
Q109 - Navigation Problems: Oceans

1. You desire to make good a true course of 129°. The variation is 7°E, magnetic compass deviation is 4°E, and gyrocompass error is 2°W. An easterly wind produces a 4° leeway. What is the course to steer per standard magnetic compass to make the true course good?

- **114°psc**
- 122°psc
- 116°psc
- 126°psc

Note:
To achieve a true course of 129, subtract leeway, variation, and deviation to determine the course to steer per standard magnetic compass, resulting in 114psc.

---

2. You desire to make good a true course of 132°. The variation is 10°W, magnetic compass deviation is 5°E, and gyrocompass error is 5°W. A northeast by east wind produces a 5° leeway. What is the course to steer per standard magnetic compass to make the true course good?

- 135°psc
- **132°psc**
- 137°psc
- 142°psc

Note:
To achieve a true course of 132, correct for leeway, then apply variation (add West) and deviation (subtract East) to determine the standard magnetic compass course, resulting in 132psc.

---

3. A great circle crosses the equator at 141°E. It will also cross the equator at what other longitude?

- **39°W**
- 141°W
- 41°E
- 180°E

Note:
A great circle crossing the equator at 141E will also cross it at 39W, as great circles intersect the equator 180 apart.

---

4. The track line on the chart is 274°T. Variation is 4°E, and deviation is 2°E. The gyro error is 1.5°E. What course would be steered by gyrocompass to make good the desired course?

- 280.5°pgc
- 278.0°pgc
- 275.5°pgc
- **272.5°pgc**

Note:
To determine the gyrocompass course needed to steer a desired true course, subtract the easterly gyro error from the true course: 274T - 1.5E = 272.5pgc. Variation and deviation are irrelevant when calculating gyrocompass courses because gyrocompasses indicate true north.

---

5. The true course between two points is 312°. Your gyrocompass has an error of 3°W. You make an allowance of 4° leeway for a west by south wind. What gyro course should be steered to make the true course good?

- 315°pgc
- 305°pgc
- 318°pgc
- **311°pgc**

Note:
To achieve a true course of 312, a gyrocompass with a 3W error requires a steering correction for leeway (4) and gyro error, resulting in a gyro course of 311.

---

6. The upper vertex of a great circle track is in LONG 156°00'E. Sailing eastward, the great circle track will cross the equator in which LONG?

- 66°00'E
- 110°00'W
- **114°00'W**
- 66°00'W

Note:
The vertex of the great circle track is at 156E. Sailing eastward, the track crosses the equator 90 of longitude away, resulting in a crossing at 114W (156E + 90 = 246E, which is 114W).

---

7. In which voyage, between two points, is the rhumb line distance NOT approximately the same as the great circle distance?

- The two points are in low latitudes in the same hemisphere.
- One point is near the equator, one point is in a high latitude, and both are near the 180th meridian.
- The two points are near the equator, but in different hemispheres.
- **The two points are in high latitudes in the same hemisphere.**

Note:
Rhumb line and great circle distances differ significantly when two points are at high latitudes in the same hemisphere, as the rhumb line follows a small circle that is much longer than the great circle arc.

---

8. 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?

- Time 0440
- **Time 0445**
- Time 0503
- Time 0528

Note:
After converting the Nautical Almanac's sunrise time to zone time using the ship's longitude and zone description, the correct sunrise time is 0445 ZT.

---

9. 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. ZONE OBSERVED TIME GHA ALTITUDE(Ho) DECLINATION ---- --- ---------- ---------- 0700 17°20.1' 21°09.0' S 00°09.7' 0900 47°03.0' 46°05.0' S 00°11.6' 1100 77°06.4' 63°16.1' S 00°13.5'

- **LAT 25°35.3'N, LONG 84°17.0'W**
- LAT 25°42.6'N, LONG 84°18.7'W
- LAT 25°30.4'N, LONG 84°28.6'W
- LAT 25°28.3'N, LONG 84°34.3'W

Note:
The correct answer is LAT 2535.3'N, LONG 8417.0'W. This position results from advancing the DR and plotting the intersection of the three morning Sun LOPs to 1100.

---

10. 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?

- Time 0521
- **Time 0529**
- Time 0536
- Time 0548

Note:
Using the Nautical Almanac for sunrise at the given latitude and longitude, correcting for the ship's westward run and time zone, results in a sunrise zone time of approximately 0529.
