
Q323 - Navigation Problems: Chart Plot

1. The Light List indicates that a light has a nominal range of 20 miles and is 52 feet (16 meters) high. If the visibility is 20 miles and your height of eye is 20 feet (6 meters), at what approximate distance will you sight the light?

- 33.0 nm
- 20.0 nm
- **13.5 nm**
- 8.5 nm

Note:
The light will be sighted at approximately 13.5 nautical miles. The Earth's curvature, determined by the observer's and light's heights, limits visibility, as this geographic range is less than the light's nominal range.

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2. The following questions are to be answered using Chart 12221 TR, Chesapeake Bay Entrance, and supporting publications. Your present course is 200°T and your vessel's engines are turning RPMs for 16 knots. Your height of eye is 55 feet and your vessel's draft is 32 feet. Use 10°W variation where required. At 2045, buoy "GM" is at a range of 6.45 miles. Hogs Island Bell Buoy "12" is at a range of 5.25 miles. What is your vessel's position?

- LAT 37°22.8'N, LONG 75°30.8'W
- LAT 37°22.0'N, LONG 75°29.3'W
- **LAT 37°22.3'N, LONG 75°31.7'W**
- LAT 37°21.8'N, LONG 75°30.7'W

Note:
A radar fix is determined by drawing circles representing ranges from known objects; the intersection of these circles, refined by the vessel's dead reckoning track, establishes the position at 3722.3'N, 7531.7'W.

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3. From your 2045 position, you set a course to pass 1.5 miles due east of the charted position of Hog Island Lighted Bell Buoy "12". The known set and drift in the area are 068°T at 3 knots. What is the course to steer, with no change in engine speed, to make good your desired course?

- **200°T**
- 203°T
- 206°T
- 209°T

Note:
To achieve the desired course made good, a heading of 200T must be steered to compensate for the current's effect on the vessel's track.

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4. What is the speed that you can expect to make good, while steering to make good your desired course?

- 15.9 knots
- 13.5 knots
- 15.1 knots
- **14.3 knots**

Note:
Speed made good is the resultant ground speed along the desired course, calculated by vector addition of the vessel's speed through the water and the current. The correct answer, 14.3 knots, is derived from solving the current triangle in the original problem.

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4. 4.1.1.4C1-27) Your height of eye is 40 feet (12.2 meters). What is the approximate geographical distance at which Ambrose Light, NY, could be visible? Refer to "Reprints from the LIGHT LISTS AND COAST PILOTS".

- 19.5 nm
- **21.0 nm**
- 22.8 nm
- 18.3 nm

Note:
The geographical range is the sum of the observer's horizon distance and the light's horizon distance. With a 40-foot eye height and Ambrose Light's height, the combined geographical range is approximately 21.0 nautical miles.

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5. At 2129 Cape Charles Light bears 253°T, Hog Island Lighted Bell Buoy "12" bears 351°T, and Cape Charles Lighted Bell Buoy "14" bears 230°T. Which statement is TRUE?

- **You are governed by the International Rules of the Road.**
- The fathometer reads about 62 feet (18.9 meters).
- You are to seaward of the contiguous zone.
- The bottom is hard sand and oysters.

Note:
Plotting the bearings indicates the vessel is seaward of the COLREGS demarcation line, therefore the International Rules of the Road apply.

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6. From your 2129 position you reduce engine speed to 14 knots. What is the course to make good from your 2129 position to arrive 0.3 mile north of Lighted Whistle Buoy "NCA" (LL#375) assuming no set and drift?

- **222°T**
- 225°T
- 219°T
- 216°T

Note:
The correct course to make good is 222T. This is determined by plotting a line from your position to the specified waypoint and measuring its bearing on the chart; speed is irrelevant when set and drift are absent.

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7. At 2207 Cape Charles Light bears 276°T, Chesapeake Light bears 194°T, and Cape Charles Lighted Bell Buoy "14" bears 312°T and is 2.0 miles off. What were the set and drift of the current acting on your vessel from 2129 to 2207?

- 258°T at 2.4 knots
- 078°T at 1.5 knots
- 258°T at 1.5 knots
- **078°T at 2.4 knots**

Note:
The current's set was 078T and drift was 2.4 knots, determined by comparing the vessel's DR position to its actual fix over 38 minutes.

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8. From your 2207 position you adjust your course to arrive 0.3 mile north of Lighted Whistle Buoy "NCA". If you make good 14 knots, at what time will Cape Charles Light be abeam?

- 2245
- 2247
- 2250
- **2242**

Note:
The correct time is 2242 because the 8.2 nautical mile distance to Cape Charles Light abeam requires approximately 35 minutes at a speed of 14 knots, calculated as time equals distance divided by speed, resulting in 2207 plus 35 minutes.

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9. At 2259 Cape Henry Light bears 250°T, Chesapeake Light bears 122°T, and North Chesapeake Entrance Lighted Whistle Buoy "NCA" has a radar range of 1.8 miles. Which statement is TRUE?

- **Chesapeake Light is 7.6 miles off.**
- The course made good is 226°T.
- You are in the red sector of Cape Henry Light.
- You are in a submerged submarine transit lane.

Note:
Plotting the provided true bearings and radar range establishes a fix, revealing that Chesapeake Light is 7.6 nautical miles distant.
