



Navigation Problems

Celestial Observations

This Study Guide Generated For

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At 0600 zone time, on 16 March your DR position is LAT 20°10.0'N, LONG 81°30.0'W. You are steering course 300°T. The speed over the ground is 10 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1130 running fix? (See Navigation Problems Question Tables NP-0004 Below)

LAT 20°39.0'N, LONG 82°22.9'W

Illustrations: NP0004

See REF1088

Your 0745 ZT 15 July position is LAT 29°04.0'N, LONG 71°17.5'W. You are on course 165°T, and your speed is 8.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1130 running fix? (See Navigation Problems Question Tables NP-0003 Below)

LAT 28°35.0'N, LONG 71°08.5'W

Illustrations: NP0003

See REF1088

At 0100 zone time on 23 September your DR position is LAT 24°25.0'N, LONG 83°00.0'W. You are steering course 315°T. The speed over the ground is 10.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1100 running fix? (See Navigation Problems Question Tables NP-0002 Below)

LAT 25°35.3'N, LONG 84°17.0'W

Illustrations: NP0002

See REF1088

At 0900 zone time on 23 September your DR position is LAT 28°48.0'N, LONG 153°11.5'W. You are steering course 257°T at a speed of 18.0 knots. You observed 3 morning sun lines. Determine the latitude and longitude of your 1020 running fix? (See Navigation Problems Question Tables NP-0001 Below)

28°49.1'N, 153°37.0'W

Illustrations: NP0001

See REF1088

On 14 September your 1810 ZT DR position is LAT 27°12.0' S, LONG 71°10.0' E. You are on course 060°T at a speed of 15.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1822 running fix. (See Navigation Problems Question Tables NP-0011 Below)

LAT 27°11.0'S, LONG 71°14.5'E

Illustrations: NP0011

See REF1088

On 20 February your 0530 ZT DR position is LAT 24°15.0'N, LONG 137°33.0'W. You are on course 033°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0010 Below)

LAT 24°27.5'N, LONG 137°31.8'W

Illustrations: NP0010

See REF1088

On 19 November your 0300 zone time DR position is LAT 19°23' N, LONG 151°37' E. You are on course 293°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0039 Below)

LAT 19°34.8'N, LONG 150°48.0'E

Illustrations: NP0039

See REF1088

On 5 May your 1600 zone time DR position is LAT 17°28' S, LONG 143°39' E. You are on course 316°T at a speed of 17 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1800 running fix. (See Navigation Problems Question Tables NP-0038 Below)

LAT 17°05.2'S, LONG 143°11.4'E

Illustrations: NP0038

See REF1088

On 16 April your 0200 zone time DR position is LAT 17°18'S, LONG 168°46'E. You are on course 236°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix.

LAT 18°00.4'S, LONG 167°49.2'E

Illustrations: NP0036

See REF1088

On 12 December your 1830 ZT DR position is LAT 24°16.0' S, LONG 41°18.0' W. You are on course 235°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1930 running fix. (See Navigation Problems Question Tables NP-0009 Below)

LAT 24°16.9'S, LONG 41°18.2'W

Illustrations: NP0009

See REF1088

On 28 May your 0200 DR position is LAT 19°16.5' S, LONG 119°24.0' W. You are on course 107°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0034 Below)

LAT 19°43.0'S, LONG 117°54.0'W

Illustrations: NP0034

See REF1088

On 19 November your 0200 zone time DR position is LAT 20°29.0' N, LONG 150°21.3' E. You are on course 136°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0033 Below)

LAT 19°33.0'N, LONG 151°10.0'E

Illustrations: NP0033

See REF1088

On 25 August your 0300 zone time DR position is LAT 21°28.0' N, LONG 167°48.0' E. You are on course 248°T at a speed of 12 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0032 Below)

LAT 20°57.1'N, LONG 167°01.0'E

Illustrations: NP0032

See REF1088

On 19 November your 0200 zone time DR position is LAT 18°41' N, LONG 150°37' E. You are on course 014°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0031 Below)

LAT 19°45.4'N, LONG 150°52.6'E

Illustrations: NP0031

See REF1088

On 6 April your 0300 DR position is LAT 27°42' S, LONG 128°58' W. You are on course 097°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0029 Below)

LAT 27°44.7'S, LONG 127°47.5'W

Illustrations: NP0029

See REF1088

On 19 September your 0300 zone time DR position is LAT 24°35' N, LONG 88°40' W. You are on course 288°T at a speed of 14 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0028 Below)

LAT 24°52.5'N, LONG 89°22.4'W

Illustrations: NP0028

See REF1088

On 9 November your 0400 DR position is LAT 18°24.0' S, LONG 97°36.0' W. You are on course 138°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0600 running fix. (See Navigation Problems Question Tables NP-0027 Below)

LAT 18°45.0'S, LONG 97°06.8'W

Illustrations: NP0027

See REF1088

On 24 October your 0100 DR position is LAT 27°42' N, LONG 158°35' E. You are on course 085°T at a speed of 12 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0700 running fix. (See Navigation Problems Question Tables NP-0026 Below)

LAT 27°56.0'N, LONG 159°47.3'E

Illustrations: NP0026

See REF1088

On 6 April your 1830 ZT DR position is LAT 26°33.0' N, LONG 64°31.0' W. You are on course 082°T at a speed of 16 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix. (See Navigation Problems Question Tables NP-0008 Below)

LAT 26°32.5'N, LONG 64°27.1'W

Illustrations: NP0008

See REF1088

On 25 October your 0430 ZT DR position is LAT 24°48' N, LONG 65°31' W. Your vessel is on course 030°T at a speed of 18 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0455 running fix. (See Navigation Problems Question Tables NP-0025 Below)

LAT 24°53'N, LONG 65°28'W

Illustrations: NP0025

See REF1088

On 12 October your vessel is on course 081°T, speed 20 knots. Your 1800 zone time DR position is LAT 26°11.0' S, LONG 77°18.0' E. You observed 3 celestial bodies. Determine the latitude and longitude of your 1835 running fix. (See Navigation Problems Question Tables NP-0024 Below)

LAT 26°12.0'S, LONG 77°31.0'E

Illustrations: NP0024

See REF1088

On 3 April your vessel's 1400 ZT DR position is LAT 20°08.0' N, LONG 147°45.0' W. You are steering course 023°T at 18.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix. (See Navigation Problems Question Tables NP-0022 Below)

LAT 21°40.0'N, LONG 147°03.2'W

Illustrations: NP0022

See REF1088

On 10 August, your 0430 ZT position is LAT 29°56.7'S, LONG 139°11.0'E. Your course is 321°T, speed 18.2 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0500 running fix? NP-0021

LAT 29°49.2'S, LONG 138°57.0'E

Illustrations: NP0021

See REF1088

At 0450 zone time, on 25 June, your DR position is LAT 21°26.0'N, LONG 160°24.5'W. You are steering course 100°T at a speed of 10 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0514 running fix? (See Navigation Problems Question Tables NP-0020 Below)

LAT 21°25.0'N, LONG 160°18.0'W

Illustrations: NP0020

See REF1088

At 1830 zone time, on 6 April your DR position is LAT 26°33.0' N, LONG 64°31.0' W. You are steering course 082°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1900 running fix. (See Navigation Problems Question Tables NP-0019 Below)

LAT 26°32.5'N, LONG 64°27.1'W

Illustrations: NP0019

See REF1088

On 15 August your vessel is enroute from Bombay, India, to San Francisco, CA. You are steering course 020°T and making a speed of 20.0 knots. Your 1830 zone time DR is LAT 26°13.0' N, LONG 135°18.0' W. You observed 3 celestial bodies. Determine the latitude and longitude of your 1935 running fix. (See Navigation Problems Question Tables NP-0017 Below)

LAT 26°48.1'N, LONG 135°20.7'W

Illustrations: NP0017

See REF1088

On 15 July your vessel is enroute from Portland, OR, to Singapore, Malaysia. You are steering course 243°T and making a speed of 16 knots. Your 1845 zone time DR is LAT 27°42.0' N, LONG 167°02.0' E. You observed 3 celestial bodies. Determine the latitude and longitude of your 1945 running fix. (See Navigation Problems Question Tables NP-0016 Below)

LAT 27°31.1'N, LONG 166°43.0'E

Illustrations: NP0016

See REF1088

On 25 March your 0500 ZT DR position is LAT 28°14.0' S, LONG 93°17.0' E. You are on course 291°T at a speed of 16.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 0550 running fix. (See Navigation Problems Question Tables NP-0006 Below)

LAT 28°15.9'S, LONG 92°56.9'E

Illustrations: NP0006

See REF1088

On 4 December your 1500 ZT DR position is LAT 18°06.0' N, LONG 75°42.0' W. You are on course 020°T at a speed of 15.0 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1548 running fix. (See Navigation Problems Question Tables NP-0014 Below)

LAT 18°17.3'N, LONG 75°37.7'W

Illustrations: NP0014

See REF1088

On 20 November your 1030 ZT DR position is LAT 27°16.0' N, LONG 157°18.6' E. You are on course 060°T at a speed of 20 knots. You observed 3 celestial bodies. Determine the latitude and longitude of your 1200 running fix. (See Navigation Problems Question Tables NP-0012 Below)

LAT 27°29.7'N, LONG 157°43.0'E

Illustrations: NP0012

See REF1088

On 22 November your vessel is enroute from Accra, Ghana to Montevideo, Uruguay. You are on course 240°T and making a speed of 15.0 knots. Your 1129 DR position is LAT 28°25.0' S, LONG 42°40.0' W. You observed 3 celestial bodies. Determine the latitude and longitude of your 1137 running fix. (See Navigation Problems Question Tables NP-0023 Below)

LAT 28°27.0'S, LONG 42°38.0'W

Illustrations: NP0023

See REF1088

On 13 October your 0515 zone time (ZT) fix gives you a position of LAT 26°53.0'N, LONG 90°05.0'W. Your vessel is on course 068°T, and your speed is 7.8 knots. Local apparent noon (LAN) occurs at 1145 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 54°51.5'. What is the calculated latitude at LAN?

27°12.6'N

See REF1088

On 5 April at 0509 zone time, morning stars were observed and the vessel's position was LAT 28°32'N, LONG 177°13.0'W. Your vessel is steaming at 19.0 knots on a course of 258°T. A sextant observation of the Sun's lower limb is made at 1021 zone time. The chronometer reads 10h 20m 09s, and the sextant altitude (hs) is 58°06.6'. The index error is 1.0' off the arc, and the chronometer error is 00m 54s slow. Your height of eye on the bridge is 55.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

129.2°T

See REF1088

On 30 June at 0630 zone time, morning stars were observed, and the vessel's position was determined to be LAT 25°15.0'S, LONG 175°36.0'E. Your vessel is steaming at 16.0 knots on a course of 302°T. A sextant observation of the Sun's lower limb is made at 1015 zone time. The chronometer reads 10h 14m 38s, and the sextant altitude is 32°07.9'. The index error is 4.5' on the arc, and the chronometer error is 01m 25s slow. Your height of eye on the bridge is 58.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

035.3°T

See REF1088

On 19 November in DR position LAT 20°03.5'N, LONG 129°48.0'W, you take an ex-meridian observation of the planet Venus at upper transit. The chronometer time of the sight is 11h 29m 44s, and the chronometer error is 01m 23s slow. The sextant altitude (hs) is 43°54.3'. The index error is 2.0' off the arc, and your height of eye is 48 feet. What is the latitude at meridian transit?

19°58.0'N

See REF1088

On 16 December your 1810 zone time DR position is LONG 129°46.5' W. At that time you observe Polaris with a sextant altitude (hs) of 23°56.8'. The chronometer time of the sight is 03h 12m 31s, and the chronometer error is 02m 16s fast. The index error is 2.5' off the arc, and the height of eye is 52.6 feet. What is your latitude by Polaris?

23°07.8'N

See REF1088

On 28 October at 1754 ZT, your vessel's DR position is LAT 28°30' N, LONG 63°24' W. At this time, you obtain a sextant altitude (hs) of Polaris reading 28°42.6', with an index error of 2.4' on the arc. Your chronometer reads 09h 50m 00s, and is 4m 14s slow. What is your latitude by Polaris, given a height of eye of 28 feet (8.5 meters)?

28°34.9'N

See REF1088

On 30 August your 0554 zone time (ZT) position was LAT 25°39.0'S, LONG 31°51.0'E. Your vessel was steaming on course 325°T at a speed of 15.0 knots. An observation of the Sun's lower limb was made at 0836 ZT. The chronometer read 06h 38m 36s and was fast 02m 24s. The observed altitude (Ho) was 30°49.2'. LAN occurred at 1157 ZT. The observed altitude (Ho) was 56°40.0'. What was the longitude of your 1157 ZT running fix?

30°52.5'E

See REF1088

During twilight on 28 December around 1800 GMT, in DR position LAT 4°00'N, LONG 0°06'W, the sextant altitude (hs) of Venus was 30°46.8'. The height of eye was 36 feet, and the index error was 2.0' on the arc. The temperature was 68°F. The barometer read 1030 mb. Calculate the observed altitude (Ho).

Ho 30°38.1'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 37°47.2' on 11 October. The index error is 3.0' off the arc. The height of eye is 63 feet (19.2 meters). What is the observed altitude (Ho)?

37°57.5'

See REF1088

On 8 April your evening DR position is LAT 22°16' N, LONG 157°58.3' W. You observe an unidentified star bearing 246°T at an observed altitude (Ho) of 58°45.5'. The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?

Betelgeuse

See REF1088

On 22 May your 0437 DR position is LAT 25°18.5'N, LONG 51°18.0'W. You observed an unidentified star bearing 233°T at an observed altitude (Ho) of 29°42.3'. The chronometer reads 07h 40m 40s, and is 03m 24s fast. What star did you observe?

Sabik

See REF1088

On 14 January your 0550 DR position is LAT 25°26.0'N, LONG 38°16.0'W. You observe an unidentified star bearing 043°T at an observed altitude (Ho) of 37°12.1'. The chronometer reads 08h 48m 51s, and is 01m 22s slow. What star did you observe?

Eltanin

See REF1088

On 22 April your 1852 ZT DR position is LAT 23°54.5' N, LONG 117°36.8' W. You observe an unidentified star bearing 129°T at an observed altitude (Ho) of 27°10.0'. The chronometer reads 02h 54m 53s and is 02m 51s fast. What star did you observe?

Gienah

See REF1088

On 12 June your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 031°T at a sextant altitude (hs) of 70°10.3'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Cor Caroli

See REF1088

On 20 June your 1742 zone time DR position is LAT 24°55.0' S, LONG 8°19.6' E. Considering their magnitude, azimuth, and altitude, which three stars are best suited for a fix at star time?

Regulus, Canopus, Antares

See REF1088

On 10 July your 0930 zone time DR position is LAT 26°31.0'S, LONG 4°41.0'E. Your vessel is on course 308°T at a speed of 22.0 knots. What is the zone time of local apparent noon (LAN)?

1149

See REF1088

On 26 September your 0830 DR position is LAT 26°04.0'N, LONG 129°16.0'W. Your vessel is on a course of 119°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?

1124

See REF1088

On 27 September your 0345 ZT DR position is LAT 26°18.0'S, LONG 4°18.0'W. You are on course 271°T at a speed of 15 knots. What will be the zone time of sunrise at your vessel?

0605

See REF1088

On 18 October your 1330 ZT DR position is LAT 27°32.0'N, LONG 154°47.0'W. You are on course 115°T at a speed of 20 knots. What will be the zone time of sunset at your vessel?

1742

See REF1088

On 1 July your 0515 ZT fix gives you a position of LAT 24°36.0'S, LONG 151°42.0'W. Your vessel is on course 300°T, and your speed is 10.0 knots. Local apparent noon (LAN) occurs at 1215 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 42°55.0'. What is the calculated latitude at LAN?

24°01.0'S

See REF1088

On 1 April at 0515 zone time, morning stars were observed, and the vessel's position was determined to be LAT 27°05.0'N, LONG 16°30.0'W. Your vessel is steaming at 19.0 knots on a course of 022°T. A sextant observation of the Sun's lower limb is made at 0930 zone time. The chronometer reads 10h 28m 25s, and the sextant altitude is 46°20.3'. The index error is 4.5' off the arc, and the chronometer error is 02m 15s slow. Your height of eye on the bridge is 57.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

115.0°T

See REF1088

On 4 June at 0630 ZT, morning stars were observed, and the vessel's position was determined to be LAT 26°15'S, LONG 121°20'W. Your vessel is steaming at 13.0 knots on a course of 246°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 05h 14m 27s, and the sextant altitude is 25°57.8'. The index error is 2.1' off the arc, and the chronometer error is 0m 53s slow. Your height of eye is 39.0 feet. What is the intercept (a) and azimuth (Zn) of this sight using the assumed position method?

Zn 044.6°, a 2.5' T

See REF1088

On 17 November in DR position LAT 01°14.4'S, LONG 148°45.5'E, you take an ex-meridian observation of the planet Venus at upper transit. The chronometer time of the sight is 05h 31m 42s, and the chronometer error is 01m 50s fast. The sextant altitude (hs) is 64°41.1'. The index error is 1.8' off the arc, and your height of eye is 50 feet. What is the latitude at meridian transit?

LAT 01°18.0'S

See REF1088

On 11 February your 1832 zone time DR position is LONG 110°52.6' W. At that time you observe Polaris with a sextant altitude (hs) of 26°19.8'. The chronometer time of the sight is 01h 34m 56s, and the chronometer error is 02m 16s fast. The index error is 2.7' off the arc, and the height of eye is 60.2 feet. What is your latitude by Polaris?

25°27.2'N

See REF1088

On 5 May at 1953 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 29°30.0' N, LONG 66°25.7' W, and your sextant reads 29°07.2'. Your chronometer reads 11h 51m 45s, and your chronometer error is 01m 36s slow. Your height of eye is 56 feet, and the index error for your sextant is 1.5' on the arc. What is the latitude of your vessel from your observation of Polaris?

29°23.6'N

See REF1088

On 20 November your 0612 zone time (ZT) position was LAT 25°38.0'N, LONG 166°54.0'W. Your vessel was steaming on course 126°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 0854 ZT. The chronometer read 07h 51m 14s and was slow 02m 52s. The observed altitude (Ho) was 27°58.3'. LAN occurred at 1147 ZT. The observed altitude (Ho) was 45°35.0'. What was the longitude of your 1147 ZT running fix?

165°12.5'W

See REF1088

During evening twilight on 28 December a sextant altitude (hs) of the planet Venus was 29°43.2'. The height of eye was 40 feet, and the index error was 2.0' on the arc. What was the observed altitude (Ho)?

29°34.1'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 31°31.5' on 6 March. The index error is 2.5' on the arc. The height of eye is 76 feet. What is the observed altitude (Ho)?

31°35.3'

See REF1088

On 8 April your evening DR position is LAT 22°16.0' N, LONG 157°58.3' W. You observe an unidentified star bearing 271°T at an observed altitude (Ho) of 44°08.2'. The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?

Aldebaran

See REF1088

On 22 April your 1852 DR position is LAT 23°54.5'N, LONG 117°36.8'W. You observe an unidentified star bearing 248°T at an observed altitude (Ho) of 25°00.9'. The chronometer reads 02h 54m 53s, and is 02m 51s fast. What star did you observe?

Rigel

See REF1088

On 14 January your 1922 DR position is LAT 27°18.5'S, LONG 67°18.0'E. You observe an unidentified star bearing 250°T at an observed altitude (Ho) of 31°01.2'. The chronometer reads 03h 25m 43s, and is 03m 15s fast. Which star did you observe?

Fomalhaut

See REF1088

On 22 March your 0519 ZT DR position is LAT 27°20.6' N, LONG 69°25.6' W. You observe an unidentified star bearing 094°T, at an observed altitude (Ho) of 30°15.0'. The chronometer reads 10h 16m 47s and is 02m 15s slow. What star did you observe?

Enif

See REF1088

On 12 June your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 174.0°T at a sextant altitude (hs) of 18°58.6'. The index error is 0.5'on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Muhlifain

See REF1088

On 24 August your vessel is enroute from Perth, Australia, to Bombay, India. Evening twilight will occur at 1807 zone time and your vessel's DR position will be LAT 27°17.0' S, LONG 83°17.0' E. Considering their magnitude and location, what are the three stars best suited to observe for a fix at star time?

Spica, Altair, Acrux

See REF1088

On 16 November your 0800 zone time DR position is LAT 25°11.0'N, LONG 117°41.0'W. Your vessel is on course 252°T at a speed of 14.5 knots. What is the zone time of local apparent noon (LAN)?

1139

See REF1088

Your 0830 DR position is LAT 27°33'S, LONG 79°17'E. Your vessel is on a course of 066°T, at a speed of 19.5 knots. Determine the time of LAN on 10 December.

1131

See REF1088

On 25 December your 0330 ZT DR position is LAT 25°15.0'N, LONG 32°16.0'W. You are on course 145°T at a speed of 20 knots. What will be the zone time of sunrise at your vessel?

0647

See REF1088

On 17 November your 1530 ZT DR position is LAT 27°13.0'S, LONG 153°21.0'W. You are on course 261°T at a speed of 14 knots. What will be the ZT of sunset at your vessel?

1845

See REF1088

On 28 July your 0800 zone time (ZT) fix gives you a position of LAT 25°16.0'N, LONG 71°19.0'W. Your vessel is on course 026°T, and your speed is 17.5 knots. Local apparent noon (LAN) occurs at 1150 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 82°28.7'. What is the latitude at 1200 ZT?

26°27.6'N

See REF1088

On 6 March at 0550 zone time, morning stars were observed, and the vessel's position was determined to be LAT 23°56.0'N, LONG 27°19.0'W. Your vessel is steaming at 25.0 knots on a course of 149.0°T. A sextant observation of the Sun's lower limb is made at 0830 zone time. The chronometer reads 10h 32m 05s, and the sextant altitude is 31°31.5'. The index error is 2.5' on the arc, and the chronometer error is 01m 45s fast. Your height of eye on the bridge is 76.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

112.8°T

See REF1088

On 18 August at 0600 ZT, morning stars were observed, and the vessel's position was determined to be LAT 19°48'N, LONG 108° 34'W. Your vessel is steaming on course 166°T at a speed of 16 knots. An observation of the Sun's lower limb is made at 1036 ZT. The chronometer reads 05h 34m 48s and is slow 01m 24s. What is the computed altitude (Hc) and azimuth (Zn) for this 1036 ZT observation using the assumed position method?

Hc 65°14.8', Zn 100.4°

See REF1088

On 16 June in DR position LAT 50°57.0'S, LONG 53°03.9'W (ZD+4), you take an ex-meridian observation of Acrux at lower transit. The chronometer time of the sight is 10h 08m 18s, and the chronometer error is 02m 12s fast. The sextant altitude (hs) is 23°49.0'. The index error is 1.1' off the arc, and your height of eye is 26 feet. What is the latitude at meridian transit?

50°41.2'S

See REF1088

On 6 March your 1854 zone time DR position is LAT 23°51.5' N, LONG 73°14.0' W. At that time you observe Polaris with a sextant altitude (hs) of 24°16.5'. The chronometer time of the sight is 11h 52m 40s, and the chronometer error is 01m 56s slow. The index error is 5.0' on the arc, and the height of eye is 43.5 feet (13.3 meters.) What is your latitude by Polaris?

23°36.3'N

See REF1088

On 16 July at 2000 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 27°22.0' N, LONG 148°35.0' W, and your sextant reads 26°57.5'. Your chronometer reads 05h 59m 16s, and your chronometer error is 01m 28s slow. Your height of eye is 48 feet, and the index error for your sextant is 1.3' off the arc. What is the latitude of your vessel from your observation of Polaris?

27°36.1'N

See REF1088

On 23 May your 0628 zone time position was LAT 28°18.0'S, LONG 102°42.0'E. Your vessel was steaming on course 040°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 0758 ZT. The chronometer read 01h 02m 06s and was fast 04m 04s. The observed altitude (Ho) was 13°16.7'. LAN occurred at 1201 zone time. The observed altitude (Ho) was 42°32.0'. What was the longitude of your 1201 zone time running fix?

104°03.5'E

See REF1088

You observe the star Deneb at a sextant altitude (hs) of 48°34.8' on 16 December. The index error is 4.0' off the arc. The height of eye is 58 feet. What is the observed altitude (Ho)?

48°30.5'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 58°06.6' on 5 April. The index error is 1.0' off the arc. The height of eye is 55 feet (16.8 meters). What is the observed altitude (Ho)?

58°15.8'

See REF1088

On 8 April while taking observations for an evening fix, you observe an unidentified star bearing 250.7°T at an observed altitude of 51°44.8'. Your DR position at the time of the sight was LAT 22°16.0' N, LONG 157°58.3' W. The chronometer reads 05h 09m 57s and is 01m 23s slow. What star did you observe?

Bellatrix

See REF1088

On 22 April your 1852 DR position is LAT 23°54.5'N, LONG 117°36.8'W. You observe an unidentified star bearing 077°T at an observed altitude (Ho) of 18°58.7'. The chronometer reads 02h 54m 53s, and is 02m 51s fast. What star did you observe?

Arcturus

See REF1088

On 14 January your 1922 DR position is LAT 27°18.5'S, LONG 67°18.0'E. You observe an unidentified star bearing 054°T at an observed altitude (Ho) of 07°52.1'. The chronometer reads 03h 25m 43s, and is 03m 15s fast. What star did you observe?

Pollux

See REF1088

On 22 March your 1834 ZT DR position is LAT 26°13.5' S, LONG 108°36.5' W. You observe an unidentified star bearing 077°T, at an observed altitude (Ho) of 43°10.5'. The chronometer reads 01h 32m 37s and is 01m 50s slow. What star did you observe?

Alphard

See REF1088

On 2 October your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 25°19.4' bearing 273°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?

Beta Librae

See REF1088

On 1 October you determine the zone time of evening twilight will be 1835. Your DR position will be LAT 27°18.0' N, LONG 48°52.0' W. Considering their magnitude and location, which group of three stars are best suited to be used in obtaining a fix at star time?

Alphecca, Kochab, Deneb

See REF1088

On 17 March your 0800 zone time DR position is LAT 21°27.0'N, LONG 65°25.0'W. Your vessel is on course 105°T at a speed of 17.5 knots. What is the zone time of local apparent noon (LAN)?

1225

See REF1088

You are keeping ZD +4 on your vessel. On 21 June at 0906 DST, your position is LAT 30°48.0'N, LONG 71°00.0'W. You are on a course of 167°T at 15.2 knots. At what time will local apparent noon (LAN) occur ZT at your vessel? You are keeping DST.

1245

See REF1088

At 0500 zone time on 21 August, your DR position is LAT 47°00'N, LONG 125°15'W. You are steering 000°T at a speed of 9.8 knots. What is the zone time of sunrise?

0525

See REF1088

On 22 November your 1400 ZT DR position is LAT 22°16.0'N, LONG 136°37.0'E. You are on course 038°T at a speed of 22 knots. What will be the zone time of sunset at your vessel?

1705

See REF1088

On 7 November your 0830 zone time fix gives you a position of LAT 27°36.0'N, LONG 162°19.0'W. Your vessel is on course 289°T and your speed is 19.0 knots. Local apparent noon (LAN) occurs at 1138 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 45°35.0'. What is the latitude at 1200 ZT?

27°59.5'N

See REF1088

On 10 January at 0550 ZT, morning stars were observed, and the vessel's position was determined to be LAT 25°16.0'N, LONG 123°18.0'W. Your vessel is steaming at 22.0 knots on a course of 295°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 05h 14m 02s, and the sextant altitude is 24°00.7'. The index error is 2.6' off the arc, and the chronometer error is 01m 34s slow. Your height of eye on the bridge is 55.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

131.9°T

See REF1088

At 1000 ZT 21 October your DR position is LAT 29°00'N, LONG 134°40'E. Determine the computed altitude (Hc) of the Sun for the assumed position nearest to the above given latitude and longitude, given a chronometer time of 01h 00m 00s.

Hc 42°35.7'

See REF1088

On 8 May in DR position LAT 30°26.0'N, LONG 46°55.1'W, you take an ex-meridian observation of Dubhe. The chronometer time of the sight is 11h 10m 54s, and the chronometer error is 01m 18s slow. The sextant altitude (hs) is 58°35.0'. The index error is 1.5' on the arc, and your height of eye is 44 feet. What is the latitude at meridian transit?

LAT 30°19.8'N

See REF1088

On 29 July your 1930 zone time DR position is LONG 164°26.0' E. At that time you observe Polaris with a sextant altitude (hs) of 23°46.8'. The chronometer time of the sight is 08h 32m 18s, and the chronometer error is 02m 26s fast. The index error is 2.7' on the arc, and the height of eye is 56.0 feet. What is your latitude by Polaris?

24°19.5'N

See REF1088

On 10 June your 2010 zone time DR position is LAT 41°10.0' N, LONG 61°15.0' W. At that time, you observe Polaris with a sextant altitude (hs) of 40°35.8'. The chronometer time of the sight is 00h 08m 18s, and the chronometer error is 01m 54s slow. The index error is 2.0' on the arc, and the height of eye is 40 feet. What is your latitude by Polaris?

41°15.0'N

See REF1088

On 16 February your 0640 zone time (ZT) position was LAT 23°46.0'N, LONG 156°24.0'W. Your vessel was steaming on course 222°T at a speed of 18.0 knots. An observation of the Sun's lower limb was made at 0910 ZT. The chronometer read 07h 08m 06s and was slow 01m 56s. The observed altitude (Ho) was 27°15.8'. LAN occurred at 1245 ZT (ZD +10). The observed altitude (Ho) was 55°25.3'. What was the longitude of your 1245 ZT running fix?

157°42.0'W

See REF1088

On 29 June you observe the star Achernar at a sextant altitude (Hs) of 54°18.9'. The index error is 4.7' off the arc. The height of eye is 58 feet. What is the observed altitude (Ho)?

54°15.5'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 28°24.7' on 17 May. The index error is 1.5' off the arc. The height of eye is 86 feet (26 meters). What is the observed altitude (Ho)?

28°31.5'

See REF1088

On 8 April your evening DR position is LAT 22°16.0' N, LONG 157°58.3' W. You observe an unidentified star bearing 238°T at an observed altitude (Ho) of 50°02.7'. The chronometer reads 05h 09m 57s, and is 01m 23s slow. What star did you observe?

Alnilam

See REF1088

On 22 April your 1852 DR position is LAT 23°54.5'N, LONG 117°36.8'W. You observe an unidentified star bearing 259°T at an observed altitude (Ho) of 41°15.2'. The chronometer reads 02h 54m 53s, and is 02m 51s fast. What star did you observe?

Betelgeuse

See REF1088

On 22 June your 0424 ZT DR position is LAT 26°18.5' N, LONG 124°18.2' W. You observe an unidentified star bearing 031°T at an observed altitude (Ho) of 49°26.0'. The chronometer reads 00h 23m 24s and is 01m 32s slow. What star did you observe?

Schedar

See REF1088

On 12 June your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 019.0°T at a sextant altitude (hs) of 53°56.2'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Mizar

See REF1088

On 2 October your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 68°03.6' bearing 154°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?

Alpha Indi

See REF1088

On 3 December evening twilight for your vessel will occur at 1901 zone time. Your vessel's DR position will be LAT 24°18.5' S, LONG 110°30.6' W. Considering their magnitude and location, what are the three stars best suited to observe for a fix at star time?

Alpheratz, Achernar, Nunki

See REF1088

On 9 February your 0830 zone time DR position is LAT 22°19.0'N, LONG 64°37.0'E. Your vessel is on course 128°T at a speed of 19.0 knots. What is the zone time of local apparent noon?

1152

See REF1088

On 27 August your 0900 zone time DR position is LAT 24°25.0'N, LONG 94°20.0'W. Your vessel is on course 071°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?

1214

See REF1088

On 8 August your 0400 ZT DR position is LAT 23°16.0'S, LONG 105°33.0'W. You are on course 295°T at a speed of 25 knots. What will be the zone time of sunrise at your vessel?

0636

See REF1088

On 1 December your 1600 ZT DR position is LAT 22°48.0'S, LONG 91°26.0'E. You are on course 327°T at a speed of 16 knots. What will be the zone time of sunset at your vessel?

1827

See REF1088

On 1 July your 0515 zone time fix gives you a position of LAT 23°24.0'S, LONG 151°42.0'W. Your vessel is on course 240°T, and your speed is 10.0 knots. Local apparent noon (LAN) occurs at 1215 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 42°55.0'. What is the latitude at 1200 ZT?

23°59.7'S

See REF1088

On 4 July at 0630 ZT, morning stars were observed, and the vessel's position was determined to be LAT 21°15.0'S, LONG 21°20.0'W. Your vessel is steaming at 13.0 knots on a course of 146°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 10h 14m 27s, and the sextant altitude is 25°29.8'. The index error is 3.1' off the arc, and the chronometer error is 0m 53s slow. Your height of eye on the bridge is 48.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

049.5°T

See REF1088

At 1300 ZT on 9 May your DR position is LAT 24°00'N, LONG 83°26'W. Determine the computed altitude (Hc) of the Sun for the assumed position nearest to the above given latitude and longitude, given a chronometer time of 07h 00m 00s.

Hc 68°26.6'

See REF1088

On 15 December in DR position LAT 23°24.0'N, LONG 55°36.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 03h 45m 19s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 43°02.3'. The index error is 2.6' on the arc, and your height of eye is 65.0 feet. What is the latitude at meridian transit?

LAT 23°33.5'N

See REF1088

On 24 September your 1841 zone time DR position is LAT 25°15.0' N, LONG 129°34.5' E. At that time you observe Polaris with a sextant altitude (hs) of 25°20.8'. The chronometer time of the sight is 09h 38m 12s, and the chronometer error is 03m 12s slow. The index error is 4.3' off the arc, and the height of eye is 52.0 feet. What is your latitude by Polaris?

25°37.6'N

See REF1088

On 24 September your 1841 zone time DR position is LONG 129°34.5' E. At that time you observe Polaris with a sextant altitude (hs) of 25°20.8'. The chronometer time of the sight is 09h 38m 12s, and the chronometer error is 03m 12s slow. The index error is 4.3' off the arc, and the height of eye is 52 feet (15.9 meters). What is your latitude by Polaris?

25°37.6'N

See REF1088

On 27 March your 0730 zone time position is LAT 28°16'N, LONG 56°37'W. Your vessel is on course 158°T at a speed of 15.0 knots. An observation of the Sun's lower limb is made at 0915 zone time. The chronometer reads 01h 14m 11s, and the chronometer error is 00m 53s slow. The observed altitude (Ho) is 45°10.7'. LAN occurs at 1150 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) is 65°32.8'. Determine the vessel's 1200 zone time position.

LAT 27°08.8'N, LONG 56°04.2'W

See REF1088

You observe the star Antares at a sextant altitude (hs) of 38°18.7' on 28 February. The index error is 2.4' on the arc. The height of eye is 40 feet (12.2 meters). What is the observed altitude (Ho)?

38°09.0'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 62°22.2' on 6 June. The index error is 1.2' on the arc. The height of eye is 28 feet (8.5 meters). What is the observed altitude (Ho)?

62°31.4'

See REF1088

On 22 July your 1759 DR position is LAT 24°50.2' S, LONG 05°16.0' E. You observe an unidentified star bearing 293°T at an observed altitude (Ho) of 17°52.8'. The chronometer reads 06h 01m 31s, and is 02m 15s fast. What star did you observe?

Regulus

See REF1088

On 22 March your 0519 DR position is LAT 27°20.6'N, LONG 69°25.6'W. You observe an unidentified star bearing 115°T at an observed altitude (Ho) of 54°52.8'. The chronometer reads 10h 16m 47s, and is 02m 15s slow. What star did you observe?

Altair

See REF1088

On 14 January your 1922 DR position is LAT 27°18.5'S, LONG 67°18.0'E. You observe an unidentified star bearing 295°T at an observed altitude (Ho) of 13°50.7'. The chronometer reads 03h 25m 43s, and is 03m 15s fast. What star did you observe?

Markab

See REF1088

On 12 June your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 162°T at a sextant altitude (hs) of 28°36.5'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Iota Centauri

See REF1088

On 16 October evening twilight will occur at 1746 ZT. Your DR position will be LAT 28°43.2' N, LONG 60°29.8' W. Considering their magnitude and location, which of the following are the three best stars to select for a fix at star time?

Antares, Arcturus, Polaris

See REF1088

On 10 October your 1500 zone time DR position is LAT 27°35.6' S, LONG 44°49.0' W. You are on course 342°T at a speed of 24 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Moon, Al Na'ir, Rigil Kentaurus

See REF1088

On 7 February your 0800 zone time DR position is LAT 22°16.0'N, LONG 92°26.0'W. Your vessel is on course 270°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?

1230

See REF1088

On 25 April your 0930 zone time position is LAT 28°35'S, LONG 82°30'W. Your vessel is on course 300°T at a speed of 20.0 knots. Determine the zone time of LAN.

1131

See REF1088

At 0400 zone time on 24 June, your DR position is LAT 23°10.0'N, LONG 085°33'W. You are steering 295°T at a speed of 10.0 knots. What is the zone time of sunrise?

0458

See REF1088

On 10 December your 1300 zone time (ZT) DR position is LAT 26°27.0'S, LONG 79°04.0'E. You are on course 068°T at a speed of 14 knots. What will be the zone time of sunset at your vessel?

1824

See REF1088

On 13 October your 0515 zone time fix gives you a position of LAT 26°53.0'N, LONG 90°05.0'W. Your vessel is on course 068°T, and your speed is 7.8 knots. Local apparent noon (LAN) occurs at 1145 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 54°51.5'. What is the latitude at 1200 ZT?

27°13.3'N

See REF1088

On 22 July at 0448 ZT, morning stars were observed, and the vessel's position was determined to be LAT 21°43.0'N, LONG 158°39.0'E. Your vessel is steaming at 21.0 knots on a course of 028°T. A sextant observation of the Sun's lower limb is made at 0956 ZT. The chronometer reads 10h 54m 27s, and the sextant altitude is 54°28.2'. The index error is 1.5' off the arc, and the chronometer error is 01m 38s slow. Your height of eye on the bridge is 56 feet. What is the azimuth (Zn) of this sight using the assumed position?

086.9°T

See REF1088

On 17 May at 0501 zone time, morning stars were observed, and the vessel's position was determined to be LAT 22°16.0'S, LONG 103°46.0'W. Your vessel is steaming at 24.0 knots on a course of 301°T. A sextant observation of the Sun's lower limb is made at 0845 zone time. The chronometer reads 03h 43m 32s, and the sextant altitude is 28°24.7'. The index error is 1.5' off the arc, and the chronometer error is 02m 02s slow. Your height of eye on the bridge is 85.5 feet. What is the azimuth (Zn) of this sight using the assumed position?

052.5°T

See REF1088

On 18 May your 1030 ZT DR position is LAT 20°41'N, LONG 63°32'W. You are on course 106°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.

Zone Time	GHA	Declination	Ho
1204	61°54.6'	N 19°37.6'	88°39.7'
1210	63°24.6'	N 19°37.7'	88°59.2'

LAT 18°41.1'N, LONG 62°53.9'W

See REF1088

On 30 December in DR position LAT 28°24.0'S, LONG 32°15.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 02h 09m 16s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 84°03.3'. The index error is 3.5' off the arc, and your height of eye is 62.0 feet. What is the latitude at meridian transit?

LAT 28°51.9'S

See REF1088

On 29 April your 1913 zone time DR position is LAT 22°09.0' N, LONG 56°16.0' W. At that time you observe Polaris with a sextant altitude (hs) of 22°25.8'. The chronometer time of the sight is 11h 11m 14s, and the chronometer error is 02m 18s slow. The index error is 1.5' off the arc, and the height of eye is 61.5 feet. What is your latitude by Polaris?

22°39.9'N

See REF1088

On 18 November your 1750 zone time DR position is LONG 110°16.0' W. At that time you observe Polaris with a sextant altitude (hs) of 21°29.8'. The chronometer time of the sight is 00h 52m 43s, and the chronometer error is 02m 18s fast. The index error is 3.2' on the arc, and the height of eye is 49.5 feet. What is your latitude by Polaris?

21°03.4'N

See REF1088

On 22 February your 0800 zone time position is LAT 24°16'S, LONG 95°37'E. Your vessel is on course 126°T at a speed of 14 knots. An observation of the Sun's lower limb is made at 0945 zone time. The chronometer reads 03h 47m 22s, and the chronometer error is 02m 37s fast. The observed altitude (Ho) is 57°02.1'. LAN occurs at 1148 zone time, and a meridian altitude of the Sun's lower limb is made. The observed meridian altitude (Ho) is 75°22.3'. Determine the vessel's 1200 zone time position.

LAT 24°52.2'S, LONG 96°24.0'E

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of $24^{\circ}00.7'$ on 10 January. The index error is 2.6' off the arc. The height of eye is 55 feet. What is the observed altitude (Ho)?

$24^{\circ}10.2'$

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of $42^{\circ}44.0'$ on 22 June. The index error is 0.8' off the arc. The height of eye is 70 feet (21.3 meters). What is the observed altitude (Ho)?

$42^{\circ}51.7'$

See REF1088

On 22 July your 1759 DR position is LAT $24^{\circ}50.2'$ S, LONG $05^{\circ}16.0'$ E. You observe an unidentified star bearing 100° T at an observed altitude (Ho) of $61^{\circ}48.2'$. The chronometer reads 06h 01m 31s, and is 02m 15s fast. What star did you observe?

Antares

See REF1088

On 22 March your 0519 DR position is LAT $27^{\circ}20.6'$ N, LONG $69^{\circ}25.6'$ W. You observe an unidentified star bearing 200° T at an observed altitude (Ho) of $33^{\circ}05.5'$. The chronometer reads 10h 16m 47s, and is 02m 15s slow. What star did you observe?

Antares

See REF1088

On 17 March your 0520 DR position is LAT $27^{\circ}23.0'$ N, LONG $39^{\circ}42.0'$ W. You observe an unidentified star bearing 110° T at an observed altitude (Ho) of $50^{\circ}47.2'$. The chronometer reads 08h 22m 15s, and is 01m 45s fast. What star did you observe?

Altair

See REF1088

On 2 October your 1845 DR position is LAT $28^{\circ}09.2'$ S, LONG $167^{\circ}48.1'$ E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of $11^{\circ}37.6'$ bearing 066° T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?

Algenib

See REF1088

On 3 February your 0451 zone time DR position is LAT $24^{\circ}15.0'$ S, LONG $124^{\circ}24.0'$ W. Considering their magnitude, azimuth and altitude, which group includes the three bodies best suited for a fix at star time?

Alphard, Denebola, Acrux

See REF1088

On 10 June your 1712 zone time DR position is LAT $25^{\circ}10.0'$ S, LONG $06^{\circ}58.0'$ E. You are on course 213° T at a speed of 9.0 knots. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?

Acrux, Procyon, Arcturus

See REF1088

On 12 February your 0930 zone time DR position is LAT $25^{\circ}20.0'$ N, LONG $30^{\circ}40.0'$ W. Your vessel is on course 135° T at a speed of 11.2 knots. What is the zone time of local apparent noon (LAN)?

1215

See REF1088

On 25 April your 1130 DR position is LAT $24^{\circ}50.0'$ N, LONG $61^{\circ}25.0'$ W. Your vessel is on a course of 300° T at a speed of 16.0 knots. Determine the zone time of (LAN) for your vessel.

1204

See REF1088

On 13 February at 0325 zone time, your DR position is LAT 23°20'N, LONG 155°15'W. You are steering 240°T at a speed of 13.6 knots. What is the zone time of sunrise?

0657

See REF1088

At 1400 zone time on 11 April, your DR position is LAT 25°40'N, LONG 91°00'W. You are steering 180°T at a speed of 10.0 knots. What is your zone time of sunset?

1825

See REF1088

On 25 February at 0622 ZT, you observe the upper limb of the Moon with a sextant altitude of 59°58.6'. Your DR position is LAT 30°28.3'S, LONG 102°39.3 E. The chronometer reading at the time of the sight is 11h 21m 18s and the chronometer is 48s slow. The height of eye is 59 feet and the index error is 2.5' on the arc. What are the azimuth (Zn) and intercept (a) of this sight using the assumed position?

Zn 305.4°, a 4.2°T

See REF1088

At 0600 ZT on 24 July your DR position is LAT 22°37'N, LONG 32°45'W. You are steering 185°T at a speed of 20.0 knots. Determine the computed altitude (Hc) and azimuth (Zn) for an observation of the Sun's lower limb taken at 1030 ZT. At this time the chronometer reads 00h 30m 16s and is 0m 31s slow.

Hc 64°41.7' Zn 087.8°

See REF1088

On 26 July your 1030 ZT DR position is LAT 18°25'N, LONG 51°15'W. You are on course 231°T, speed 15 knots. Determine your 1200 position using the following observations of the Sun.

(5.1.4.1-2)

ZT	GHA	DECLINATION	Ho
1228	50°23.5'	N 19°21.9'	88°14.3'
1236	52°23.5'	N 19°21.8'	88°29.0'

LAT 18°07.2'N, LONG 51°30.4'W

See REF1088

On 16 November your 1200 ZT DR position is LAT 26°48.0'S, LONG 124°32.0'W. Your vessel is on course 078°T, speed 17.0 knots. You observe an ex-meridian of the Sun's lower limb. The sextant (hs) reads 81°41.3'. The index error is 1.5' off the arc, and your height of eye is 56 feet. The chronometer time of the observation is 08h 15m 32s, and the chronometer is 03m 06s fast. What is your latitude at meridian transit?

26°42.6'S

See REF1088

On 14 March your 1846 ZT DR position is LAT 21°57.6' N, LONG 132°16.2' W. At that time you observe Polaris with a sextant altitude (hs) of 22°16.8'. The chronometer time of the sight is 03h 45m 10s, and the chronometer error is 01m 32s slow. The index error is 3.2' off the arc, and the height of eye is 44.9 feet. What is your latitude by Polaris?

21°49.8'N

See REF1088

On 2 January your 1759 zone time DR longitude is 45°17.6' W. At that time you observe Polaris with a sextant altitude (hs) of 24°16.5'. The chronometer time of the sight is 08h 57m 10s, and the chronometer error is 02m 16s slow. The index error is 3.5' on the arc, and the height of eye is 42.5 feet. What is your latitude by Polaris?

23°18.8'N

See REF1088

On 8 February your 0800 zone time position is LAT 21°55'S, LONG 52°27'W. Your vessel is on course 056°T at a speed of 17.5 knots. An observation of the Sun's lower limb is made at 0938 zone time, and the observed altitude (Ho) is 46°06.5'. The chronometer reads 12h 37m 23s, and the chronometer error is 1m 24s slow. LAN occurs at 1243 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 83°56.1'. Determine the vessel's 1200 zone time position.

LAT 21°04.0'S, LONG 51°21.5'W

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 46°20.3' on 1 April. The index error is 4.5' off the arc. The height of eye is 57 feet (17.4 meters). What is the observed altitude (Ho)?

46°32.6'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 22°58.6' on 16 June. The index error is 2.0' off the arc. The height of eye is 61 feet. What is the observed altitude (Ho)?

23°06.7'

See REF1088

On 22 July your 1759 DR position is LAT 24°50.2' S, LONG 005°16.0' E. You observe an unidentified star bearing 203°T at an observed altitude (Ho) of 28°12.2'. The chronometer reads 06h 01m 31s, and is 02m 15s fast. What star did you observe?

Miaplacidus

See REF1088

On 22 March your 0519 DR position is LAT 27°20.6'N, LONG 69°25.6'W. You observe an unidentified star bearing 051°T at an observed altitude (Ho) of 50°03.7'. The chronometer reads 10h 16m 47s, and is 02m 15s slow. What star did you observe?

Deneb

See REF1088

On 17 March your 0520 DR position is LAT 27°23.0'N, LONG 39°42.0'W. You observe an unidentified star bearing 313°T at an observed altitude (Ho) of 43°03.8'. The chronometer reads 08h 22m 15s and is 01m 45s fast. What star did you observe?

Alkaid

See REF1088

On 2 October your 1845 DR position is LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 63°29.1' bearing 237.5°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 0m 51s fast. What star did you observe?

Kappa Scorpii

See REF1088

On 2 February your 0400 zone time DR position is LAT 24°14.0' N, LONG 163°28.0' W. You are on course 322°T at a speed of 22 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Saturn, Antares, Rasalhague

See REF1088

On 3 February your 0550 zone time DR position is LAT 26°16.0' N, LONG 112°05.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Spica, Kochab, Rasalhague

See REF1088

On 14 October your 0800 ZT DR position is LAT 28°22.0'N, LONG 161°17.0'E. Your vessel is on course 116°T at a speed of 17.5 knots. What is the ZT of local apparent noon (LAN)?

1156

See REF1088

Your 0900 DR position is LAT 23°16'N, LONG 146°12'E. Your vessel is on a course of 286°T, at a speed of 14.5 knots. Determine the zone time of LAN on 14 March.

1228

See REF1088

Your 0000 zone time position on 13 June is LAT 24°35'N, LONG 142°26'E. Your vessel is on course 245°T, speed is 13.5 knots. What is the zone time of sunrise?

0445

See REF1088

At 1800 zone time, on 7 December, your DR position is LAT 22°48'S, LONG 91°26'W. You are steering 320°T at a speed of 14.0 knots. What is the zone time of sunset?

1842

See REF1088

On 15 November your 0913 zone time fix gives you a position of LAT 22°30.0'N, LONG 68°28.0'W. Your vessel is on course 164°T, and your speed is 13.5 knots. Local apparent noon (LAN) occurs at 1118 zone time at which time meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 49°46.0'. What is the calculated latitude at LAN?

21°39.3'N

See REF1088

On 22 July at 0720 ZT, in DR position LAT 20°38.2'N, LONG 87°16.0'W, you observe the Moon's lower limb. The sextant altitude (hs) is 38°32.6, and the chronometer reads 01h 18m 14s. The chronometer is 01m 28s slow. The index error is 3.1' off the arc, and the height of eye is 68 feet. What is the azimuth (Zn) and intercept (a) of this sight from the assumed position?

Zn 248.6°, a 5.0' T

See REF1088

At 0800 ZT on 29 June your DR position is LAT 26°00.0'N, LONG 75°29.5'W. Given a chronometer time of 01h 00m 00s, determine the computed altitude (Hc) of the Sun for the assumed position nearest to the above given latitude and longitude.

Hc 34°58.6'

See REF1088

On 13 November your 1030 ZT DR position is LAT 19°03'S, LONG 6°34'E. You are on course 164°T, speed 12 knots. Determine your 1200 position using the following observations of the Sun. 5.1.4.1-3

ZT	GHA	DECLINATION	Ho
1112	351°55.4'	S 18°00.4'	88°08.0'
1121	354°10.4'	S 18°00.5'	88°33.9'

LAT 19°22.3'S, LONG 6°37.8'E

See REF1088

On 29 October in DR position LAT 41°12.0'N, LONG 50°18.9'W, you take an ex-meridian observation of the Sun's lower limb, near upper transit. The chronometer time of the sight is 03h 21m 12s, and the chronometer error is 01m 50s slow. The sextant altitude (hs) is 34°54.2'. The index error is 2.0' on the arc, and your height of eye is 45 feet. What is the latitude at meridian transit?

41°16.0'N

See REF1088

On 16 February your 1845 ZT DR position is LAT 25°50.5' N, LONG 46°24.0' W. At that time you observe Polaris with a sextant altitude (hs) of 26°25.5'. The chronometer time of the sight is 09h 47m 30s and the chronometer error is 02m 16s fast. The index error is 2.5' off the arc, and the height of eye is 55.0 feet. What is your latitude by Polaris?

25°38.0'N

See REF1088

On 3 January your 1759 zone time DR position is LONG 60°53.2' W. At that time you observe Polaris with a sextant altitude (hs) of 22°55.8'. The chronometer time of the sight is 09h 57m 10s, and the chronometer error is 02m 26s slow. The index error is 2.9' off the arc, and the height of eye is 52.5 feet. What is your latitude by Polaris?

22°03.6'N

See REF1088

On 20 September your 0730 zone time position was LAT 28°58.0'N, LONG 152°26.0'W. Your vessel was steaming on course 225°T at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0931 ZT. The chronometer read 07h 29m 20s and was slow 02m 22s. The observed altitude (Ho) was 44°14.4'. LAN occurred at 1206 zone time. The observed altitude (Ho) was 62°49.5'. What was the longitude of your 1200 zone time running fix?

LONG 153°23.5'W

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 45°49.7' on 13 November. The index error is 1.0' on the arc. The height of eye is 61 feet (18.6 meters). What is the observed altitude (Ho)?

45°56.4'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 35°26.3' on 25 June. The index error is 1.5' on the arc. The height of eye is 58 feet (17.6 meters). What is the observed altitude (Ho)?

35°32.1'

See REF1088

On 22 July your 0442 DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 091°T at an observed altitude (Ho) of 64°35.2'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?

Hamal

See REF1088

On 22 March your 1834 DR position is LAT 26°13.5'S, LONG 108°36.5'W. You observe an unidentified star bearing 062°T at an observed altitude (Ho) of 23°22.0'. The chronometer reads 01h 32m 37s, and is 01m 50s slow. Which star did you observe?

Regulus

See REF1088

On 17 March your 1845 DR position is LAT 25°10.0'N, LONG 66°48.0'W. You observe an unidentified star bearing 340°T at an observed altitude (Ho) of 66°25.1'. The chronometer reads 10h 47m 49s, and is 1m 54s fast. What star did you observe?

Capella

See REF1088

On 13 September your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observe a faint unidentifiable star through a hole in the clouds. The star bore 132.3°T at a sextant altitude (hs) of 29°34.6'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?

Beta Gruis

See REF1088

On 16 July your 1810 zone time DR position is LAT 24°16.5' S, LONG 162°52.0' E. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Jupiter, Alphard, Alphecca

See REF1088

On 28 February your 1850 zone time DR position is LAT 27°49.0' N, LONG 159°24.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?

Rigel, Schedar, Regulus

See REF1088

On 3 October your 0830 ZT position is LAT 26°15.0'S, LONG 73°16.0'E. Your vessel is on course 280°T at a speed of 19.0 knots. What is the ZT of local apparent noon (LAN)?

1201

See REF1088

On 10 October your 0930 zone time position is LAT 25°00.0'S, LONG 164°38.6'W. Your vessel is on course 180°T at a speed to 10.0 knots. What is the zone time of local apparent noon (LAN)?

1145

See REF1088

On 22 June your 0400 zone time DR position is LAT 23°00'N, LONG 81°45'W. You are steaming on course 110°T at a speed of 8.6 knots. What will be the zone time of sunrise at your vessel?

0541

See REF1088

At 1544 zone time on 5 October your DR position is LAT 25°00'N, LONG 60°15'W. You are steering 270°T at a speed of 6.8 knots. What is the zone time of sunset?

1745

See REF1088

On 12 February your 0542 zone time (ZT) fix gives you a position of LAT 26°42.0'N, LONG 60°18.0'W. Your vessel is on course 300°T, and your speed is 9.8 knots. Local apparent noon (LAN) occurs at 1220 ZT at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 49°10.0'. What is the calculated latitude at LAN?

27°16.3'N

See REF1088

On 26 July your 1901 ZT position is LAT 28°28'N, LONG 157°16'E when you take an observation of Jupiter. The chronometer at the time of the sight reads 08h 54m 34s and is 06m 24s slow. The sextant altitude (hs) is 33°51.5'. The index error is 2.8' off the arc, and the height of eye is 48 feet. What are the azimuth (Zn) and intercept (a) for this sight using the assumed position?

Zn 248.2°, a 34.2' T

See REF1088

On 8 August at 0545 ZT, morning stars were observed, and the vessel's position was determined to be LAT 26°16.0' S, LONG 94°16.0'E. Your vessel is steaming at 20.0 knots on a course of 346°T. A sextant observation of the Sun's lower limb is made at 0905 ZT. The chronometer reads 03h 02m 52s, and the sextant altitude (hs) is 38°07.5'. The index error is 5.2' off the arc, and the chronometer error is 2m 17s slow. Your height of eye on the bridge is 72 feet (22.0 meters). What is the observed altitude (Ho) and azimuth (Zn) of this sight using the assumed position?

38°19.4', 048.4°T

See REF1088

On 15 November your 1030 ZT DR position is LAT 17°25'S, LONG 42°12'W. You are on course 059°T, speed 22 knots. Determine your 1200 position using the following observations of the Sun.

ZT	GHA	DECLINATION	Ho
1128	40°50.4'	S 18°33.6'	88°18.4'
1133	42°05.4'	S 18°33.6'	88°37.7'

LAT 17°06.8'S, LONG 41°44.3'W

See REF1088

On 27 March in DR position LAT 32°31.0'N, LONG 76°25.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 05h 23m 32s, and the chronometer error is 01m 30s fast. The sextant altitude (hs) is 59°59.0'. The index error is 1.8' off the arc, and your height of eye is 52 feet. What is the latitude at meridian transit?

LAT 32°29.5'N

See REF1088

On 15 July at 0447 ZT, your vessel's DR position is LAT 22°42' N, LONG 126°36' E. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading 23°46.2' with an index error of 1.6' off the arc. Your chronometer reads 08h 48m 28s, and is 1m 16s fast. What is your latitude by Polaris, given a height of eye of 33 feet?

22°54.1'N

See REF1088

On 12 March your 1846 zone time DR position is LONG 129°16.5' W. At that time you observe Polaris with a sextant altitude (hs) of 28°01.5'. The chronometer time of the sight is 03h 44m 10s, and the chronometer error is 01m 55s slow. The index error is 2.2' off the arc, and the height of eye is 59.8 feet (18.2 m). What is your latitude by Polaris?

27°33.7'N

See REF1088

On 15 August your 0512 zone time position was LAT 29°18.0'N, LONG 57°24.0'W. Your vessel was steaming on course 262°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 0824 ZT. The chronometer read 00h 22m 24s and was slow 01m 34s. The observed altitude (Ho) was 38°16.7'. LAN occurred at 1204 zone time. The observed altitude (Ho) was 74°58.0'. What was the longitude of your 1204 zone time running fix?

LONG 59°58.5'W

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 50°26.9' on 9 November. The index error is 1.5' on the arc. The height of eye is 56 feet (17 meters). What is the observed altitude (Ho)?

50°33.5'

See REF1088

On 26 November at 0535 ZT, while taking sights for a morning fix, you observe an unidentified planet bearing 074°T at an observed altitude (Ho) of 38°29.8'. Your DR position is LAT 27°18.9' S, LONG 30°18.4' E. The chronometer time of the sight is 03h 33m 16s, and the chronometer is 01m 48s slow. What planet did you observe?

Saturn

See REF1088

On 22 July your 0442 DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 104°T at an observed altitude (Ho) of 9°55.7'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?

Rigel

See REF1088

On 22 July your 0442 ZT DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 112°T, at an observed altitude (Ho) of 44°16.0'. The chronometer reads 05h 39m 03s and is 03m 14s slow. What star did you observe?

Menkar

See REF1088

On 17 March your 1845 DR position is LAT 25°10.0'N, LONG 66°48.0'W. You observe an unidentified star bearing 320°T at an observed altitude (Ho) of 50°02.9'. The chronometer reads 10h 47m 49s, and is 1m 54s fast. What star did you observe?

Mirfak

See REF1088

On 13 September your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observed a faint unidentifiable star through a hole in the clouds. The star bore 351.5°T at a sextant altitude (hs) of 62°05.6'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?

Beta Ophiuchi

See REF1088

On 3 February your 0547 zone time DR position is LAT 24°18.5' N, LONG 167°25.0' E. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Regulus, Deneb, Antares

See REF1088

On 17 July your 1951 zone time DR position is LAT 24°26.0' N, LONG 51°16.0' W. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Kochab, Jupiter, Rasalhague

See REF1088

On 26 September your 0830 zone time DR position is LAT 23°04.0'N, LONG 129°16.0'E. Your vessel is on course 119°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?

1210

See REF1088

On 12 July your 0800 ZT DR position is LAT 24°15.0'N, LONG 132°30.0'W. Your vessel is on course 045°T at a speed of 15.0 knots. What is the ZT of local apparent noon (LAN)?

1152

See REF1088

On 17 April your vessel is enroute from the Panama Canal to Kobe, Japan. Your 0400 zone time DR position is LAT 26°12.0'N, LONG 126°12.0'W. Your vessel is on course 285°T at a speed of 18 knots. What will be the zone time of sunrise at your vessel?

0602

See REF1088

At 1730 zone time, on 3 March, your DR position is LAT 16°00'S, LONG 80°00'W. You are steering 000°T at a speed of 7.5 knots. What is the zone time of sunset?

1843

See REF1088

On 15 November your 0813 zone time (ZT) fix gives you a position of LAT 22°30.0'N, LONG 67°28.0'W. Your vessel is on course 164°T, and your speed is 13.5 knots. Local apparent noon (LAN) occurs at 1215 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 49°46.0'. What is the latitude at 1200 ZT?

21°42.5'N

See REF1088

On 25 May your vessel's 1917 zone time position is LAT 24°16.0'N, LONG 017°26.0'W. At that time a sextant observation of the planet Saturn was made. The sextant altitude is 63°05.1', and the chronometer reads 08h 18m 24s. The index error is 4.5' off the arc, and the chronometer error is 01m 05s fast. Your height of eye is determined to be 62.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

147.3°

See REF1088

On 11 October at 0516 ZT, morning stars were observed, and the vessel's position was determined to be LAT 23°21.0'N, LONG 139°27.0'W. Your vessel is steaming at 14.0 knots on a course of 293°T. A sextant observation of the Sun's lower limb is made at 0927 ZT. The chronometer reads 06h 30m 21s, and the sextant altitude (hs) is 39°48.7'. The index error is 2.0' on the arc, and the chronometer error is 02m 56s fast. Your height of eye on the bridge is 63.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

123.4°T

See REF1088

On 15 November your 1030 ZT DR position is LAT 19°41'S, LONG 41°37'W. You are on course 239°T, speed 22 knots. Determine your 1200 position using the following observations of the Sun.

(5.1.4.1-5)

ZT	GHA	DECLINATION	Ho
1128	40°50.4'	S 18°33.6'	88°18.4'
1133	42°05.4'	S 18°33.6'	88°37.7'

LAT 20°01.0'S, LONG 42°05.9'W

See REF1088

On 15 March in DR position LAT 21°42.0'N, LONG 55°26.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 04h 02m 40s, and the chronometer error is 02m 24s fast. The sextant altitude (hs) is 66°15.6'. The index error is 2.8' on the arc, and your height of eye is 56 feet. What is the latitude at meridian transit?

21°32.0'N

See REF1088

On 7 March at 1838 ZT, in DR position LAT 34°26.9' N, LONG 58°16.2' W, you observe Polaris for latitude. The sextant altitude (hs) is 35°08.4'. The index error is 2.5' off the arc. The height of eye is 54 feet. What is the latitude at the time of the sight?

34°33.4'N

See REF1088

On 11 March your 1846 zone time DR position is LAT 25°05.7' N, LONG 124°29.0' W. At that time you observe Polaris with a sextant altitude (hs) of 25°59.1'. The chronometer time of the sight is 02h 44m 01s, and the chronometer error is 02m 15s slow. The index error is 3.9' on the arc, and the height of eye is 42.7 feet (13.0 meters). What is your latitude by Polaris?

25°17.9'N

See REF1088

On 17 January your 0730 zone time position was LAT 22°26.0'N, LONG 152°17.0'E. Your vessel was steaming on course 136°T at a speed of 17.0 knots. An observation of the Sun's lower limb was made at 1015 ZT. The chronometer read 00h 13m 23s and was slow 01m 49s. The observed altitude (Ho) was 40°25.7'. LAN occurred at 1222 zone time. The observed altitude (Ho) was 47°48.1'. What was the longitude of your 1200 zone time running fix?

LONG 153°13.1'E

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 34°51.4' on 18 October. The index error is 2.0' off the arc. The height of eye is 54 feet (16.5 meters). What is the observed altitude (Ho)?

35°01.2'

See REF1088

On 26 November your 0535 DR position is LAT 27°18.9' S, LONG 30°18.4' E. You observe an unidentified planet bearing 085°T at an observed altitude (Ho) of 32°15.2'. The chronometer reads 03h 33m 16s, and is 01m 48s slow. What planet did you observe?

Jupiter

See REF1088

On 22 July your 0442 DR position is LAT 26°35.6' N, LONG 22°16.7' W. You observe an unidentified star bearing 149°T at an observed altitude (Ho) of 12°55.0'. The chronometer reads 05h 39m 03s, and is 03m 14s slow. What star did you observe?

Acamar

See REF1088

On 22 March your 1834 DR position is LAT 26°13.5'S, LONG 108°36.5'W. You observe an unidentified star bearing 315°T at an observed altitude (Ho) of 66°01.2'. The chronometer reads 01h 32m 37s, and is 01m 50s slow. What star did you observe?

Rigel

See REF1088

On 17 March your 1845 DR position is LAT 25°10.0'N, LONG 66°48.0'W. You observe an unidentified star bearing 077°T at an observed altitude (Ho) of 67°04.4'. The chronometer reads 10h 47m 49s, and is 1m 54s fast. What star did you observe?

Pollux

See REF1088

On 13 September your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E when you observed a faint unidentifiable star through a hole in the clouds. The star bore 265.0°T at a sextant altitude (hs) of 62°25.4'. The chronometer read 11h 24m 39s and is 5m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?

Dschubba

See REF1088

On 11 November your 0200 zone time DR position is LAT 26°32' S, LONG 154°16' E. You are on course 058°T at a speed of 21 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Mars, Betelgeuse, Miaplacidus

See REF1088

On 8 November your 1731 zone time DR position is LAT 27°16.0'N, LONG 137°25.0'W. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?

Alphecca, Fomalhaut, Schedar

See REF1088

On 2 April your 0900 zone time DR position is LAT 28°04.0'S, LONG 94°14.0'E. Your vessel is on course 316°T at a speed of 18.5 knots. What is the zone time of local apparent noon (LAN)?

1149

See REF1088

On 26 September your 0830 zone time DR position is LAT 26°04.0'N, LONG 129°16.0'W. Your vessel is on course 119°T at a speed of 20.0 knots. What is the zone time of local apparent noon (LAN)?

1124

See REF1088

At 0327 ZT on 29 May, your DR position is LAT 25°00'N, LONG 64°15'W. You are steering 270°T at a speed of 13.6 knots. What is the zone time of sunrise?

0529

See REF1088

On 19 July your 1500 ZT DR position is LAT 28°25.0'N, LONG 120°28.0'W. You are on course 233°T at a speed of 10 knots. What will be the zone time of sunset at your vessel?

1901

See REF1088

On 12 September your 0600 zone time (ZT) fix gives you a position of LAT 22°51.9'N, LONG 133°40.1'W. Your vessel is on course 062°T, and your speed is 12.3 knots. Local apparent noon (LAN) occurs at 1142 ZT, at which time a meridian altitude of the Sun's upper limb is observed. The observed altitude (Ho) for this sight is 70°33.2'. What is the calculated latitude at LAN?

23°24.8'N

See REF1088

On 25 May your vessel's 1858 zone time position is LAT 21°05.0'N, LONG 143°27.0'E. At that time a sextant observation of the planet Venus was made. The sextant altitude is 12°53.4' and the chronometer reads 08h 59m 15s. The index error is 4.5' off the arc, and the chronometer error is 01m 25s fast. Your height of eye is determined to be 55.0 feet. What is the azimuth (Zn) of the sight using the assumed position?

290.4°T

See REF1088

On 18 October at 0518 ZT, morning stars were observed and the vessel's position was determined to be LAT 25°31.0'N, LONG 146°29.2'E. Your vessel is steaming at 19.0 knots on a course of 308°T. A sextant observation of the Sun's lower limb is made at 0915 ZT. The chronometer reads 11h 17m 11s, and the sextant altitude (hs) is 34°51.4'. The index error is 2.0' off the arc, and the chronometer error is 01m 57s fast. Your height of eye on the bridge is 54.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

125.5°T

See REF1088

On 18 May your 1030 ZT DR position is LAT 20°41'N, LONG 63°32'W. You are on course 106°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.

Zone Time	GHA	Declination	Ho
1204	61°54.6'	N 19°37.6'	88°39.7'
1210	63°24.6'	N 19°37.7'	88°59.2'

LAT 20°32.6'N, LONG 62°57.5'W

See REF1088

On 30 August in DR position LAT 26°34.0'N, LONG 141°36.0'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 09h 15m 26s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 71°41.7'. The index error is 3.2' off the arc, and your height of eye is 49.6 feet. What is the latitude at meridian transit?

LAT 26°41.9'N

See REF1088

On 22 May at 0440 ZT, your vessel's DR position is LAT 23°24' N, LONG 110°24' W. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading 23°40.9' with an index error of 1.6' on the arc. Your chronometer reads 11h 42m 14s, and is 2m 36s fast. What is your latitude by Polaris, given a height of eye of 24 feet?

23°31.2'N

See REF1088

On 22 August your 1852 zone time DR position is LONG 155°54.0' E. At that time you observe Polaris with a sextant altitude (hs) of 27°36.9'. The chronometer time of the sight is 08h 54m 06s, and the chronometer error is 02m 20s fast. The index error is 3.6' off the arc, and the height of eye is 61.5 feet. What is your latitude by Polaris?

28°05.9'N

See REF1088

On 29 June your 0800 zone time fix gives you a position of LAT 26°16.0'S, LONG 61°04.0'E. Your vessel is steaming a course of 079°T at a speed of 15.5 knots. An observation of the Sun's upper limb is made at 0905 zone time, and the observed altitude (Ho) is 25°20.1. The chronometer reads 05h 08m 12s, and the chronometer error is 02m 27s fast. Local apparent noon occurs at 1154 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 40°44.2'. Determine the vessel's 1200 zone time position.

LAT 26°02.0'S, LONG 62°05.0'E

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 38°07.5' on 8 August. The index error is 5.2' off the arc. The height of eye is 72 feet (22 meters). What is the observed altitude (Ho)?

38°19.2'

See REF1088

On 23 September while taking stars for an evening fix, an unidentified star is observed bearing 261°T at an observed altitude of 61°35'. Your 1836 zone time DR position is LAT 25°18' S, LONG 162°36' E. The chronometer reads 07h 34m 12s, and the chronometer error is 01m 54s slow. Your vessel is steaming on a course of 230°T at a speed of 18 knots. What star did you observe?

Antares

See REF1088

On 22 June your 0424 DR position is LAT 26°18.5'N, LONG 124°18.2'W. You observe an unidentified star bearing 195°T at an observed altitude (Ho) of 03°30.7'. The chronometer reads 00h 23m 24s, and is 01m 32s slow. What star did you observe?

Peacock

See REF1088

On 22 March your 1834 DR position is LAT 26°13.5'S, LONG 108°36.5'W. You observe an unidentified star bearing 294°T at an observed altitude (Ho) of 33°02.7'. The chronometer reads 01h 32m 37s, and is 01m 50s slow. What star did you observe?

Menkar

See REF1088

On 23 September your 1836 DR position is LAT 25°18'S, LONG 162°23'E. You observe an unidentified star bearing 000°T at an observed altitude (Ho) of 26°18'. The chronometer reads 07h 34m 12s, and is 01m 54s slow. What star did you observe?

Vega

See REF1088

On 13 September your 1830 ZT DR position was LAT 23°03'S, LONG 105°16'E, when you observed a faint unidentifiable star through a hole in the clouds. The star bore 148.0°T at a sextant altitude (hs) of 32°24.3'. The chronometer read 11h 24m 39s and is 05m 08s slow. The index error is 1.0' off the arc, and the height of eye is 52 feet. What star did you observe?

Alpha Tucanae

See REF1088

On 29 April your 0300 ZT DR position is LAT 28°39' N, LONG 168°03' E. You are on course 108°T at a speed of 22 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Moon, Alpheratz, Polaris

See REF1088

On 4 September your 1813 zone time DR position is LAT 24°18.0' S, LONG 95°16.0' E. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?

Rasalhague, Fomalhaut, Spica

See REF1088

On 16 January your 0930 ZT DR position is LAT 26°07.0'S, LONG 51°43.0'E. Your vessel is on course 238°T at a speed of 17.0 knots. What is the ZT of local apparent noon (LAN)?

1145

See REF1088

On 3 May your 1009 zone time DR position is LAT 30°01.0'N, LONG 123°15.0'W. Your vessel is on course 330°T at a speed of 8.6 knots. What is the zone time of local apparent noon (LAN)?

1211

See REF1088

On 27 March your 0330 zone time DR position is LAT 23°32'N, LONG 154°47'E. Your vessel is on a course of 105°T at a speed of 20 knots. What will be the zone time of sunrise at your vessel?

0534

See REF1088

On 1 November your 1600 zone time DR position is LAT 27°48'S, LONG 91°26'E. Your vessel is on a course of 327° T at a speed of 16 knots. What will be the zone time of sunset at your vessel?

1813

See REF1088

On 16 September your 0600 ZT fix gives you a position of LAT 29°47.2'N, LONG 65°28.4'W. Your vessel is on course 242°T and your speed is 13.5 knots. Local apparent noon (LAN) occurs at 1227 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 63°25.3'. What is the calculated latitude at LAN?

29°04.7'N

See REF1088

On 26 May your vessel's 1906 zone time position is LAT 27°16.0'N, LONG 24°37.0'W. At that time, a sextant observation of the planet Jupiter was made. The sextant altitude is 63°27.6', and the chronometer reads 09h 05m 16s. The index error is 5.2' on the arc, and the chronometer error is 01m 25s slow. Your height of eye is determined to be 52.6 feet. What is the (Zn) of this sight using the assumed position?

168.7°T

See REF1088

On 13 November at 0438 ZT, morning stars were observed and the vessel's position was determined to be LAT 22°14.0'S, LONG 79°23.0'E. Your vessel is steaming at 13.0 knots on a course of 242°T. A sextant observation of the Sun's lower limb is made at 0822 ZT. The chronometer reads 03h 20m 16s, and the sextant altitude (hs) is 45°49.7'. The index error is 1.0' on the arc, and the chronometer error is 01m 47s slow. Your height of eye on the bridge is 61.0 feet (18.6 meters). What is the azimuth (Zn) of this sight using the assumed position?

092.6°T

See REF1088

On 30 July your 1030 ZT DR position is LAT 19°02'N, LONG 138°12'W. You are on course 309°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.

(5.1.4.1-7)

ZT	GHA	DECLINATION	Ho
1220	138°25.0'	N 18°22.3'	88°43.3'
1226	139°55.0'	N 18°22.2'	88°24.0'

LAT 19°29.7'N, LONG 138°42.0'W

See REF1088

On 10 March in DR position LAT 21°42.0'S, LONG 57°28.0'E, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 08h 28m 17s, and the chronometer error is 00m 00s. The sextant altitude (hs) is 72°08.0'. The index error is 3.4' on the arc, and your height of eye is 52.7 feet. What is the latitude at meridian transit?

LAT 21°45.5'S

See REF1088

On 13 October at 1847 ZT, your vessel's DR position is LAT 42°17.4' N, LONG 138°46.2' W. At approximately this time, you obtain a sextant altitude (hs) of Polaris reading 42°16.8', with an index error of 3.2' on the arc. Your chronometer reads 03h 45m 20s and is 1m 32s slow. What is your latitude by Polaris, given a height of eye of 44 feet?

42°09.1'N

See REF1088

On 6 December your 0800 zone time DR position was LAT 21°48.0'N, LONG 124°30.0'E. Your vessel was steaming on course 045°T at a speed of 20.0 knots. An observation of the Sun's lower limb was made at 1012 ZT. The chronometer read 02h 10m 42s and was slow 01m 02s. The observed altitude (Ho) was 41°17.1'. LAN occurred at 1129 zone time. The observed altitude (Ho) was 44°53.7'. What was the longitude of your 1200 zone time running fix?

LONG 125°35.2'E

See REF1088

On 2 April your 0830 zone time fix gives you a position of LAT 20°16.0'S, LONG 004°12.0'E. Your vessel is steaming a course of 143°T at a speed of 18.0 knots. An observation of the Sun's upper limb is made at 0903 zone time, and the observed altitude (Ho) is 42°39.6'. The chronometer reads 09h 05m 40s, and the chronometer error is 02m 15s fast. Local apparent noon occurs at 1145 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 63°46.2'. Determine the vessel's 1200 zone time position.

LAT 21°18.0'S, LONG 005°00.5'E

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 75°12.3' on 6 August. The index error is 1.5' off the arc. The height of eye is 32 feet (9.8 meters). What is the observed altitude (Ho)?

75°24.0'

See REF1088

On 22 February your 1857 ZT DR position is LAT 23°46.0' S, LONG 93°16.5' E. You observe an unidentified star bearing 159°T, at an observed altitude (Ho) of 34°30.0'. The chronometer reads 01h 00m 35s and is 03m 25s fast. What star did you observe?

Miaplacidus

See REF1088

On 22 June your 0424 DR position is LAT 26°18.5' N, LONG 124°18.2' W. You observe an unidentified star bearing 154°T at an observed altitude (Ho) of 15°01.2'. The chronometer reads 12h 23m 24s, and is 01m 32s slow. What star did you observe?

Ankaa

See REF1088

On 22 February your 1857 DR position is LAT 23°46.0'S, LONG 93°16.5'E. You observe an unidentified star bearing 126°T at an observed altitude (Ho) of 40°21.5'. The chronometer reads 01h 00m 35s and is 03m 25s fast. What star did you observe?

Suhail

See REF1088

On 23 September your 1836 DR position is LAT 25°18'S, LONG 162°36'E. You observe an unidentified star bearing 148°T at an observed altitude (Ho) of 13°32'. The chronometer reads 07h 34m 12s, and is 01m 54s slow. Which star did you observe?

Achernar

See REF1088

On 2 October your 1845 DR position was LAT 28°09.2'S, LONG 167°48.1'E. You observe a faint star through a hole in the clouds at a sextant altitude (hs) of 20°45.6' T, bearing 201.5°T. The index error is 1.3' off the arc, and the height of eye is 42 feet. The chronometer reads 07h 46m 19s and is 00m 51s fast. What star did you observe?

Alpha Muscae

See REF1088

On 24 March your vessel is enroute from Cadiz to Norfolk. Evening twilight will occur at 1830 zone time and your vessel's DR position will be LAT 35°06' N, LONG 60°48' W. Considering their azimuth, altitude, and magnitude, which group of stars is best suited for plotting a star fix at star time?

Sirius, Dubhe, Mirfak

See REF1088

On 24 July your 1912 zone time DR position is LAT 24°28.0' N, LONG 73°46.5' W. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?

Spica, Altair, Alioth

See REF1088

On 23 June your 0900 zone time DR position is LAT 21°26.0'N, LONG 137°46.0'W. Your vessel is on course 059°T at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?

1210

See REF1088

On 4 January your 0800 zone time DR position is LAT 25°25.0 S, LONG 16°09.0'W. Your vessel is on course 290°T at a speed of 13.5 knots. What is the zone time of local apparent noon (LAN)?

1213

See REF1088

On 12 June your 0400 ZT DR position is LAT 22°31.0'N, LONG 31°45.0'W. You are on course 240°T at a speed of 16.5 knots. What will be the zone time of sunrise at your vessel?

0523

See REF1088

On 5 May your 1800 ZT DR position is LAT 26°11.5'N, LONG 65°35.0'W. You are on course 270°T at a speed of 12 knots. What will be the ZT of sunset at your vessel?

1857

See REF1088

On 22 February your 0612 zone time fix gives you a position of LAT 27°16.2'S, LONG 37°41.6'W. Your vessel is on course 298°T, and your speed is 14.2 knots. Local apparent noon (LAN) occurs at 1147 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 73°33.3'. What is the calculated latitude at LAN?

26°31.4'S

See REF1088

On 28 April your vessel's 0515 zone time position is LAT 23°26'S, LONG 95°30'E. At this time, the observed altitude (Ho) of the star Rigil Kentaurus is 24°51.4'. Your chronometer reads 11h 16m 36s and is 01m 18s fast. What is the intercept (a) based on the assumed position method?

34.4 miles

See REF1088

On 9 November at 0426 ZT, your position was LAT 25°17.0'S, LONG 154°16.0'E. Your vessel is steaming at 14.0 knots on course 066°T. A sextant observation of the Sun's lower limb is made at 0837 ZT. The chronometer reads 10h 35m 21s, and the sextant altitude (hs) is 50°26.9'. The index error is 1.5' on the arc, and the chronometer error is 01m 48s slow. Your height of eye on the bridge is 56.0 feet. What is the observed altitude (Ho) and azimuth (Zn) of this sight using the assumed position?

50°33.5', 085.9°T

See REF1088

On 30 July your 1030 ZT DR position is LAT 17°46'N, LONG 139°30'W. You are on course 129°T, speed 24 knots. Determine your 1200 position using the following observations of the Sun.

(5.1.4.1-8)

ZT	GHA	DECLINATION	Ho
1220	138°25.0'	N 18°22.3'	88°43.3'
1226	139°55.0'	N 18°22.2'	88°24.0'

LAT 17°15.1'N, LONG 139°00.0'W

See REF1088

On 15 October an ex-meridian altitude of the Sun's lower limb at upper transit was observed at 1146 ZT. Your DR position is LAT 22°42.0'N, LONG 139°52.0'E, and your sextant altitude (hs) is 58°30.4'. The index error is 3.4' on the arc, and your height of eye is 56.7 feet. The chronometer time of the observation is 02h 45m 06s, and the chronometer error is 01m 06s slow. Find the latitude at meridian transit from the ex-meridian observation.

LAT 22°35.2'N

See REF1088

On 16 January at 1804 zone time, you take a sextant observation of Polaris. Your vessel's DR position is LAT 36°12' N, LONG 124°36' W, and your sextant reads (hs) 37°16.4'. Your chronometer reads 02h 02m 12s, and is 01m 36s slow. Your height of eye is 60 feet, and the index error is 1.5' on the arc. From your observation of Polaris, what is the latitude of your vessel?

36°17.9'N

See REF1088

On 7 November your 0830 zone time position was LAT 27°36.0'N, LONG 162°19.0'W. Your vessel was steaming on course 289°T at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0945 ZT. The chronometer read 08h 43m 11s and was slow 01m 51s. The observed altitude (Ho) was 38°21.1'. Local Apparent Noon (LAN) occurred at 1138 zone time. The observed altitude (Ho) was 45°35.0'. What was the longitude of your 1200 zone time running fix?

163°38.8'W

See REF1088

On 24 March your 0800 zone time fix gives you a position of LAT 22°16.0'N, LONG 31°45.0'W. Your vessel is steaming a course of 285°T at a speed of 16.5 knots. An observation of the Sun's upper limb is made at 0938 zone time, and the observed altitude (Ho) is 46°32.2'. The chronometer reads 11h 41m 01s, and the chronometer error is 02m 50s fast. Local apparent noon occurs at 1214 zone time, and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) for this sight is 68°55.8'. Determine the vessel's 1200 zone time position.

LAT 22°35.0'N, LONG 32°51.0'W

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 54°28.2' on 22 July. The index error is 1.5' off the arc. The height of eye is 56 feet (17.1 meters). What is the observed altitude (Ho)?

54°37.7'

See REF1088

On 14 January your 0550 ZT DR position is LAT 25°26.0' N, LONG 38°16.0' W. You observe an unidentified star bearing 004.5°T, at an observed altitude (Ho) of 40°10.0'. The chronometer reads 08h 48m 51s and is 01m 22s slow. What star did you observe?

Kochab

See REF1088

On 22 June your 0424 DR position is LAT 26°18.5' N, LONG 124°18.2' W. You observe an unidentified star bearing 249°T at an observed altitude (Ho) of 52°50.7'. The chronometer reads 00h 23m 24s, and is 01m 32s slow. What star did you observe?

Altair

See REF1088

On 22 February your 1857 DR position is LAT 23°46.0'S, LONG 93°16.5'E. You observe an unidentified star bearing 150°T at an observed altitude (Ho) of 42°15.0'. The chronometer reads 01h 00m 35s, and is 03m 25s fast. What star did you observe?

Avior

See REF1088

On 23 September your 1836 DR position is LAT 25°18'S, LONG 162°36'E. You observe an unidentified star bearing 022°T at an observed altitude (Ho) of 13°16'. The chronometer reads 07h 34m 12s, and is 01m 54s slow. What star did you observe?

Deneb

See REF1088

On 12 June your 1945 DR position is LAT 21°47.0'N, LONG 46°52.0'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 130°T at a sextant altitude (hs) of 45°21.2'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 10h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Beta Librae

See REF1088

On 28 October morning twilight will occur around 0524 ZT. Your DR position is LAT 25°25.0' N, LONG 32°33.3' W. Considering their magnitude and location, which group will be the three stars best suited to observe for a star fix at star time?

Sirius, Capella, Denebola

See REF1088

On 16 July your 1920 ZT DR position is LAT 25°36.0' N, LONG 172°18.9' W. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Venus, Antares, Vega

See REF1088

On 14 October your 0800 zone time (ZT) dead reckoning position is LAT 28°22.0'N, LONG 161°17.0'E. Your vessel is on course 116°T at a speed of 17.5 knots. What is the ZT of local apparent noon (LAN)?

1156

See REF1088

On 25 June your 0900 zone time DR position is LAT 24°10.0'S, LONG 148°30.0'W. Your vessel is on a course of 230°T at a speed of 18.0 knots. What is the zone time of local apparent noon (LAN)?

1200

See REF1088

On 17 May your 0300 ZT DR position is LAT 27°21.0'N, LONG 146°14.0'E. You are on course 107°T at a speed of 18 knots. What will be the zone time of sunrise at your vessel?

0522

See REF1088

On 10 November your 1630 zone time DR position is LAT 25°10.0'N, LONG 71°12.0'W. You are on course 335°T at a speed of 24 knots. What will be the zone time of sunset at your vessel?

1700

See REF1088

On 17 December your 0600 ZT fix gives you a position of LAT 27°16.7'N, LONG 138°39.2'W. Your vessel is on course 137°T, and your speed is 14.8 knots. Local apparent noon (LAN) occurs at 1207 ZT, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 40°22.1'. What is the calculated latitude at LAN?

26°15.4'N

See REF1088

On 17 April your vessel's 1856 zone time DR position is LAT 22°35.0'N, LONG 63°15.0'W. At that time, a sextant observation of the star Sirius is made. The sextant altitude is 42°45.0' and the chronometer reads 10h 59m 27s. The index error is 2.6' off the arc, and the chronometer error is 03m 01s fast. Your height of eye is determined to be 45 feet. What is the computed altitude (Hc) and azimuth (Zn) for this sight using the assumed position?

42°51.6', 214.9°T

See REF1088

On 21 November at 0430 ZT, morning stars were observed, and the vessel's position was LAT 22°14.0'S, LONG 79°23.0'E. Your vessel is steaming at 14.5 knots on a course of 246°T. A sextant observation of the Sun's lower limb is made at 0816 ZT. The chronometer reads 03h 14m 16s, and the sextant altitude (hs) is 44°29.2'. The index error is 1.0' on the arc, and the chronometer error is 01m 47s slow. Your height of eye is 61.0 feet (18.6 meters). What is the azimuth (Zn) and intercept (a) of this sight using the assumed position method?

Zn 095.6°, a 6.6' T

See REF1088

On 23 August in DR position LAT 24°22.0'S, LONG 64°55.3'E, you take an ex-meridian observation of the Moon's upper limb at upper transit. The chronometer time of the sight is 02h 15m 04s, and the chronometer error is 01m 06s fast. The sextant altitude (hs) is 48°03.6'. The index error is 2.0' on the arc, and your height of eye is 60 feet (21.0 meters). What is the latitude at meridian transit?

24°20.5'S

See REF1088

On 30 October an ex-meridian altitude of the Sun's lower limb at upper transit was observed at 1144 ZT. Your DR position is LAT 22°42.0'S, LONG 137°16.0'W, and your sextant altitude (hs) is 80°59.4'. The index error is 2.5' off the arc, and your height of eye is 42.5 feet. The chronometer time of the observation is 08h 46m 15s, and the chronometer error is 02m 12s fast. Find the latitude at meridian transit from the ex-meridian observation.

LAT 22°31.4'S

See REF1088

On 14 March at 1845 ZT, you take a sextant observation of Polaris. Your DR position is LAT 29°10' N, LONG 154°30' W, and your sextant reads 29°53.5'. Your chronometer reads 04h 42m 36s, and the chronometer error is 02m 24s slow. Your height of eye is 24 feet, and the index error is 1.3' off the arc. Determine the latitude by Polaris.

29°21.3'N

See REF1088

On 8 February your 0800 zone time (ZT) position was LAT 28°55.0'S, LONG 52°27.0'W. Your vessel was steaming on course 036°T at a speed of 19.0 knots. An observation of the Sun's lower limb was made at 0938 ZT. The chronometer read 12h 37m 23s and was slow 01m 24s. The observed altitude (Ho) was 45°29.2'. Local Apparent Noon (LAN) occurred at 1240 ZT. The observed altitude (Ho) was 77°10.5'. What was the longitude of your 1200 ZT running fix?

51°35.4'W

See REF1088

On 29 April your 0530 zone time position was LAT 23°04.0'S, LONG 162°12.0'E. Your vessel was steaming on course 120°T at a speed of 9.0 knots. An observation of the Sun's upper limb was made at 0830 ZT. The chronometer read 09h 27m 32s and was slow 02m 24s. The observed altitude (Ho) was 24°58.0'. LAN occurred at 1205 zone time. The observed altitude (Ho) was 52°04.0'. What was the longitude of your 1200 zone time running fix?

LONG 163°06.0'E

See REF1088

On 4 July you observe the lower limb of the Sun at a sextant altitude (hs) of 25°29.8'. The index error is 3.1' off the arc. The height of eye is 48 feet (14.6 meters). What is the observed altitude (Ho)?

25°40.2'

See REF1088

On 14 January your 1922 ZT DR position is LAT 27°18.5' S, LONG 67°18.0' E. You observe an unidentified star bearing 029°T, at an observed altitude (Ho) of 29°35.0'. The chronometer reads 03h 25m 43s and is 03m 15s fast. What star did you observe?

Elnath

See REF1088

On 22 July your 1759 ZT DR position is LAT 24°50.2' S, LONG 05°16.0' E. You observe an unidentified star bearing 231°T, at an observed altitude (Ho) of 26°10.0'. The chronometer reads 06h 01m 31s and is 02m 15s fast. What star did you observe?

Suhail

See REF1088

On 22 February your 1857 DR position is LAT 23°46.0'S, LONG 93°16.5'E. You observe an unidentified star bearing 108°T at an observed altitude (Ho) of 67°53.9'. The chronometer reads 01h 00m 35s, and is 03m 25s fast. What star did you observe?

Adhara

See REF1088

On 17 March your 0520 DR position is LAT 27°23.0'N, LONG 39°42.0'W. At this time you observe an unidentified star bearing 270°T with an observed altitude of 46°30.2'. The chronometer reads 08h 22m 15s, and is 01m 45s fast. What star did you observe?

Arcturus

See REF1088

On 12 June your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 282.5°T at a sextant altitude (hs) of 14°22.3'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Alhena

See REF1088

On 23 July your 1700 zone time DR position is LAT 27°29' N, LONG 129°26' W. You are on course 079°T at a speed of 20 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Spica, Sabik, Vega

See REF1088

On 12 February your 0900 zone time DR position is LAT 16°43.0'N, LONG 51°42.0'W. Your vessel is on course 093°T at a speed of 18.5 knots. What is the zone time of local apparent noon (LAN)?

1237

See REF1088

On 16 November your 0800 ZT DR position is LAT 25°11.0'N, LONG 117°41.0'W. Your vessel is on a course of 252°T at a speed of 14.5 knots. What is the ZT of local apparent noon (LAN)?

1139

See REF1088

On 8 April your 0830 zone time DR position is LAT 22°49.0'N, LONG 84°37.0'W. Your vessel is on course 228° T at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?

1144

See REF1088

On 16 March your 0330 ZT DR position is LAT 22°36.0'S, LONG 76°16.0'E. You are on course 098°T at a speed of 16 knots. What will be the ZT of sunrise at your vessel?

0553

See REF1088

On 28 June your 1820 ZT DR position is LAT 16°00.0'N, LONG 31°00.0'W. You are on course 310°T at a speed of 18 knots. What will be the zone time of sunset at your vessel?

1840

See REF1088

On 28 July your 0800 zone time fix gives you a position of LAT 25°16.0'N, LONG 71°19.0'W. Your vessel is on course 026°T, and your speed is 17.5 knots. Local apparent noon (LAN) occurs at 1149 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 82°28.7'. What is the calculated latitude at LAN?

26°25.0'N

See REF1088

On 16 June 0612 zone time, morning stars were observed. The vessel's position was LAT 27°23.0'S, LONG 56°22.0'W. The vessel is steaming at 16.0 knots on a course of 212°T. A sextant observation of the Sun's lower limb is made at 0850 zone time. The chronometer reads 00h 53m 19s, and the sextant altitude is 22°58.6'. The index error is 2.0' off the arc, and the chronometer error is 02m 43s fast. Your height of eye is 61.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

044.3°

See REF1088

On 22 June at 0906 EDT (ZD +4), your position is LAT 24°36'N, LONG 69°30'W. You are on course 165°pgc at a speed of 14.8 knots. A sextant observation of the Sun's lower limb is made, and the sextant altitude (hs) is 42°44.0' with an index error of 0.8' off the arc. At this time the chronometer reads 01h 10m 12s, and is 2m 42s slow. If your height of eye is 70 feet, what is the azimuth (Zn) of the sight using the assumed position?

Zn 080.4°

See REF1088

On 30 March in DR position LAT 20°26.2'N, LONG 131°17.9'E, you take an ex-meridian observation of the Moon's lower limb at upper transit. The chronometer time of the sight is 10h 36m 02s, and the chronometer error is 02m 06s slow. The sextant altitude (hs) is 48°21.4'. The index error is 2.0' on the arc, and your height of eye is 40 feet. What is the latitude at meridian transit?

LAT 20°31.9'N

See REF1088

On 15 August an ex-meridian altitude of the Sun's lower limb at upper transit was observed at 1130 ZT. Your DR position is LAT 26°24.0'S, LONG 155°02.0'E, and your sextant altitude (hs) is 48°45.9'. The index error is 2.6' on the arc, and your height of eye is 51.5 feet. The chronometer time of the observation is 01h 27m 38s, and the chronometer error is 02m 14s slow. Find the latitude at meridian transit from the ex-meridian observation.

LAT 26°51.6'S

See REF1088

On 7 May you observe Polaris for latitude at 0303 ZT. Your DR position is LAT 56°35.4' N, LONG 05°38.9' W. The sextant altitude is 56°11.1'. The height of eye is 36', and the index error is 3.3' off the arc. What is the latitude at the time of the sight?

56°38.7'N

See REF1088

On 17 January your 0730 zone time fix gives you a position of LAT 22°26.0'S, LONG 152°17.0'E. Your vessel is steaming on a course of 116°T at a speed of 17 knots. An observation of the Sun's lower limb is made at 1015 zone time. The chronometer reads 00h 13m 23s, and the chronometer error is 01m 49s slow. The observed altitude (Ho) is 66°02.1'. LAN occurs at 1152 zone time and a meridian altitude of the Sun's lower limb is made. The observed altitude (Ho) is 87°54.2'. Determine the vessel's 1200 zone time position.

LAT 22°53.8'S, LONG 153°25.6'E

See REF1088

You observe the planet Saturn at a sextant altitude (hs) of $63^{\circ}05.1'$ on 25 May. The index error is 4.5' off the arc. The height of eye is 62 feet. What is the observed altitude (Ho)?

63°01.5'

See REF1088

On 2 January you observe the lower limb of the Sun at a sextant altitude (hs) of $35^{\circ}50.4'$. The index error is 0.8' on the arc. The height of eye is 24 feet (7.3 meters). What is the observed altitude (Ho)?

35°59.7'

See REF1088

At 0520 zone time on 17 March, while taking stars for a morning fix, you observe an unidentified star bearing $050^{\circ}T$, at an observed altitude (Ho) of $45^{\circ}00.0'$. Your DR position at the time of the sight is LAT $27^{\circ}23.0'N$, LONG $39^{\circ}42.0'W$. The chronometer time of the sight is 08h 22m 15s, and the chronometer error is 01m 45s fast. Your vessel is steaming on a course of $300^{\circ}T$ at a speed of 18 knots. What star did you observe?

Deneb

See REF1088

On 22 May your 0437 DR position is LAT $25^{\circ}18.5'N$, LONG $51^{\circ}18.0'W$. You observe an unidentified star bearing $142^{\circ}T$ at an observed altitude (Ho) of $23^{\circ}10.2'$. The chronometer reads 07h 40m 40s, and is 03m 24s fast. What star did you observe?

Fomalhaut

See REF1088

On 14 January your 0550 DR position is LAT $25^{\circ}26.0'N$, LONG $38^{\circ}16.0'W$. You observe an unidentified star bearing $212^{\circ}T$ at an observed altitude (Ho) of $41^{\circ}42.3'$. The chronometer reads 08h 48m 51s, and is 01m 22s slow. What star did you observe?

Gienah

See REF1088

On 22 May your 0437 ZT DR position is LAT $25^{\circ}18.5'N$, LONG $51^{\circ}18.0'W$. You observe an unidentified star bearing $097^{\circ}T$ at an observed altitude (Ho) of $48^{\circ}20.0'$. The chronometer reads 07h 40m 40s and is 03m 24s fast. What star did you observe?

Markab

See REF1088

On 12 June your 1845 DR position is LAT $21^{\circ}47'N$, LONG $46^{\circ}52'W$ when you observe a faint unidentifiable star through a break in the clouds. The star bears $313^{\circ}T$ at a sextant altitude (hs) of $14^{\circ}56.3'$. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Menkalinan

See REF1088

On 23 March your 1600 ZT DR position is LAT $27^{\circ}16.3'N$, LONG $156^{\circ}48.2'W$. You are on course $063^{\circ}T$ at a speed of 18.0 knots. Considering their magnitude, azimuth, and altitude, which group includes the three stars best suited for a fix at star time?

Hamal, Rigel, Alphard

See REF1088

On 24 January your 0700 zone time DR position is LAT $22^{\circ}25.0'N$, LONG $46^{\circ}10.0'W$. Your vessel is on course $110^{\circ}T$ at a speed of 12.0 knots. What is the zone time of local apparent noon (LAN)?

1212

See REF1088

On 3 October your 0830 zone time DR position is LAT $26^{\circ}15.0'S$, LONG $73^{\circ}16.0'E$. Your vessel is on course $280^{\circ}T$ at a speed of 19.0 knots. What is the zone time of local apparent noon (LAN)?

1201

See REF1088

On 13 August your 0345 ZT DR position is LAT 21°35.0' N, LONG 135°26.0'W. You are on course 052°T at a speed of 14 knots. What will be the zone time of sunrise at your vessel?

0536

See REF1088

On 2 January you are on a course of 094°T at a speed of 20 knots. At 0430 ZT, your DR position is LAT 24°12'N, LONG 71°24'W. Determine the zone time of sunrise.

0627

See REF1088

On 5 May your 1300 ZT DR position is LAT 25°16.0'S, LONG 12°30.0'W. You are on course 012°T at a speed of 14 knots. What will be the zone time of sunset at your vessel?

1719

See REF1088

On 7 November your 0830 zone time fix gives you a position of LAT 27°36.0'N, LONG 163°19.0'W. Your vessel is on course 289°T, and your speed is 19.0 knots. Local apparent noon (LAN) occurs at 1138 zone time, at which time a meridian altitude of the Sun's lower limb is observed. The observed altitude (Ho) for this sight is 45°35.0'. What is the calculated latitude at LAN?

27°57.2'N

See REF1088

On 25 June at 0612 zone time, morning stars were observed, and the vessel's position was determined to be LAT 28°13.0'S, LONG 49°34.0'E. Your vessel is steaming at 17.0 knots on a course of 066°T. A sextant observation of the Sun's lower limb is made at 1022 zone time. The chronometer reads 07h 19m 17s, and the sextant altitude is 35°26.3'. The index error is 1.5' on the arc, and the chronometer error is 02m 51s slow. Your height of eye on the bridge is 58.0 feet. What is the azimuth (Zn) of this sight using the assumed position?

021.5°T

See REF1088

On 12 April at 0515 ZT, morning stars were observed, and the vessel's position was determined to be LAT 21°05'S, LONG 16°30'W. Your vessel is steaming at 19 knots on a course of 278°T. A sextant observation of the Sun's lower limb is made at 0930 ZT. The chronometer reads 10h 28m 25s, and the sextant altitude (hs) is 40°15.9'. The index error is 2.5' off the arc, and the chronometer error is 2m 15s slow. Your height of eye on the bridge is 57 feet. What are the intercept (a) and azimuth (Zn) from the assumed position of this sight?

Zn 057.0°, a 17.7' A

See REF1088

On 22 August in DR position LAT 29°41.8'N, LONG 33°15.5'W, you take an ex-meridian observation of the Moon's upper limb at upper transit. The chronometer time of the sight is 08h 00m 02s, and the chronometer error is 02m 20s slow. The sextant altitude (hs) is 74°32.4'. The index error is 1.5' off the arc, and your height of eye is 48 feet. What is the latitude at meridian transit?

LAT 29°47.8'N

See REF1088

On 5 May in DR position LAT 38°34.5'N, LONG 124°20.7'W, you take an ex-meridian observation of the Sun's lower limb. The chronometer time of the sight is 07h 59m 10s, and the chronometer error is 01m 10s slow. The sextant altitude (hs) is 67°27.0'. The index error is 1.4' on the arc, and your height of eye is 30 feet. What is the latitude at meridian transit?

LAT 38°36.0'N

See REF1088

On 15 February at 0610 ZT, in DR position LAT 56°53.0' N, LONG 157°02.9' E, you observe Polaris at a sextant altitude (hs) of 56°10.4'. The index error is 2.5' on the arc, and the height of eye is 18 meters. What is the latitude?

56°41.8'N

See REF1088

On 11 November your 0730 zone time position was LAT 19°58.0'N, LONG 143°54.0'W. Your vessel was steaming on course 084°T at a speed of 15.0 knots. An observation of the Sun's lower limb was made at 0931 ZT. The chronometer read 07h 29m 22s and was slow 02m 22s. The observed altitude (Ho) was 44°17.6'. LAN occurred at 1125 zone time (ZD +10). The observed altitude (Ho) was 52°17.4'. What was the longitude of your 1200 zone time running fix?

142°40.2'W

See REF1088

You observe the planet Jupiter at a sextant altitude (hs) of 66°27.6' on 26 May. The index error is 5.2' on the arc. The height of eye is 52 feet. What is the observed altitude (Ho)?

66°15.0'

See REF1088

You observe the lower limb of the Sun at a sextant altitude (hs) of 41°29.8' on 11 January. The index error is 2.4' off the arc. The height of eye is 68 feet. What is the observed altitude (Ho)?

41°39.4'

See REF1088

On 13 June your 0445 DR position is LAT 20°12.0' N, LONG 44°45.0' W. You observe an unidentified star bearing 168°T at an observed altitude (Ho) of 38°56.0'. The chronometer reads 07h 43m 20s, and is 01m 39s slow. Which star did you observe?

Fomalhaut

See REF1088

On 22 May your 0437 DR position is LAT 25°18.5'N, LONG 51°18.0'W. You observe an unidentified star bearing 116°T at an observed altitude (Ho) of 11°27.8'. The chronometer reads 07h 40m 40s, and is 03m 24s fast. What star did you observe?

Diphda

See REF1088

On 14 January your 0550 DR position is LAT 25°26.0'N, LONG 38°16.0'W. You observe an unidentified star bearing 192°T at an observed altitude (Ho) of 06°15.2'. The chronometer reads 08h 48m 51s, and is 01m 22s slow. What star did you observe?

Gacrux

See REF1088

At 1845 zone time, on 17 March, while taking stars for an evening fix, you observe an unidentified star bearing 200°T at an observed altitude of 53°45.0'. Your DR position at the time of the sight is LAT 25°10.0'N, LONG 66°48.0'W. The chronometer time of the sight is 10h 47m 49s, and the chronometer error is 1m 54s fast. Your vessel is steaming on a course of 290°T at a speed of 18.0 knots. What star did you observe?

Rigel

See REF1088

On 12 June your 1845 DR position is LAT 21°47'N, LONG 46°52'W when you observe a faint unidentifiable star through a break in the clouds. The star bears 270°T at a sextant altitude (hs) of 65°41.7'. The index error is 0.5' on the arc, and the height of eye is 45 feet. The chronometer reads 09h 43m 27s, and the chronometer error is 1m 46s slow. What star did you observe?

Algeiba

See REF1088

On 15 October your 0300 zone time DR position is LAT 27°14' S, LONG 99°46' E. You are on course 128°T at a speed of 19 knots. Considering their magnitude, azimuth, and altitude, which group includes the three bodies best suited for a fix at star time?

Achernar, Procyon, Aldebaran

See REF1088

On 31 January your 0920 zone time DR position is LAT 24°16.0'S, LONG 151°33.0'E. Your vessel is on course 258°T at a speed of 18.5 knots. What is the zone time of local apparent noon (LAN)?

1211

See REF1088

On 20 June your 0800 zone time DR position is LAT 21°02.0'N, LONG 152°50.0'E. Your vessel is on course 265°T at a speed of 15.0 knots. What is the zone time of local apparent noon (LAN)?

1154

See REF1088

On 16 February your 0300 ZT DR position is LAT 28°32.0'S, LONG 176°49.0'E. You are on course 082°T at a speed of 21 knots. What will be the zone time of sunrise at your vessel?

0552

See REF1088

On 16 August your 1600 ZT DR position is LAT 26°17.0'N, LONG 165°17.0'E. You are on course 301°T at a speed of 15 knots. What will be the zone time of sunset at your vessel?

1838

See REF1088

On 10 April, your 1630 ZT DR position is LAT 21°03.0'N, LONG 63°11.0'W. You are on course 324°T at a speed of 22 knots. What will be the zone time of sunset at your vessel?

1833

See REF1088