
Q415 - Navigation Problems: Near Coastal

1. While on a course of 066°pgc, a light bears 13° on the port bow at a distance of 12.3 miles. What course should you steer to pass 4 miles abeam of the light leaving it to port?

- 079°pgc
- 067°pgc
- **072°pgc**
- 085°pgc

Note:
To pass a fixed object at a specific distance, steer a course that makes a tangent to a circle centered on the object with a radius equal to the desired closest point of approach. The angle between your course and the object's bearing is calculated using the sine function: sin(A) = CPA / Range, where CPA is the closest point of approach and Range is the initial distance to the object.

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2. You are on course 086°T, speed 11.7 knots. At 1013 you see a buoy bearing 088°T at a range of 4.8 miles. If you change course at 1019 to leave the buoy abeam to port at 1.0 mile, at what time will the buoy be abeam?

- 1043
- 1052
- **1037**
- 1040

Note:
After altering course, the buoy will be abeam 18 minutes later, resulting in a time of 1037.

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3. While on a course of 283°pgc, a light bears 10° on the port bow at a distance of 8.3 miles. What course should you steer to pass 3.5 miles abeam of the light leaving it to port?

- 289°pgc
- 294°pgc
- **298°pgc**
- 302°pgc

Note:
To pass 3.5 miles abeam of the light while keeping it to port, steer a course of 298pgc, which creates a tangent to a circle around the light with a radius of 3.5 miles.

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4. You will be entering the Mystic River in Connecticut. What is the current at the Highway Bridge at 1900 EST (ZD +5) on 24 January 1983?

- **Slight ebb**
- 2.5 knots ebbing
- Slack water
- 2.2 knots flooding

Note:
The current at the Mystic River Highway Bridge at 1900 EST on 24 January 1983 was a slight ebb, as indicated by the U.S. Tidal Current Tables, which list predictions in local standard time and show a small current moving in the ebb direction.

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5. You are steaming on a course of 246°T at 17 knots. At 2107 you observe a lighthouse bearing 207°T. At 2119 the lighthouse bears 179°T. What is your distance off at the second bearing?

- **4.6 miles**
- 4.2 miles
- 3.9 miles
- 5.1 miles

Note:
The distance off at the second bearing is 4.6 nautical miles. This was determined by calculating the triangle formed by the ship's positions and the lighthouse, using the law of sines with a run of 3.4 NM and an angle of 28 at the lighthouse.

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6. You are steering 143°T, and a light is picked up dead ahead at a distance of 18.2 miles at 2006. You change course to pass the light 5.5 miles off abeam to port. If you are making 14.5 knots, what is your ETA at a position 5.5 miles off the light?

- 2115
- **2118**
- 2121
- 2124

Note:
The distance from the initial sighting to 5.5 miles abeam is calculated using the Pythagorean theorem, resulting in a run of approximately 17.34 nautical miles. This distance, at a speed of 14.5 knots, takes about 1 hour and 12 minutes. Adding this time to the initial time of 2006 yields an ETA of 2118.

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7. You are steering 318°psc. A northeasterly wind causes 3° of leeway. The variation is 14°E and the deviation table is extracted below. What will be the true course made good? DEVIATION TABLE Magnetic Heading Deviation 300° 2°E 315° 0 330° 2°W

- 327°T
- 303°T
- **329°T**
- 301°T

Note:
The true course made good is 329T. Leeway is subtracted from the steering compass course, deviation is accounted for using the provided table, and variation is added to convert magnetic to true.

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8. You swung ship and compared the magnetic compass against the gyrocompass to find deviation. Gyro error is 2°W. The variation is 8°W. Find the deviation on a magnetic compass heading of 166°. PSC PGC 030.5° 024° 061.5° 054° 092.0° 084° 122.5° 114° 152.0° 144° 181.0° 174° 239.5° 234° 269.0° 264° 210.0° 204° 298.0° 294° 327.5° 324° 358.5° 354°

- 2.0°W
- **1.5°W**
- 1.0°W
- 0.5°W

Note:
Deviation at 166 magnetic heading is found by interpolating between the deviations at 152 and 181, yielding approximately 1.5W.

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9. The true course between two points is 337°. Your gyrocompass has an error of 3°E and you make an allowance of 5° leeway for a west wind. Which gyro course should be steered to make the true course good?

- 339°pgc
- **329°pgc**
- 345°pgc
- 335°pgc

Note:
To determine the gyro course to steer, adjust the true course for leeway and then correct for gyro error. Leeway, caused by a west wind, requires steering to the west, while a 3E gyro error necessitates subtracting 3 from the true heading to obtain the gyro course, resulting in a gyro course of 329.

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10. Your vessel is on a course of 221°T at 15 knots. At 0319 a light bears 198.5°T, and at 0353 the light bears 176°T. At what time and distance off will your vessel be when abeam of the light?

- **0417, 6.0 miles**
- 0410, 5.2 miles
- 0407, 4.3 miles
- 0427, 7.4 miles

Note:
Trigonometry applied to the changing relative bearings and the vessel's speed indicates the vessel will be abeam of the light at 0417, approximately 6 nautical miles off.
