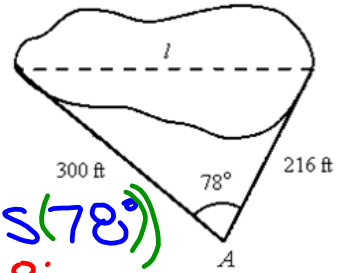


Laws of Sines & Cosines Applications

Example 1

A trigonometry class wants to determine the length of a pond near the school. From a point, A, they measure the distance to each end of the pond and the angle between these two sides. What is the approximate length of the pond?



$$l^2 = 300^2 + 216^2 - (2 \cdot 300 \cdot 216 \cos(78^\circ))$$

$$l^2 = 90000 + 46656 - 129600 \cos 78^\circ$$

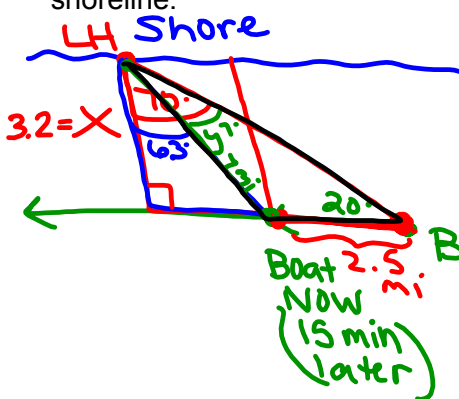
$$l^2 = 136656 - 26945.4$$

$$\sqrt{l^2} = \sqrt{109710.6}$$

$$l = 331.2 \text{ ft}$$

Example 2

A boat is sailing due west parallel to the shoreline at a speed of 10 miles per hour. At a given time the bearing from the lighthouse is S 70° E, and 15 minutes later the bearing is S 63° E. Find the distance from the boat to the shoreline if the lighthouse is at the shoreline.



10 mph \rightarrow 15 min later ($\frac{1}{4}$ of an hr.)
 $10(\frac{1}{4}) = 2.5 \text{ mi}$

$$\frac{2.5}{\sin 7^\circ} = \frac{y}{\sin 20^\circ}$$

$$y \sin 7^\circ = 2.5 \sin 20^\circ$$

$$y = 7 \text{ mi}$$

$$7 \cdot \cos 63^\circ = \frac{x}{7}$$

$$3.2 \text{ mi} = x$$