
Q416 - Navigation Problems: Oceans

1. While on a course of 159°T, a light bears 11° on the starboard bow at a distance of 10.6 miles. What course should you steer to pass 2 miles abeam of the light leaving it to starboard?

- **159°T**
- 171°T
- 163°T
- 167°T

Note:
The current course results in a closest approach of approximately 2 nautical miles to starboard of the light, fulfilling the requirement to pass 2 miles abeam while leaving the light to starboard; therefore, no course alteration is necessary.

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2. While on a course of 349°T, a light bears 13° on the starboard bow at a distance of 10.8 miles. What course should you steer to pass 2.5 miles abeam of the light leaving it to starboard?

- 346°T
- 355°T
- 352°T
- **349°T**

Note:
Maintaining a course of 349T results in a closest point of approach of approximately 2.5 nautical miles to starboard, fulfilling the requirement to pass 2.5 miles abeam of the light.

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3. 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**
- 0529
- 0531
- 0535

Note:
Sunrise occurs at 0525 ZT. This is determined by converting the Nautical Almanac's local mean time of sunrise for the given date and latitude to zone time, accounting for the zone description (+8) and the longitude difference.

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4. At 0915 zone time on 6 March you depart Sydney, LAT 33°51.5'S, LONG 151°13.0'E (ZD -10). You are bound for Kodiak, LAT 57°47.0'N, LONG 152°25.0'W, and you estimate your speed of advance at 21 knots. The distance is 6,222 miles. What is your estimated zone time of arrival at Kodiak?

- 0732, 17 March
- **2132, 17 March**
- 0732, 18 March
- 2132, 18 March

Note:
The correct arrival time is determined by converting the departure time to GMT, adding the travel time, and then converting back to Kodiak's zone time, resulting in an arrival of 2132 on 17 March.

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5. At 0915 ZT on 26 July you depart Yokohama, LAT 35°27.0'N, LONG 139°39.0'E (ZD -9). You are bound for Seattle, LAT 47°36.0'N, LONG 122°22.0'W, and you estimate your speed of advance at 14 knots. The distance is 4,245 miles. What is your estimated ZT of arrival at Seattle?

- **0728, 7 August**
- 1528, 7 August
- 0028, 8 August
- 1528, 8 August

Note:
Calculate the voyage time in hours, then add it to the departure time in GMT. Adjust for the destination's zone description to determine the arrival time in Seattle's local time, resulting in 0728 on 7 August.

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6. 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?

- 24°02.5'S
- 24°01.0'S
- **23°59.7'S**
- 23°58.6'S

Note:
The latitude at 1200 ZT is determined from the Sun's observed meridian altitude at Local Apparent Noon (LAN). Calculate the zenith distance (Z) as 90 - observed altitude (Ho), then use the formula L = Z - Dec to find the latitude magnitude, considering the ship's hemisphere based on the DR position and declination.

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7. 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°03.6'S
- 24°02.5'S
- **24°01.0'S**
- 24°00.0'S

Note:
The calculated latitude at LAN is 2401.0'S, determined by running a dead reckoning from the initial position to LAN, accounting for speed, time, and course, and confirmed by applying the noon sight formula using the observed altitude and the Sun's declination.

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8. 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**
- 1821
- 1829
- 1836

Note:
The Nautical Almanac provides the Local Mean Time (LMT) of sunset for a given date and latitude. Convert this LMT to Zone Time by subtracting the longitude in time, accounting for the vessel's position (9126'E) and time zone (+6), resulting in a Zone Time of 1813.

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9. 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)?

- 1144
- **1149**
- 1153
- 1159

Note:
Local apparent noon occurs when the Sun crosses the meridian, and the correct time is determined by accounting for Greenwich Mean Time, the initial longitude, and the change in longitude due to the vessel's movement.

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10. 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°32.5'S
- LAT 21°40.6'S
- **LAT 21°45.5'S**
- LAT 21°50.2'S

Note:
After correcting the sextant altitude, applying the ex-meridian reduction, and using the meridian-altitude latitude formula with the Sun’s declination, the computed latitude is 2145.5'S.
