05.6		32°46.1	62°58.0	64°19.4	76°57.2
19	189°50.1	14.2′	17°20.5	-11.1′	54.6′	87°27.4	59°42.2	57°35.7		33°16.1	63°28.6	64°47.3	77°27.0
20	204°23.3	14.3′	17°09.4	-11.2′	54.6′	86°59.9	59°17.3	57°05.7		33°46.1	63°59.3	65°15.3	77°56.8
21	218°56.6	14.3′	16°58.1	-11.3′	54.7′	86°32.3	58°52.4	56°35.7		34°16.2	64°30.0	65°43.3	78°26.6
22	233°29.9	14.3′	16°46.8	-11.4′	54.7′	86°04.7	58°27.6	56°05.7		34°46.3	65°00.6	66°11.3	78°56.4
23	248°03.2	14.4′	16°35.5	-11.5′	54.7′	85°37.1	58°02.8	55°35.6		35°16.4	65°31.4	66°39.4	79°26.2
	SD = 14.8′		Mer. pass. 05:57			Sun SD = 16.2′							

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Thu	GHA	ν	Dec	d	HP	-Rigil Kent.	-Sun	-Arcturus	-Spica	+Pollux	+Mars	+Capella	+Aldebaran
0	262°36.6	14.4′	N16°24.0	-11.5′	54.7′	93°38.5	85°09.4	57°38.0	55°05.6	35°46.5	66°02.1	67°07.5	79°56.1
1	277°10.0	14.4′	16°12.5	-11.6′	54.7′	93°15.7	84°41.8	57°13.3	54°35.5	36°16.6	66°32.9	67°35.6	80°26.0
2	291°43.4	14.5′	16°00.9	-11.7′	54.8′	92°52.9	84°14.1	56°48.6	54°05.4	36°46.8	67°03.7	68°03.8	80°55.9
3	306°16.9	14.5′	15°49.2	-11.7′	54.8′	92°30.1	83°46.4	56°24.0	53°35.3	37°17.0	67°34.5	68°32.0	81°25.8
4	320°50.4	14.5′	15°37.4	-11.8′	54.8′	92°07.2	83°18.6	55°59.4	53°05.1	37°47.2	68°05.3	69°00.2	81°55.8
5	335°24.0	14.6′	15°25.6	-11.9′	54.8′	91°44.4	82°50.9	55°34.8	52°35.0	38°17.4	68°36.2	69°28.5	82°25.8
6	349°57.5	14.6′	N15°13.7	-12.0′	54.8′	91°21.5	82°23.1	55°10.3	52°04.8	38°47.7	69°07.1	69°56.8	82°55.8
7	4°31.1	14.6′	15°01.8	-12.0′	54.9′	90°58.6	81°55.3	54°45.8	51°34.6	39°17.9	69°38.0	70°25.2	83°25.8
8	19°04.8	14.7′	14°49.7	-12.1′	54.9′	90°35.7	81°27.5	54°21.4	51°04.3	39°48.3	70°08.9	70°53.5	83°55.9
9	33°38.4	14.7′	14°37.6	-12.2′	54.9′	90°12.7	80°59.6	53°57.0	50°34.1	40°18.6	70°39.9	71°22.0	84°26.0
10	48°12.1	14.7′	14°25.5	-12.2′	54.9′	89°49.7	80°31.7	53°32.7	50°03.8	40°48.9	71°10.9	71°50.4	84°56.1
11	62°45.9	14.8′	14°13.2	-12.3′	55.0′	89°26.8	80°03.8	53°08.4	49°33.5	41°19.3	71°41.9	72°18.9	85°26.2
12	77°19.6	14.8′	N14°00.9	-12.4′	55.0′	89°03.8	79°35.9	52°44.1	49°03.2	41°49.7	72°13.0	72°47.4	85°56.4
13	91°53.4	14.8′	13°48.5	-12.4′	55.0′	88°40.7	79°08.0	52°20.0	48°32.8	42°20.2	72°44.0	73°16.0	86°26.5
14	106°27.2	14.8′	13°36.1	-12.5′	55.0′	88°17.7	78°40.0	51°55.9	48°02.4	42°50.6	73°15.1	73°44.6	86°56.8
15	121°01.0	14.9′	13°23.6	-12.6′	55.0′	87°54.6	78°12.0	51°31.8	47°32.0	43°21.1	73°46.3	74°13.2	87°27.0
16	135°34.9	14.9′	13°11.0	-12.6′	55.1′	87°31.6	77°43.9	51°07.8	47°01.6	43°51.7	74°17.4	74°41.8	87°57.3
17	150°08.8	14.9′	12°58.4	-12.7′	55.1′	87°08.5	77°15.9	50°43.9	46°31.1	44°22.2	74°48.6	75°10.5	88°27.6
18	164°42.7	14.9′	N12°45.7	-12.8′	55.1′	86°45.4	76°47.8	50°20.0	46°00.7	44°52.8	75°19.8	75°39.3	88°57.9
19	179°16.6	14.9′	12°32.9	-12.8′	55.1′	86°22.2	76°19.7	49°56.2	45°30.2	45°23.4	75°51.1	76°08.0	89°28.2
20	193°50.5	15.0′	12°20.1	-12.9′	55.2′	85°59.1	75°51.5	49°32.5	44°59.6	45°54.0	76°22.4	76°36.8	89°58.6
21	208°24.5	15.0′	12°07.2	-12.9′	55.2′	85°36.0	75°23.3	49°08.8	44°29.1	46°24.7	76°53.7	77°05.7	90°29.0
22	222°58.5	15.0′	11°54.3	-13.0′	55.2′	85°12.8	74°55.1	48°45.2	43°58.5	46°55.4	77°25.0	77°34.5	90°59.5
23	237°32.5	15.0′	11°41.3	-13.1′	55.2′	84°49.6	74°26.9	48°21.7	43°27.9	47°26.1	77°56.4	78°03.4	91°29.9
	SD = 14.9′		Mer. pass. 06:41			Sun SD = 16.2′							

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Fri	GHA	ν	Dec	d	HP	-Rigil Kent.	-Sun	-Arcturus	-Spica	+Regulus	+Pollux	+Mars	+Aldebaran
0	252°06.5	15.0′	N11°28.2	-13.1′	55.3′	84°26.4	73°58.6	47°58.3	42°57.2	12°15.9	47°56.9	78°27.8	92°00.4
1	266°40.5	15.0′	11°15.1	-13.2′	55.3′	84°03.3	73°30.4	47°34.9	42°26.6	12°44.5	48°27.7	78°59.2	92°30.9
2	281°14.6	15.1′	11°01.9	-13.2′	55.3′	83°40.0	73°02.0	47°11.7	41°55.9	13°13.3	48°58.5	79°30.7	93°01.5
3	295°48.6	15.1′	10°48.6	-13.3′	55.3′	83°16.8	72°33.7	46°48.5	41°25.2	13°42.3	49°29.3	80°02.2	93°32.1
4	310°22.7	15.1′	10°35.3	-13.4′	55.4′	82°53.6	72°05.3	46°25.4	40°54.4	14°11.5	50°00.2	80°33.7	94°02.7
5	324°56.8	15.1′	10°22.0	-13.4′	55.4′	82°30.4	71°36.9	46°02.4	40°23.6	14°40.8	50°31.1	81°05.3	94°33.3
6	339°30.9	15.1′	N10°08.6	-13.5′	55.4′	82°07.1	71°08.4	45°39.5	39°52.8	15°10.2	51°02.1	81°36.9	95°04.0
7	354°05.0	15.1′	09°55.1	-13.5′	55.5′	81°43.9	70°39.9	45°16.7	39°22.0	15°39.8	51°33.1	82°08.5	95°34.7
8	8°39.1	15.1′	09°41.6	-13.6′	55.5′	81°20.6	70°11.4	44°54.0	38°51.1	16°09.5	52°04.1	82°40.2	96°05.5
9	23°13.2	15.1′	09°28.0	-13.6′	55.5′	80°57.4	69°42.9	44°31.5	38°20.2	16°39.3	52°35.1	83°11.9	96°36.3
10	37°47.3	15.1′	09°14.4	-13.7′	55.5′	80°34.1	69°14.3	44°09.0	37°49.3	17°09.2	53°06.2	83°43.7	97°07.1
11	52°21.5	15.1′	09°00.7	-13.7′	55.6′	80°10.8	68°45.7	43°46.6	37°18.4	17°39.2	53°37.3	84°15.4	97°37.9
12	66°55.6	15.1′	N08°47.0	-13.8′	55.6′	79°47.5	68°17.0	43°24.4	36°47.4	18°09.3	54°08.5	84°47.2	98°08.8
13	81°29.7	15.1′	08°33.2	-13.8′	55.6′	79°24.3	67°48.3	43°02.3	36°16.4	18°39.5	54°39.6	85°19.1	98°39.7
14	96°03.9	15.1′	08°19.4	-13.9′	55.7′	79°01.0	67°19.6	42°40.3	35°45.3	19°09.8	55°10.8	85°51.0	99°10.6
15	110°38.0	15.1′	08°05.5	-13.9′	55.7′	78°37.7	66°50.9	42°18.5	35°14.2	19°40.1	55°42.1	86°22.9	99°41.6
16	125°12.2	15.1′	07°51.6	-14.0′	55.7′	78°14.4	66°22.1	41°56.7	34°43.1	20°10.6	56°13.4	86°54.8	100°12.6
17	139°46.3	15.1′	07°37.6	-14.0′	55.7′	77°51.1	65°53.3	41°35.2	34°12.0	20°41.1	56°44.7	87°26.8	100°43.6
18	154°20.5	15.1′	N07°23.6	-14.1′	55.8′	77°27.8	65°24.4	41°13.7	33°40.9	21°11.6	57°16.1	87°58.9	101°14.7
19	168°54.6	15.1′	07°09.5	-14.1′	55.8′	77°04.6	64°55.5	40°52.5	33°09.7	21°42.3	57°47.5	88°30.9	101°45.8
20	183°28.8	15.1′	06°55.4	-14.2′	55.8′	76°41.3	64°26.6	40°31.3	32°38.4	22°13.0	58°18.9	89°03.0	102°17.0
21	198°02.9	15.1′	06°41.3	-14.2′	55.9′	76°18.0	63°57.6	40°10.4	32°07.2	22°43.8	58°50.4	89°35.2	102°48.2
22	212°37.0	15.1′	06°27.1	-14.2′	55.9′	75°54.7	63°28.6	39°49.6	31°35.9	23°14.7	59°21.9	90°07.4	103°19.4
23	227°11.2	15.1′	06°12.9	-14.3′	55.9′	75°31.5	62°59.6	39°29.0	31°04.6	23°45.6	59°53.4	90°39.6	103°50.6
	SD = 15.1′		Mer. pass. 07:24			Sun SD = 16.2′							

DUT1 = UT1-UTC = -0.0065 sec ΔT = TT-UT1 = +69.1905 sec

2022 November 19 to Nov. 21 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	-Rigil Kent.	-Hadar	-Sun	-Spica	+Regulus	+Pollux	+Mars	+Aldebaran
0	241°45.3	15.1′	N05°58.6	-14.3′	56.0′	75°08.2	71°55.1	62°30.5	30°33.3	24°16.6	60°25.0	91°11.8	104°21.9
1	256°19.4	15.1′	05°44.3	-14.4′	56.0′	74°45.0	71°33.1	62°01.4	30°01.9	24°47.6	60°56.6	91°44.1	104°53.2
2	270°53.5	15.1′	05°29.9	-14.4′	56.0′	74°21.7	71°11.1	61°32.2	29°30.5	25°18.7	61°28.3	92°16.5	105°24.6
3	285°27.6	15.1′	05°15.5	-14.4′	56.1′	73°58.5	70°49.1	61°03.0	28°59.1	25°49.9	62°00.0	92°48.8	105°56.0
4	300°01.6	15.1′	05°01.0	-14.5′	56.1′	73°35.3	70°27.1	60°33.8	28°27.6	26°21.1	62°31.7	93°21.3	106°27.4
5	314°35.7	15.0′	04°46.6	-14.5′	56.1′	73°12.1	70°05.2	60°04.5	27°56.2	26°52.4	63°03.5	93°53.7	106°58.9
6	329°09.7	15.0′	N04°32.1	-14.6′	56.2′	72°48.9	69°43.2	59°35.2	27°24.6	27°23.8	63°35.3	94°26.2	107°30.4
7	343°43.7	15.0′	04°17.5	-14.6′	56.2′	72°25.7	69°21.4	59°05.9	26°53.1	27°55.1	64°07.1	94°58.7	108°01.9
8	358°17.8	15.0′	04°02.9	-14.6′	56.2′	72°02.5	68°59.5	58°36.5	26°21.5	28°26.6	64°39.0	95°31.3	108°33.5
9	12°51.7	15.0′	03°48.3	-14.7′	56.2′	71°39.4	68°37.7	58°07.1	25°50.0	28°58.1	65°11.0	96°03.9	109°05.1
10	27°25.7	15.0′	03°33.6	-14.7′	56.3′	71°16.3	68°15.9	57°37.6	25°18.3	29°29.7	65°42.9	96°36.6	109°36.8
11	41°59.7	14.9′	03°18.9	-14.7′	56.3′	70°53.1	67°54.2	57°08.1	24°46.7	30°01.3	66°15.0	97°09.3	110°08.5
12	56°33.6	14.9′	N03°04.2	-14.8′	56.3′	70°30.1	67°32.5	56°38.6	24°15.0	30°32.9	66°47.0	97°42.0	110°40.2
13	71°07.5	14.9′	02°49.5	-14.8′	56.4′	70°07.0	67°10.8	56°09.0	23°43.4	31°04.7	67°19.1	98°14.8	111°12.0
14	85°41.4	14.9′	02°34.7	-14.8′	56.4′	69°43.9	66°49.2	55°39.4	23°11.7	31°36.4	67°51.2	98°47.7	111°43.8
15	100°15.2	14.8′	02°19.9	-14.8′	56.4′	69°20.9	66°27.6	55°09.7	22°39.9	32°08.2	68°23.4	99°20.5	112°15.6
16	114°49.1	14.8′	02°05.0	-14.9′	56.5′	68°57.9	66°06.1	54°40.0	22°08.2	32°40.1	68°55.6	99°53.4	112°47.5
17	129°22.9	14.8′	01°50.2	-14.9′	56.5′	68°35.0	65°44.6	54°10.2	21°36.4	33°12.0	69°27.9	100°26.4	113°19.4
18	143°56.6	14.7′	N01°35.3	-14.9′	56.6′	68°12.0	65°23.1	53°40.5	21°04.6	33°44.0	70°00.2	100°59.4	113°51.4
19	158°30.4	14.7′	01°20.3	-14.9′	56.6′	67°49.1	65°01.7	53°10.6	20°32.8	34°16.1	70°32.5	101°32.4	114°23.4
20	173°04.1	14.7′	01°05.4	-15.0′	56.6′	67°26.2	64°40.4	52°40.8	20°01.0	34°48.1	71°04.9	102°05.5	114°55.4
21	187°37.8	14.6′	00°50.4	-15.0′	56.7′	67°03.4	64°19.1	52°10.8	19°29.2	35°20.3	71°37.3	102°38.6	115°27.5
22	202°11.4	14.6′	00°35.4	-15.0′	56.7′	66°40.6	63°57.9	51°40.9	18°57.4	35°52.4	72°09.8	103°11.8	115°59.6
23	216°45.0	14.6′	00°20.4	-15.0′	56.7′	66°17.8	63°36.7	51°10.9	18°25.5	36°24.7	72°42.3	103°45.0	116°31.8
	SD = 15.3′		Mer. pass. 08:07			Sun SD = 16.2′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Rigil Kent.	-Hadar	-Sun	-Spica	+Regulus	+Pollux	+Mars	+Aldebaran
0	231°18.6	14.5′	N00°05.4	-15.1′	56.8′	65°55.1	63°15.6	50°40.8	17°53.7	36°56.9	73°14.9	104°18.3	117°04.0
1	245°52.1	14.5′	S00°09.7	-15.1′	56.8′	65°32.4	62°54.6	50°10.8	17°21.9	37°29.3	73°47.5	104°51.6	117°36.2
2	260°25.6	14.5′	00°24.8	-15.1′	56.8′	65°09.8	62°33.6	49°40.6	16°50.0	38°01.7	74°20.1	105°24.9	118°08.5
3	274°59.1	14.4′	00°39.9	-15.1′	56.9′	64°47.2	62°12.7	49°10.5	16°18.2	38°34.1	74°52.8	105°58.3	118°40.8
4	289°32.5	14.4′	00°55.0	-15.1′	56.9′	64°24.6	61°51.8	48°40.2	15°46.4	39°06.6	75°25.5	106°31.8	119°13.1
5	304°05.8	14.3′	01°10.1	-15.1′	56.9′	64°02.1	61°31.0	48°10.0	15°14.7	39°39.1	75°58.3	107°05.3	119°45.5
6	318°39.2	14.3′	S01°25.2	-15.2′	57.0′	63°39.7	61°10.3	47°39.7	14°42.9	40°11.7	76°31.1	107°38.8	
7	333°12.5	14.2′	01°40.4	-15.2′	57.0′	63°17.3	60°49.7	47°09.4	14°11.2	40°44.3	77°04.0	108°12.4	
8	347°45.7	14.2′	01°55.6	-15.2′	57.0′	62°55.0	60°29.2	46°39.0	13°39.5	41°17.0	77°36.9	108°46.0	
9	2°18.9	14.1′	02°10.8	-15.2′	57.1′	62°32.7	60°08.7	46°08.5	13°07.9	41°49.7	78°09.8	109°19.6	
10	16°52.0	14.1′	02°25.9	-15.2′	57.1′	62°10.4	59°48.4	45°38.1	12°36.4	42°22.5	78°42.8	109°53.3	
11	31°25.1	14.0′	02°41.1	-15.2′	57.2′	61°48.3	59°28.1	45°07.6	12°05.0	42°55.3	79°15.9	110°27.1	
12	45°58.1	14.0′	S02°56.4	-15.2′	57.2′	61°26.2	59°07.9	44°37.0	11°33.7	43°28.1	79°48.9	111°00.9	
13	60°31.1	13.9′	03°11.6	-15.2′	57.2′	61°04.2	58°47.8	44°06.4	11°02.4	44°01.1	80°22.1	111°34.7	
14	75°04.0	13.9′	03°26.8	-15.2′	57.3′	60°42.2	58°27.8	43°35.7	10°31.4	44°34.0	80°55.2	112°08.6	
15	89°36.9	13.8′	03°42.0	-15.2′	57.3′	60°20.3	58°07.9	43°05.1	10°00.5	45°07.0	81°28.4	112°42.6	
16	104°09.7	13.8′	03°57.3	-15.2′	57.3′	59°58.5	57°48.1	42°34.3	9°29.9	45°40.1	82°01.7	113°16.5	
17	118°42.5	13.7′	04°12.5	-15.2′	57.4′	59°36.8	57°28.4	42°03.5	8°59.5	46°13.2	82°35.0	113°50.6	
18	133°15.2	13.6′	S04°27.7	-15.2′	57.4′	59°15.1	57°08.8	41°32.7	8°29.4	46°46.4	83°08.4	114°24.6	
19	147°47.8	13.6′	04°43.0	-15.2′	57.4′	58°53.5	56°49.3	41°01.9	7°59.8	47°19.6	83°41.7	114°58.8	
20	162°20.4	13.5′	04°58.2	-15.2′	57.5′	58°32.0	56°29.9	40°30.9	7°30.6	47°52.9	84°15.2	115°32.9	
21	176°52.9	13.4′	05°13.4	-15.2′	57.5′	58°10.7	56°10.7		7°02.0	48°26.2	84°48.7	116°07.1	
22	191°25.4	13.4′	05°28.7	-15.2′	57.5′	57°49.3	55°51.6		6°34.2	48°59.5	85°22.2	116°41.4	
23	205°57.8	13.3′	05°43.9	-15.2′	57.6′	57°28.1	55°32.6		6°07.2	49°32.9	85°55.8	117°15.7	
	SD = 15.5′		Mer. pass. 08:50			Sun SD = 16.2′							

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Rigil Kent.	-Hadar	+Spica	+Regulus	+Procyon	+Pollux	+Betelgeuse	+Mars
0	220°30.1	13.2′	S05°59.1	-15.2′	57.6′	57°07.0	55°13.7		50°06.3	84°56.7	86°29.4	110°54.1	117°50.0
1	235°02.3	13.2′	06°14.3	-15.2′	57.7′	56°46.0	54°54.9		50°39.8	85°28.1	87°03.0	111°25.5	118°24.4
2	249°34.5	13.1′	06°29.5	-15.2′	57.7′	56°25.1	54°36.3		51°13.4	85°59.6	87°36.7	111°56.9	118°58.9
3	264°06.6	13.0′	06°44.7	-15.2′	57.7′	56°04.3	54°17.9		51°47.0	86°31.1	88°10.5	112°28.3	119°33.4
4	278°38.6	13.0′	06°59.9	-15.2′	57.8′	55°43.6	53°59.6		52°20.6	87°02.6	88°44.3	112°59.8	
5	293°10.6	12.9′	07°15.1	-15.2′	57.8′	55°23.1	53°41.4		52°54.3	87°34.2	89°18.1	113°31.2	
6	307°42.5	12.8′	S07°30.2	-15.1′	57.8′	55°02.6	53°23.4		53°28.0	88°05.8	89°52.0	114°02.8	
7	322°14.3	12.7′	07°45.4	-15.1′	57.9′	54°42.3	53°05.5		54°01.8	88°37.5	90°25.9	114°34.3	
8	336°46.0	12.7′	08°00.5	-15.1′	57.9′	54°22.1	52°47.8		54°35.6	89°09.3	90°59.9	115°05.8	
9	351°17.7	12.6′	08°15.6	-15.1′	57.9′	54°02.0	52°30.3		55°09.5	89°41.0	91°33.9	115°37.4	
10	5°49.3	12.5′	08°30.7	-15.1′	58.0′	53°42.1	52°12.9		55°43.4	90°12.8	92°08.0	116°09.0	
11	20°20.8	12.4′	08°45.8	-15.0′	58.0′	53°22.3	51°55.7		56°17.4	90°44.7	92°42.1	116°40.6	
12	34°52.2	12.3′	S09°00.8	-15.0′	58.0′	53°02.6	51°38.7		56°51.4	91°16.6	93°16.3	117°12.2	
13	49°23.5	12.2′	09°15.8	-15.0′	58.1′	52°43.1	51°21.8		57°25.5	91°48.5	93°50.5	117°43.8	
14	63°54.7	12.2′	09°30.8	-15.0′	58.1′	52°23.8	51°05.2		57°59.6	92°20.5	94°24.7	118°15.5	
15	78°25.9	12.1′	09°45.8	-14.9′	58.2′	52°04.6	50°48.7		58°33.7	92°52.5	94°59.0	118°47.1	
16	92°57.0	12.0′	10°00.7	-14.9′	58.2′	51°45.5	50°32.4		59°07.9	93°24.5	95°33.3	119°18.8	
17	107°27.9	11.9′	10°15.6	-14.9′	58.2′	51°26.6	50°16.3		59°42.2	93°56.6	96°07.7	119°50.5	
18	121°58.8	11.8′	S10°30.5	-14.8′	58.3′	51°07.9	50°00.5		60°16.4	94°28.7	96°42.1		
19	136°29.6	11.7′	10°45.4	-14.8′	58.3′	50°49.4	49°44.8	7°32.8	60°50.8	95°00.9	97°16.6		
20	151°00.4	11.6′	11°00.2	-14.8′	58.3′	50°31.0	49°29.4	8°03.0	61°25.1	95°33.1	97°51.1		
21	165°31.0	11.5′	11°14.9	-14.7′	58.4′	50°12.8	49°14.2	8°33.7	61°59.6	96°05.3	98°25.6		
22	180°01.5	11.4′	11°29.7	-14.7′	58.4′	49°54.9	48°59.2	9°05.0	62°34.0	96°37.6	99°00.2		
23	194°31.9	11.3′	11°44.4	-14.7′	58.4′	49°37.1		9°36.6	63°08.5	97°09.9	99°34.8		
	SD = 15.7′		Mer. pass. 09:36										

DUT1 = UT1-UTC = -0.0077 sec ΔT = TT-UT1 = +69.1917 sec

2022 November 22 to Nov. 24 UT

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Rigil Kent.	+Spica	+Arcturus	+Regulus	+Procyon	+Adhara	+Pollux	+Sirius
0	209°02.3	11.2′	S11°59.0	-14.6′	58.5′	49°19.5	10°08.6		63°43.1	97°42.2	98°37.9	100°09.5	105°27.2
1	223°32.5	11.1′	12°13.6	-14.6′	58.5′	49°02.1	10°41.0		64°17.7	98°14.6	98°56.7	100°44.2	105°51.2
2	238°02.6	11.0′	12°28.2	-14.5′	58.5′	48°44.9	11°13.6		64°52.3	98°47.0	99°15.5	101°19.0	106°15.1
3	252°32.7	10.9′	12°42.7	-14.5′	58.6′	48°27.9	11°46.5		65°27.0	99°19.4	99°34.3	101°53.8	106°39.0
4	267°02.6	10.8′	12°57.2	-14.4′	58.6′	48°11.2	12°19.5		66°01.7	99°51.9	99°53.0	102°28.6	107°02.9
5	281°32.4	10.7′	13°11.6	-14.4′	58.6′	47°54.6	12°52.8		66°36.5	100°24.4	100°11.8	103°03.5	107°26.8
6	296°02.1	10.6′	S13°25.9	-14.3′	58.7′	47°38.3	13°26.3	32°30.7	67°11.3	100°56.9	100°30.5	103°38.5	107°50.7
7	310°31.8	10.5′	13°40.2	-14.3′	58.7′	47°22.3	13°59.9	32°46.3	67°46.2	101°29.5	100°49.2	104°13.4	108°14.5
8	325°01.3	10.4′	13°54.5	-14.2′	58.7′	47°06.5	14°33.6	33°02.3	68°21.1	102°02.1	101°07.8	104°48.4	108°38.3
9	339°30.7	10.3′	14°08.7	-14.1′	58.8′	46°50.9	15°07.5	33°18.7	68°56.0	102°34.7	101°26.5	105°23.5	109°02.0
10	354°00.0	10.2′	14°22.8	-14.1′	58.8′	46°35.6	15°41.5	33°35.6	69°31.0	103°07.3	101°45.1	105°58.6	109°25.7
11	8°29.2	10.1′	14°36.9	-14.0′	58.8′	46°20.5	16°15.6	33°52.9	70°06.0	103°40.0	102°03.7	106°33.7	109°49.4
12	22°58.3	10.0′	S14°50.9	-13.9′	58.9′		16°49.9	34°10.7	70°41.1	104°12.7	102°22.2	107°08.9	110°13.0
13	37°27.3	9.9′	15°04.9	-13.9′	58.9′		17°24.2	34°28.9	71°16.2	104°45.4	102°40.7	107°44.1	110°36.5
14	51°56.1	9.8′	15°18.8	-13.8′	58.9′		17°58.6	34°47.4	71°51.4	105°18.2	102°59.2	108°19.4	111°00.1
15	66°24.9	9.6′	15°32.6	-13.7′	59.0′		18°33.2	35°06.4	72°26.5	105°50.9	103°17.6	108°54.7	111°23.5
16	80°53.5	9.5′	15°46.3	-13.7′	59.0′		19°07.8	35°25.7	73°01.8	106°23.7	103°36.0	109°30.0	111°46.9
17	95°22.0	9.4′	16°00.0	-13.6′	59.0′		19°42.4	35°45.5	73°37.0	106°56.5	103°54.3	110°05.4	112°10.3
18	109°50.5	9.3′	S16°13.6	-13.5′	59.1′		20°17.2	36°05.6	74°12.3	107°29.4	104°12.6	110°40.8	112°33.6
19	124°18.8	9.2′	16°27.1	-13.4′	59.1′		20°52.0	36°26.0	74°47.7	108°02.2	104°30.9	111°16.2	112°56.8
20	138°46.9	9.1′	16°40.6	-13.4′	59.1′		21°26.9	36°46.8	75°23.1	108°35.1	104°49.1	111°51.7	113°20.0
21	153°15.0	8.9′	16°53.9	-13.3′	59.1′		22°01.9	37°08.0	75°58.5	109°08.0	105°07.2	112°27.2	113°43.1
22	167°43.0	8.8′	17°07.2	-13.2′	59.2′		22°37.0	37°29.4	76°33.9	109°40.9	105°25.3	113°02.8	114°06.2
23	182°10.8	8.7′	17°20.4	-13.1′	59.2′		23°12.1	37°51.3	77°09.4	110°13.8	105°43.3	113°38.4	114°29.1
	SD = 15.9′		Mer. pass. 10:25										

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	+Spica	+Arcturus	+Regulus	+Adhara	+Procyon	+Pollux	+Sirius
0	196°38.5	8.6′	S17°33.5	-13.0′	59.2′	23°47.2	38°13.4	77°45.0	106°01.3	110°46.7	114°14.0	114°52.0
1	211°06.1	8.5′	17°46.5	-12.9′	59.3′	24°22.4	38°35.8	78°20.5	106°19.2	111°19.6	114°49.7	115°14.8
2	225°33.6	8.4′	17°59.5	-12.8′	59.3′	24°57.7	38°58.5	78°56.1	106°37.1	111°52.6	115°25.4	115°37.6
3	240°00.9	8.2′	18°12.3	-12.7′	59.3′	25°33.0	39°21.6	79°31.8	106°54.8	112°25.5	116°01.1	116°00.2
4	254°28.2	8.1′	18°25.0	-12.6′	59.3′	26°08.4	39°44.9	80°07.4	107°12.6	112°58.5	116°36.9	116°22.8
5	268°55.3	8.0′	18°37.7	-12.5′	59.4′	26°43.8	40°08.5	80°43.1	107°30.2	113°31.5	117°12.7	116°45.2
6	283°22.3	7.9′	S18°50.2	-12.4′	59.4′	——— New Moon ———						
7	297°49.1	7.7′	19°02.7	-12.3′	59.4′	——— New Moon ———						
8	312°15.9	7.6′	19°15.0	-12.2′	59.5′	——— New Moon ———						
9	326°42.5	7.5′	19°27.3	-12.1′	59.5′	——— New Moon ———						
10	341°09.0	7.4′	19°39.4	-12.0′	59.5′	——— New Moon ———						
11	355°35.4	7.3′	19°51.4	-11.9′	59.5′	——— New Moon ———						
12	10°01.6	7.1′	S20°03.3	-11.8′	59.6′	——— New Moon ———						
13	24°27.8	7.0′	20°15.1	-11.7′	59.6′	——— New Moon ———						
14	38°53.8	6.9′	20°26.8	-11.6′	59.6′	——— New Moon ———						
15	53°19.7	6.8′	20°38.4	-11.4′	59.6′	——— New Moon ———						
16	67°45.4	6.6′	20°49.8	-11.3′	59.7′	——— New Moon ———						
17	82°11.1	6.5′	21°01.2	-11.2′	59.7′	——— New Moon ———						
18	96°36.6	6.4′	S21°12.4	-11.1′	59.7′	——— New Moon ———						
19	111°02.0	6.3′	21°23.4	-10.9′	59.7′	——— New Moon ———						
20	125°27.3	6.2′	21°34.4	-10.8′	59.7′	——— New Moon ———						
21	139°52.5	6.0′	21°45.2	-10.7′	59.8′	——— New Moon ———						
22	154°17.5	5.9′	21°55.9	-10.6′	59.8′	——— New Moon ———						
23	168°42.4	5.8′	22°06.5	-10.4′	59.8′	——— New Moon ———						
	SD = 16.2′		Mer. pass. 11:18									

h — Moon — Lunar Distance (objects with largest hourly LD delta)

Thu	GHA	ν	Dec	d	HP	-Jupiter	-Achernar	-Deneb	-Fomalhaut	-Saturn	-Altair
0	183°07.2	5.7′	S22°16.9	-10.3′	59.8′	——— New Moon ———					
1	197°31.9	5.6′	22°27.2	-10.1′	59.9′	——— New Moon ———					
2	211°56.4	5.4′	22°37.3	-10.0′	59.9′	——— New Moon ———					
3	226°20.9	5.3′	22°47.3	-9.9′	59.9′	——— New Moon ———					
4	240°45.2	5.2′	22°57.1	-9.7′	59.9′	——— New Moon ———					
5	255°09.4	5.1′	23°06.8	-9.6′	59.9′	——— New Moon ———					
6	269°33.5	5.0′	S23°16.4	-9.4′	59.9′	——— New Moon ———					
7	283°57.5	4.9′	23°25.8	-9.3′	60.0′	——— New Moon ———					
8	298°21.3	4.7′	23°35.1	-9.1′	60.0′	——— New Moon ———					
9	312°45.1	4.6′	23°44.2	-8.9′	60.0′	——— New Moon ———					
10	327°08.7	4.5′	23°53.1	-8.8′	60.0′	——— New Moon ———					
11	341°32.2	4.4′	24°01.9	-8.6′	60.0′	——— New Moon ———					
12	355°55.7	4.3′	S24°10.5	-8.5′	60.1′	——— New Moon ———					
13	10°19.0	4.2′	24°19.0	-8.3′	60.1′	——— New Moon ———					
14	24°42.2	4.1′	24°27.3	-8.1′	60.1′	——— New Moon ———					
15	39°05.3	4.0′	24°35.4	-8.0′	60.1′	——— New Moon ———					
16	53°28.3	3.9′	24°43.4	-7.8′	60.1′	——— New Moon ———					
17	67°51.2	3.8′	24°51.2	-7.6′	60.1′	106°06.5	89°20.0	88°44.7	81°13.3	66°51.0	57°02.9
18	82°14.0	3.7′	S24°58.8	-7.5′	60.1′	105°29.8	88°58.8	88°29.0	80°38.0	66°14.5	56°35.8
19	96°36.7	3.6′	25°06.3	-7.3′	60.2′	104°53.0	88°37.7	88°13.3	80°02.7	65°37.9	56°08.8
20	110°59.3	3.5′	25°13.6	-7.1′	60.2′	104°16.2	88°16.5	87°57.6	79°27.4	65°01.4	55°41.9
21	125°21.8	3.4′	25°20.7	-6.9′	60.2′	103°39.5	87°55.3	87°41.9	78°52.1	64°24.8	55°15.2
22	139°44.2	3.3′	25°27.6	-6.7′	60.2′	103°02.7	87°34.1	87°26.2	78°16.8	63°48.2	54°48.5
23	154°06.5	3.2′	25°34.3	-6.6′	60.2′	102°25.9	87°13.0	87°10.5	77°41.5	63°11.6	54°22.0
	SD = 16.3′		Mer. pass. 12:17								

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Fri	GHA	ν	Dec	d	HP	-Jupiter	-Deneb	-Achernar	-Fomalhaut	-Saturn	-Altair
0	168°28.7	3.1′	S25°40.9	-6.4′	60.2′	101°49.0	86°54.9	86°51.8	77°06.2	62°35.0	53°55.6
1	182°50.9	3.1′	25°47.3	-6.2′	60.2′	101°12.2	86°39.2	86°30.6	76°30.8	61°58.3	53°29.3
2	197°12.9	3.0′	25°53.5	-6.0′	60.2′	100°35.3	86°23.6	86°09.5	75°55.5	61°21.7	53°03.2
3	211°34.9	2.9′	25°59.5	-5.8′	60.2′	99°58.5	86°08.0	85°48.3	75°20.2	60°45.1	52°37.2
4	225°56.8	2.8′	26°05.3	-5.6′	60.3′	99°21.6	85°52.4	85°27.2	74°44.9	60°08.4	52°11.3
5	240°18.7	2.8′	26°11.0	-5.5′	60.3′	98°44.7	85°36.8	85°06.1	74°09.5	59°31.7	51°45.6
6	254°40.4	2.7′	S26°16.4	-5.3′	60.3′	98°07.9	85°21.2	84°45.0	73°34.2	58°55.1	51°20.1
7	269°02.1	2.6′	26°21.7	-5.1′	60.3′	97°31.0	85°05.7	84°23.9	72°58.9	58°18.4	50°54.7
8	283°23.7	2.5′	26°26.8	-4.9′	60.3′	96°54.1	84°50.2	84°02.9	72°23.5	57°41.7	50°29.5
9	297°45.2	2.5′	26°31.6	-4.7′	60.3′	96°17.1	84°34.7	83°41.9	71°48.2	57°05.0	50°04.5
10	312°06.7	2.4′	26°36.3	-4.5′	60.3′	95°40.2	84°19.2	83°20.9	71°12.9	56°28.3	49°39.6
11	326°28.1	2.4′	26°40.8	-4.3′	60.3′	95°03.3	84°03.8	82°59.9	70°37.6	55°51.6	49°14.9
12	340°49.5	2.3′	S26°45.1	-4.1′	60.3′	94°26.4	83°48.4	82°39.0	70°02.3	55°14.9	48°50.4
13	355°10.8	2.2′	26°49.2	-3.9′	60.3′	93°49.4	83°33.0	82°18.0	69°27.0	54°38.2	48°26.1
14	9°32.0	2.2′	26°53.1	-3.7′	60.3′	93°12.5	83°17.7	81°57.2	68°51.7	54°01.5	48°02.0
15	23°53.2	2.1′	26°56.8	-3.5′	60.3′	92°35.6	83°02.4	81°36.3	68°16.4	53°24.8	47°38.1
16	38°14.4	2.1′	27°00.3	-3.3′	60.3′	91°58.6	82°47.1	81°15.5	67°41.2	52°48.1	47°14.4
17	52°35.5	2.1′	27°03.6	-3.1′	60.3′	91°21.7	82°31.9	80°54.8	67°05.9	52°11.4	46°50.9
18	66°56.5	2.0′	S27°06.7	-2.9′	60.3′	90°44.7	82°16.7	80°34.1	66°30.7	51°34.7	46°27.7
19	81°17.5	2.0′	27°09.6	-2.7′	60.3′	90°07.8	82°01.6	80°13.4	65°55.4	50°57.9	46°04.6
20	95°38.5	2.0′	27°12.3	-2.5′	60.3′	89°30.8	81°46.5	79°52.7	65°20.2	50°21.2	45°41.9
21	109°59.5	1.9′	27°14.7	-2.3′	60.4′	88°53.9	81°31.5	79°32.2	64°45.0	49°44.5	45°19.3
22	124°20.4	1.9′	27°17.0	-2.1′	60.4′	88°16.9		79°11.6	64°09.8	49°07.8	44°57.0
23	138°41.3	1.9′	27°19.1	-1.9′	60.4′	87°40.0		78°51.2	63°34.7	48°31.1	44°35.0
	SD = 16.4′		Mer. pass. 13:20								

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Sat	GHA	ν	Dec	d	HP	-Jupiter	-Achernar	-Fomalhaut	-Saturn	-Altair	+Sun
0	153°02.2	1.9′	S27°21.0	-1.7′	60.4′	87°03.0	78°30.7	62°59.5	47°54.4	44°13.2	
1	167°23.0	1.8′	27°22.6	-1.5′	60.4′	86°26.1	78°10.4	62°24.4	47°17.7	43°51.7	
2	181°43.8	1.8′	27°24.1	-1.3′	60.4′	85°49.1	77°50.1	61°49.3	46°41.0	43°30.4	
3	196°04.7	1.8′	27°25.3	-1.0′	60.4′	85°12.2	77°29.8	61°14.3	46°04.4	43°09.5	
4	210°25.5	1.8′	27°26.4	-0.8′	60.4′	84°35.2	77°09.7	60°39.2	45°27.7	42°48.8	
5	224°46.3	1.8′	27°27.2	-0.6′	60.4′	83°58.3	76°49.6	60°04.2	44°51.0	42°28.5	
6	239°07.1	1.8′	S27°27.8	-0.4′	60.4′	83°21.4	76°29.5	59°29.2	44°14.3	42°08.4	
7	253°27.9	1.8′	27°28.3	-0.2′	60.3′	82°44.5	76°09.5	58°54.3	43°37.7	41°48.7	
8	267°48.7	1.8′	27°28.5	-0.0′	60.3′	82°07.5	75°49.6	58°19.3	43°01.1	41°29.3	
9	282°09.5	1.8′	27°28.5	0.2′	60.3′	81°30.6	75°29.8	57°44.4	42°24.4	41°10.2	
10	296°30.3	1.8′	27°28.3	0.4′	60.3′	80°53.7	75°10.1	57°09.6	41°47.8	40°51.5	
11	310°51.1	1.8′	27°27.9	0.6′	60.3′	80°16.8	74°50.4	56°34.7	41°11.2	40°33.1	
12	325°11.9	1.9′	S27°27.3	0.8′	60.3′	79°39.9	74°30.8	55°59.9	40°34.6	40°15.0	
13	339°32.8	1.9′	27°26.5	1.0′	60.3′	79°03.0	74°11.3	55°25.2	39°58.0	39°57.3	
14	353°53.7	1.9′	27°25.5	1.2′	60.3′	78°26.2	73°51.9	54°50.5	39°21.4	39°40.0	
15	8°14.6	1.9′	27°24.2	1.4′	60.3′	77°49.3	73°32.5	54°15.8	38°44.9	39°23.1	
16	22°35.5	2.0′	27°22.8	1.6′	60.3′	77°12.5	73°13.3	53°41.2	38°08.3	39°06.5	
17	36°56.5	2.0′	27°21.2	1.8′	60.3′	76°35.6	72°54.2	53°06.6	37°31.8	38°50.4	
18	51°17.4	2.0′	S27°19.3	2.0′	60.3′	75°58.8	72°35.1	52°32.0	36°55.3	38°34.7	
19	65°38.5	2.1′	27°17.3	2.2′	60.3′	75°22.0	72°16.1	51°57.5	36°18.8	38°19.3	
20	79°59.5	2.1′	27°15.0	2.4′	60.3′	74°45.1	71°57.3	51°23.1	35°42.4		
21	94°20.6	2.2′	27°12.6	2.7′	60.3′	74°08.3	71°38.5	50°48.7	35°05.9		40°15.1
22	108°41.8	2.2′	27°09.9	2.9′	60.3′	73°31.6	71°19.9	50°14.4	34°29.5		40°49.4
23	123°03.0	2.3′	27°07.1	3.1′	60.3′	72°54.8	71°01.3	49°40.1	33°53.1		41°23.6
	SD = 16.5′		Mer. pass. 14:26			Sun SD = 16.2′					

h | Moon | | | | | Lunar Distance (objects with largest hourly LD delta)

Sun	GHA	ν	Dec	d	HP	-Jupiter	-Achernar	-Fomalhaut	-Saturn	+Sun
0	137°24.3	2.3′	S27°04.0	3.2′	60.3′	72°18.0	70°42.9	49°05.8	33°16.7	41°57.9
1	151°45.6	2.4′	27°00.8	3.4′	60.2′	71°41.3	70°24.6	48°31.7	32°40.3	42°32.1
2	166°06.9	2.4′	26°57.3	3.6′	60.2′	71°04.6	70°06.3	47°57.6	32°04.0	43°06.4
3	180°28.3	2.5′	26°53.7	3.8′	60.2′	70°27.8	69°48.2	47°23.5	31°27.7	43°40.6
4	194°49.8	2.5′	26°49.8	4.0′	60.2′	69°51.1	69°30.3	46°49.5	30°51.4	44°14.8
5	209°11.4	2.6′	26°45.8	4.2′	60.2′	69°14.5	69°12.4	46°15.6	30°15.1	44°49.0
6	223°33.0	2.7′	S26°41.6	4.4′	60.2′	68°37.8	68°54.6	45°41.8	29°38.9	45°23.1
7	237°54.7	2.8′	26°37.2	4.6′	60.2′	68°01.2	68°37.0	45°08.0	29°02.7	45°57.3
8	252°16.4	2.8′	26°32.6	4.8′	60.2′	67°24.5	68°19.5	44°34.3	28°26.5	46°31.4
9	266°38.3	2.9′	26°27.7	5.0′	60.2′	66°47.9	68°02.2	44°00.7	27°50.3	47°05.6
10	281°00.2	3.0′	26°22.8	5.2′	60.1′	66°11.3	67°44.9	43°27.2	27°14.2	47°39.7
11	295°22.2	3.1′	26°17.6	5.4′	60.1′	65°34.7	67°27.8	42°53.8	26°38.2	48°13.8
12	309°44.2	3.2′	S26°12.2	5.6′	60.1′	64°58.2	67°10.9	42°20.4	26°02.1	48°47.8
13	324°06.4	3.2′	26°06.7	5.7′	60.1′	64°21.6	66°54.1	41°47.1	25°26.1	49°21.9
14	338°28.6	3.3′	26°00.9	5.9′	60.1′	63°45.1	66°37.4	41°14.0	24°50.2	49°55.9
15	352°51.0	3.4′	25°55.0	6.1′	60.1′	63°08.6	66°20.8	40°40.9	24°14.2	50°29.9
16	7°13.4	3.5′	25°48.9	6.3′	60.1′	62°32.1	66°04.4	40°07.9	23°38.4	51°03.9
17	21°35.9	3.6′	25°42.6	6.5′	60.1′	61°55.7	65°48.2	39°35.1	23°02.5	51°37.9
18	35°58.5	3.7′	S25°36.2	6.6′	60.0′	61°19.2	65°32.1	39°02.3	22°26.8	52°11.9
19	50°21.2	3.8′	25°29.5	6.8′	60.0′	60°42.8	65°16.1	38°29.7	21°51.0	52°45.8
20	64°44.0	3.9′	25°22.7	7.0′	60.0′	60°06.4	65°00.3	37°57.1	21°15.4	53°19.7
21	79°06.9	4.0′	25°15.8	7.1′	60.0′	59°30.1	64°44.7	37°24.7	20°39.7	53°53.6
22	93°29.9	4.1′	25°08.6	7.3′	60.0′	58°53.7	64°29.2	36°52.4	20°04.2	54°27.5
23	107°53.0	4.2′	25°01.3	7.5′	60.0′	58°17.4	64°13.9	36°20.3	19°28.7	55°01.3
	SD = 16.4′		Mer. pass. 15:30			Sun SD = 16.2′				

h | Moon | Lunar Distance (objects with largest hourly LD delta)

Mon	GHA	ν	Dec	d	HP	-Aldebaran	-Rigel	-Jupiter	-Fomalhaut	-Saturn	+Sun
0	122°16.2	4.3′	S24°53.8	7.7′	59.9′			57°41.1	35°48.3	18°53.2	55°35.2
1	136°39.5	4.4′	24°46.1	7.8′	59.9′			57°04.8	35°16.4	18°17.9	56°09.0
2	151°02.9	4.5′	24°38.3	8.0′	59.9′			56°28.5	34°44.7	17°42.6	56°42.8
3	165°26.4	4.6′	24°30.4	8.1′	59.9′			55°52.3	34°13.1	17°07.4	57°16.5
4	179°50.0	4.7′	24°22.2	8.3′	59.9′			55°16.1	33°41.7	16°32.3	57°50.3
5	194°13.7	4.8′	24°13.9	8.5′	59.9′			54°39.9	33°10.5	15°57.3	58°24.0
6	208°37.6	5.0′	S24°05.4	8.6′	59.8′			54°03.7	32°39.4	15°22.4	58°57.7
7	223°01.5	5.1′	23°56.8	8.8′	59.8′			53°27.6	32°08.5	14°47.6	59°31.3
8	237°25.6	5.2′	23°48.1	8.9′	59.8′			52°51.5	31°37.8	14°13.0	60°05.0
9	251°49.8	5.3′	23°39.1	9.1′	59.8′			52°15.4	31°07.3	13°38.4	60°38.6
10	266°14.1	5.4′	23°30.1	9.2′	59.8′			51°39.4	30°37.0	13°04.1	61°12.2
11	280°38.5	5.5′	23°20.9	9.4′	59.7′		119°34.0	51°03.3	30°06.9	12°29.9	61°45.8
12	295°03.0	5.6′	S23°11.5	9.5′	59.7′		119°06.3	50°27.3	29°37.0	11°55.9	62°19.3
13	309°27.7	5.8′	23°02.0	9.7′	59.7′		118°38.5	49°51.4	29°07.4	11°22.1	62°52.8
14	323°52.4	5.9′	22°52.3	9.8′	59.7′	119°37.1	118°10.7	49°15.4	28°38.0	10°48.6	63°26.3
15	338°17.3	6.0′	22°42.5	9.9′	59.7′	119°01.5	117°42.7	48°39.5	28°08.9	10°15.4	63°59.8
16	352°42.3	6.1′	22°32.6	10.1′	59.6′	118°26.0	117°14.8	48°03.6	27°40.1	9°42.5	64°33.2
17	7°07.4	6.2′	22°22.5	10.2′	59.6′	117°50.5	116°46.8	47°27.7	27°11.5	9°10.0	65°06.6
18	21°32.6	6.3′	S22°12.3	10.3′	59.6′	117°15.0	116°18.7	46°51.9	26°43.2	8°37.9	65°40.0
19	35°58.0	6.5′	22°02.0	10.5′	59.6′	116°39.5	115°50.6	46°16.1	26°15.2	8°06.4	66°13.4
20	50°23.4	6.6′	21°51.5	10.6′	59.6′	116°04.0	115°22.4	45°40.3	25°47.6	7°35.6	66°46.7
21	64°49.0	6.7′	21°40.9	10.7′	59.5′	115°28.6	114°54.2	45°04.5	25°20.3	7°05.5	67°20.0
22	79°14.7	6.8′	21°30.2	10.8′	59.5′	114°53.2	114°25.9	44°28.8	24°53.4	6°36.3	67°53.3
23	93°40.5	6.9′	21°19.4	11.0′	59.5′	114°17.8	113°57.6	43°53.1	24°26.8		68°26.5
	SD = 16.3′		Mer. pass. 16:30			Sun SD = 16.2′					

h | Moon | Lunar Distance (objects with largest hourly LD delta)

Tue	GHA	ν	Dec	d	HP	-Mars	-Capella	-Betelgeuse	-Aldebaran	-Jupiter	+Saturn	+Altair	+Sun
0	108°06.5	7.1′	S21°08.4	11.1′	59.5′				113°42.4	43°17.5			68°59.7
1	122°32.6	7.2′	20°57.3	11.2′	59.5′				113°07.1	42°41.8			69°32.9
2	136°58.7	7.3′	20°46.1	11.3′	59.4′				112°31.7	42°06.2			70°06.1
3	151°25.0	7.4′	20°34.8	11.4′	59.4′				111°56.4	41°30.6			70°39.2
4	165°51.5	7.5′	20°23.3	11.6′	59.4′				111°21.2	40°55.1			71°12.3
5	180°18.0	7.7′	20°11.8	11.7′	59.4′				110°45.9	40°19.6			71°45.4
6	194°44.6	7.8′	S20°00.1	11.8′	59.3′				110°10.7	39°44.1			72°18.5
7	209°11.4	7.9′	19°48.3	11.9′	59.3′	119°44.9			109°35.5	39°08.6			72°51.5
8	223°38.3	8.0′	19°36.4	12.0′	59.3′	119°08.5			109°00.3	38°33.2		38°43.6	73°24.5
9	238°05.3	8.1′	19°24.4	12.1′	59.3′	118°32.1			108°25.2	37°57.8		38°59.0	73°57.4
10	252°32.4	8.2′	19°12.3	12.2′	59.3′	117°55.7			107°50.1	37°22.5		39°14.7	74°30.4
11	266°59.7	8.4′	19°00.1	12.3′	59.2′	117°19.4	119°35.4		107°15.0	36°47.1		39°30.8	75°03.3
12	281°27.0	8.5′	S18°47.8	12.4′	59.2′	116°43.0	119°02.7		106°39.9	36°11.8		39°47.2	75°36.1
13	295°54.5	8.6′	18°35.4	12.5′	59.2′	116°06.7	118°30.0		106°04.9	35°36.6		40°03.9	76°09.0
14	310°22.1	8.7′	18°22.9	12.6′	59.2′	115°30.5	117°57.2		105°29.9	35°01.3		40°21.0	76°41.8
15	324°49.8	8.8′	18°10.3	12.7′	59.1′	114°54.2	117°24.5		104°54.9	34°26.1		40°38.4	77°14.6
16	339°17.6	8.9′	17°57.6	12.8′	59.1′	114°18.0	116°51.8		104°19.9	33°51.0		40°56.0	77°47.4
17	353°45.5	9.0′	17°44.8	12.9′	59.1′	113°41.8	116°19.1		103°45.0	33°15.8		41°14.0	78°20.1
18	8°13.5	9.1′	S17°32.0	13.0′	59.1′	113°05.7	115°46.3	119°33.8	103°10.1	32°40.7	7°35.0	41°32.3	78°52.8
19	22°41.7	9.3′	17°19.0	13.0′	59.0′	112°29.6	115°13.6	119°01.3	102°35.2	32°05.6	8°05.3	41°50.8	79°25.5
20	37°09.9	9.4′	17°06.0	13.1′	59.0′	111°53.5	114°40.9	118°28.9	102°00.4	31°30.6	8°36.1	42°09.6	79°58.1
21	51°38.3	9.5′	16°52.8	13.2′	59.0′	111°17.4	114°08.2	117°56.4	101°25.6	30°55.6	9°07.5	42°28.7	80°30.7
22	66°06.8	9.6′	16°39.6	13.3′	59.0′	110°41.4	113°35.5	117°23.9	100°50.8	30°20.6	9°39.2	42°48.0	81°03.3
23	80°35.3	9.7′	16°26.3	13.4′	58.9′	110°05.4	113°02.8	116°51.4	100°16.0	29°45.7	10°11.2	43°07.6	81°35.8
	SD = 16.2′		Mer. pass. 17:26			Sun SD = 16.2′							

h | Moon | Lunar Distance (objects with largest hourly LD delta)

Wed	GHA	ν	Dec	d	HP	-Capella	-Mars	-Aldebaran	-Jupiter	+Saturn	+Fomalhaut	+Altair	+Sun
0	95°04.0	9.8′	S16°13.0	13.4′	58.9′	112°30.1	109°29.4	99°41.3	29°10.8	10°43.5		43°27.4	82°08.4
1	109°32.8	9.9′	15°59.5	13.5′	58.9′	111°57.4	108°53.4	99°06.6	28°35.9	11°16.1		43°47.5	82°40.8
2	124°01.7	10.0′	15°46.0	13.6′	58.9′	111°24.8	108°17.5	98°31.9	28°01.1	11°48.8		44°07.8	83°13.3
3	138°30.7	10.1′	15°32.4	13.7′	58.8′	110°52.1	107°41.6	97°57.3	27°26.3	12°21.7		44°28.3	83°45.7
4	152°59.8	10.2′	15°18.7	13.7′	58.8′	110°19.5	107°05.8	97°22.7	26°51.5	12°54.7		44°49.1	84°18.1
5	167°29.0	10.3′	15°05.0	13.8′	58.8′	109°46.8	106°29.9	96°48.1	26°16.8	13°27.9		45°10.0	84°50.5
6	181°58.3	10.4′	S14°51.2	13.9′	58.8′	109°14.2	105°54.1	96°13.5	25°42.1	14°01.1		45°31.2	85°22.8
7	196°27.7	10.5′	14°37.3	13.9′	58.7′	108°41.6	105°18.3	95°39.0	25°07.4	14°34.4		45°52.5	85°55.1
8	210°57.2	10.6′	14°23.4	14.0′	58.7′	108°09.0	104°42.6	95°04.5	24°32.8	15°07.9		46°14.1	86°27.4
9	225°26.8	10.7′	14°09.4	14.1′	58.7′	107°36.4	104°06.9	94°30.0	23°58.2	15°41.3		46°35.8	86°59.7
10	239°56.5	10.8′	13°55.3	14.1′	58.7′	107°03.8	103°31.2	93°55.6	23°23.7	16°14.8		46°57.7	87°31.9
11	254°26.3	10.9′	13°41.2	14.2′	58.6′	106°31.3	102°55.6	93°21.2	22°49.2	16°48.4		47°19.9	88°04.1
12	268°56.1	11.0′	S13°27.0	14.2′	58.6′	105°58.7	102°19.9	92°46.8	22°14.7	17°22.0		47°42.1	88°36.2
13	283°26.1	11.1′	13°12.7	14.3′	58.6′	105°26.2	101°44.3	92°12.4	21°40.3	17°55.6		48°04.6	89°08.4
14	297°56.2	11.2′	12°58.4	14.4′	58.6′	104°53.7	101°08.8	91°38.1	21°05.9	18°29.2		48°27.2	89°40.5
15	312°26.3	11.2′	12°44.1	14.4′	58.5′	104°21.2	100°33.2	91°03.8	20°31.5	19°02.9		48°49.9	90°12.5
16	326°56.6	11.3′	12°29.7	14.5′	58.5′	103°48.8	99°57.7	90°29.5	19°57.2	19°36.6		49°12.8	90°44.6
17	341°26.9	11.4′	12°15.2	14.5′	58.5′	103°16.3	99°22.2	89°55.3	19°22.9	20°10.3		49°35.9	91°16.6
18	355°57.3	11.5′	S12°00.7	14.6′	58.5′	102°43.9	98°46.8	89°21.1	18°48.7	20°44.0		49°59.1	91°48.6
19	10°27.8	11.6′	11°46.1	14.6′	58.4′	102°11.4	98°11.4	88°46.9	18°14.5	21°17.7		50°22.5	92°20.5
20	24°58.4	11.7′	11°31.5	14.6′	58.4′	101°39.0	97°36.0	88°12.8	17°40.4	21°51.4		50°45.9	92°52.4
21	39°29.1	11.7′	11°16.9	14.7′	58.4′	101°06.7	97°00.6	87°38.6	17°06.3	22°25.1	18°13.7	51°09.5	93°24.3
22	53°59.8	11.8′	11°02.2	14.7′	58.4′	100°34.3	96°25.3	87°04.6	16°32.3	22°58.8	18°29.5	51°33.3	93°56.2
23	68°30.6	11.9′	10°47.5	14.8′	58.3′	100°02.0	95°50.0	86°30.5	15°58.3	23°32.5	18°46.2	51°57.1	94°28.0
	SD = 16.1′		Mer. pass. 18:17			Sun SD = 16.2′							