

Answer on Question #70634 – Math – Trigonometry

Question

The angle of depression is 20° for a yacht and $12^\circ 30'$ for the barge. Are they less than 300 ft. apart?

Solution

If the observer is located at a place with a height of 208 ft. above the sea level, we can calculate the distance from the bottom of that place and each of the two vessels.

We know that the tangent (tan) is the opposite side divided by the adjacent one. Thus, the adjacent is the opposite divided by the tangent.

As $12^\circ 30'$ equals 12.5° , the distance between the lighthouse, where the observer stands, and the barge (adjacent) is 208 ft (opposite) divided by $\tan 12.5^\circ$:

$$A_1 = \frac{208}{\tan 12.5^\circ} = \frac{208}{0.221695} = 938.2259.$$

Similarly, the distance between the lighthouse and the yacht is 208 ft. divided by $\tan 20^\circ$:

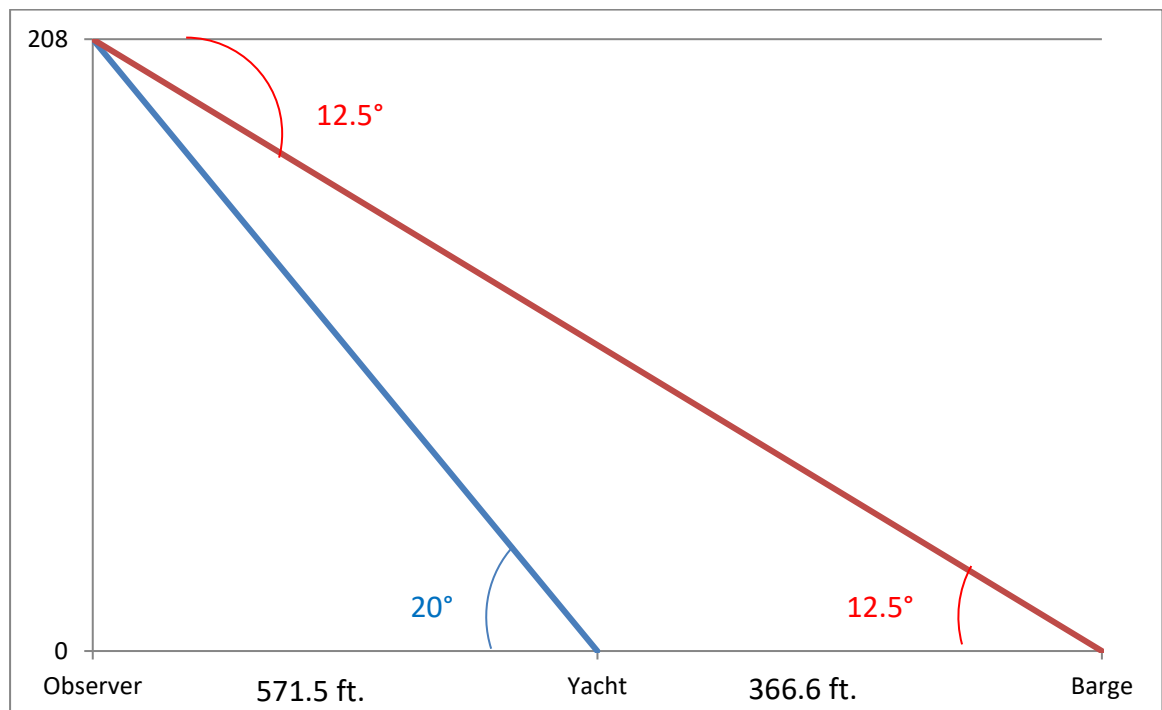
$$A_2 = \frac{208}{\tan 20^\circ} = \frac{208}{0.363970} = 571.4757.$$

Therefore, the distance between the barge and the yacht is

$$A_1 - A_2 = 938.2259 - 571.4757 = 366.5702 \text{ (ft.)}.$$

So, the two vessels are more than 300 ft. apart.

Answer: No, the vessels are more than 300 ft. apart.



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