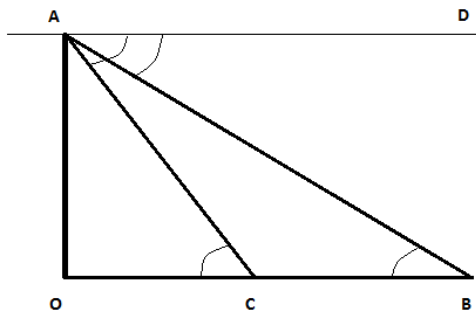


Answer on Question #46300 – Math - Trigonometry

A person is watching a boat from the top of a lighthouse. The boat is approaching the lighthouse directly. When first noticed the angle of depression to the boat is $16^{\circ}18'$. When the boat stops, the angle of depression is $48^{\circ}51'$. The lighthouse is 200 feet tall. How far did the boat travel from when it was first noticed until it stopped? Round your answer to the hundredths place.

Solution.



We have: $OA = 200 \text{ ft}$, $\angle BAD = 16^{\circ}18'$, $\angle CAD = 48^{\circ}51'$.

So, $\angle ABO = 16^{\circ}18'$, $\angle ACO = 48^{\circ}51'$

$$OC = \frac{OA}{\tan(\angle ACO)} = \frac{200}{\tan 48^{\circ}51'} = \frac{200}{1.1443} = 174.78 \text{ ft.};$$

$$OB = \frac{OA}{\tan(\angle ABO)} = \frac{200}{\tan 16^{\circ}18'} = \frac{200}{0.2924} = 683.99 \text{ ft.};$$

$$BC = OB - OC = 683.99 - 174.78 = 509.21 \text{ ft.}$$

The boat travel 509.21 ft. from when it was first noticed until it stopped.