
Q215 - Navigation Problems: Oceans

1. You desire to make good a true course of 203°. The variation is 19°E, magnetic compass deviation is 2°W, and gyrocompass error is 1°E. A westerly wind produces a 3° leeway. What is the course to steer per standard magnetic compass to make the true course good?

- 223°psc
- 210°psc
- 183°psc
- **189°psc**

Note:
To make good a true course of 203, correct for leeway (3), then convert true to magnetic and magnetic to compass, accounting for variation (19E) and deviation (2W). This results in a course to steer of 189 per standard magnetic compass.

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2. Your vessel is steering course 352°psc, variation for the area is 11°E, and deviation is 9°W. The wind is from the northeast, producing a 1° leeway. What true course are you making good?

- **353°T**
- 349°T
- 351°T
- 355°T

Note:
Applying leeway to the compass heading, then correcting for deviation and variation in the proper order results in a true course made good of 353T.

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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 0530 zone time on 20 December, you depart Cape Town (ZD -1). You are bound for New York (ZD +5), and you estimate your speed of advance at 25 knots. The distance is 6,762 miles. What is your estimated zone time of arrival at New York?

- 1200, 31 December
- 1100, 31 December
- 0700, 31 December
- **0600, 31 December**

Note:
The estimated time of arrival in New York is 0600 on December 31st. This is determined by converting the departure zone time to GMT, adding the steaming time, and then converting back to New York's zone time.

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5. 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°27.5' Zn 092.3°
- Hc 64°30.8' Zn 090.1°
- **Hc 64°41.7' Zn 087.8°**
- Hc 64°44.2' Zn 094.7°

Note:
Using the DR position advanced to the time of sight, corrected chronometer time, and the Sun's GHA and declination from the Nautical Almanac, the sight reduction yields Hc = 6441.7' and Zn = 087.8.

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6. At 0915 zone time on 7 November you depart Seattle, LAT 47°36.0'N, LONG 122°22.0'W, (ZD +8). You are bound for Kobe, LAT 34°40.0'N, LONG 135°12.0'E, and you estimate your speed of advance at 18.5 knots. The distance is 4,527 miles. What is your estimated zone time of arrival at Kobe?

- 1257, 17 November
- **0657, 18 November**
- 1857, 18 November
- 0657, 19 November

Note:
The correct arrival time is determined by converting the departure zone time to GMT, adding the steaming time, and then converting the resulting GMT to the arrival zone time, accounting for zone descriptions and date changes.

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7. 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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8. 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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9. 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?

- Venus, Arcturus, Hamal
- **Moon, Al Na'ir, Rigil Kentaurus**
- Venus, Moon, Fomalhaut
- Deneb, Spica, Markab

Note:
The optimal celestial fix utilizes bright bodies with altitudes between 30 and 60 and wide azimuth separation. Moon, Al Na'ir, and Rigil Kentaurus satisfy these criteria at the specified date, time, and DR position, providing strong crossing angles for an accurate fix.

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10. 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 is the azimuth (Zn) and intercept (a) based on the assumed position of this sight?

- Zn 057.7°, a 15.4' T
- **Zn 057.0°, a 17.7' A**
- Zn 122.3°, a 17.7' A
- Zn 123.0°, a 22.7' A

Note:
A sextant observation of the Sun was made after determining a vessel's position and course. The azimuth and intercept were calculated based on the assumed position, requiring accurate chronometer correction, index error adjustment, dip correction, and application of the Nautical Almanac for altitude and azimuth determination.
