

Indirect Measurement: Using Triangles and Trigonometry

A math project by Nader Mohyuddin

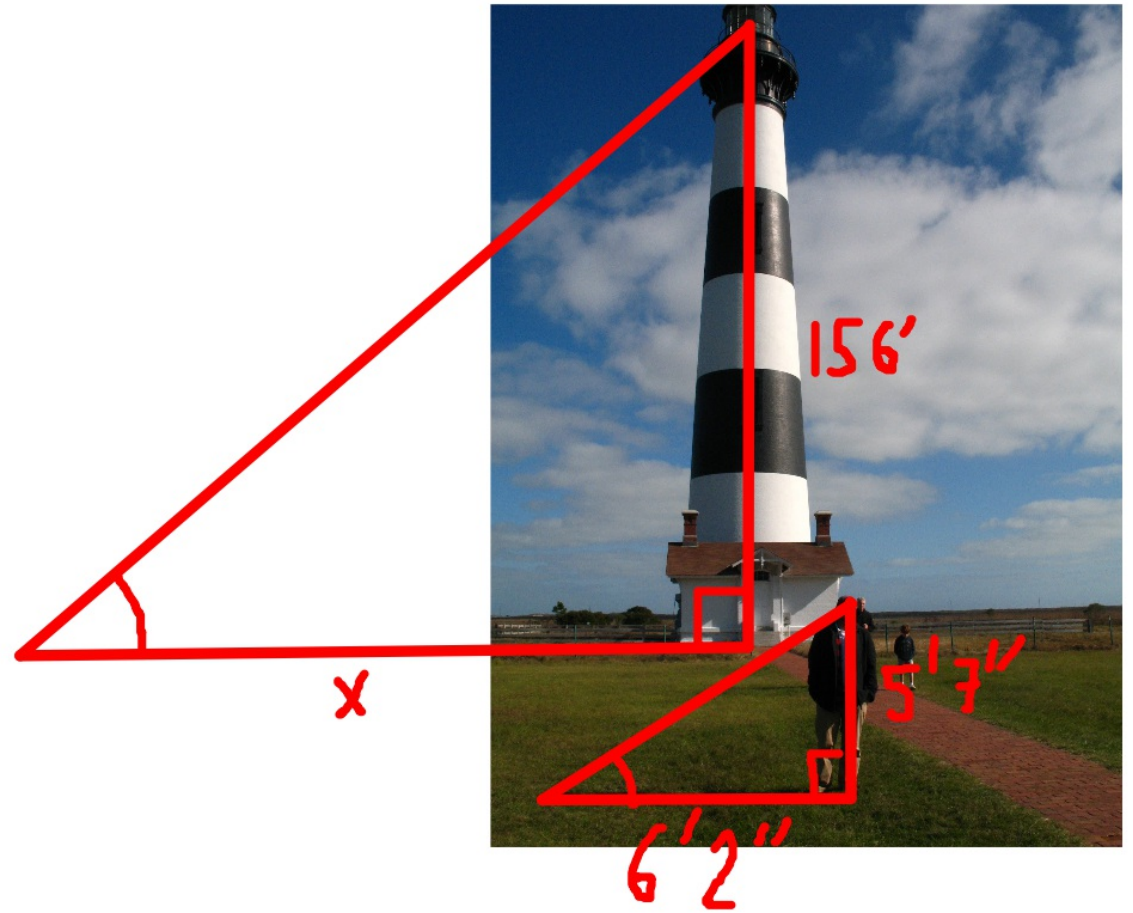


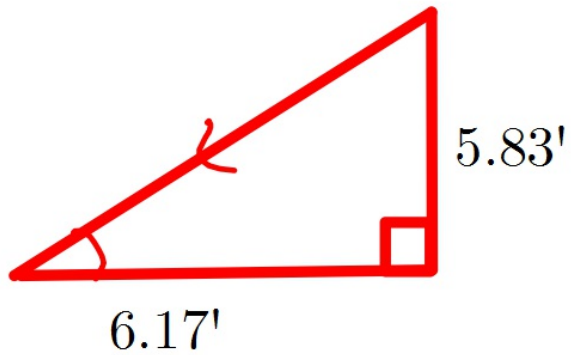
Core questions: How long is the lighthouse's shadow?

How far am I from the Bank of China Tower?

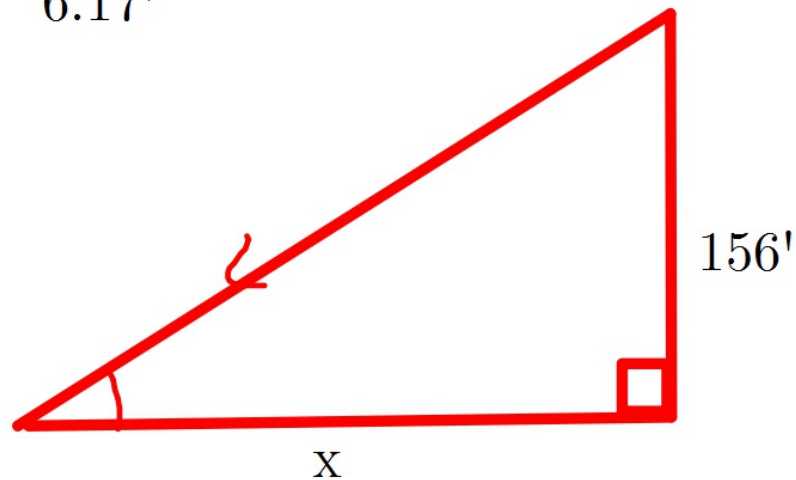


Bodie Island, NC





Triangles are similar by Angle-Angle
Similar triangles have proportional
side lengths and can map by dilations



$$\frac{5.83}{156} = \frac{6.17}{x}$$

$$5.83x = 156(6.17)$$

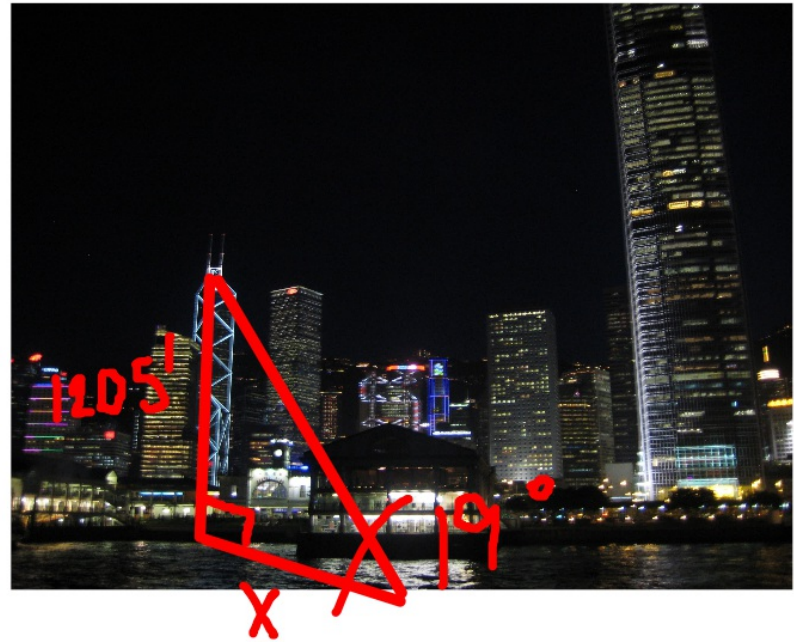
$$5.83x = 962.52$$

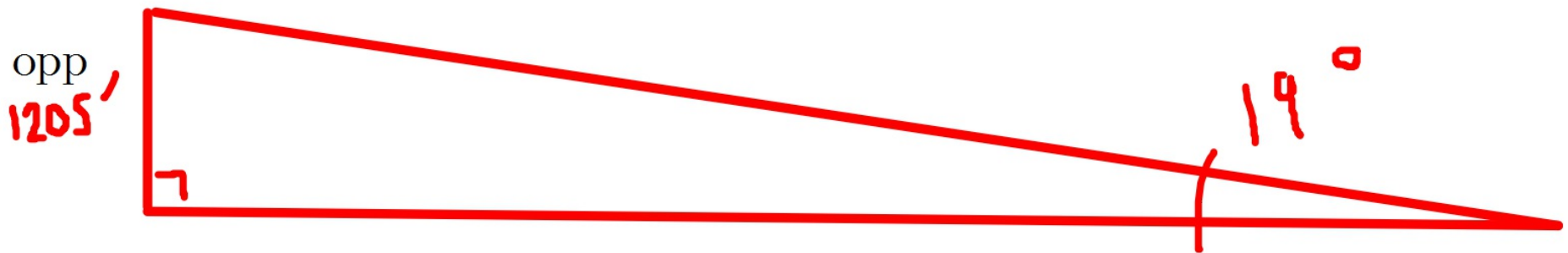
$$x = 165.1 \text{ feet}$$

The lighthouse's shadow measures about 165.1 feet



Hong Kong SAR, China





SohCahToa

$$\tan(19^\circ) = \frac{1205 \text{ ft}}{x}$$

$$0.092767 = \frac{1205}{x}$$

$$0.092767x = 1205$$

$$x = 3499.57 \text{ ft}$$

The Bank of China Tower is about 3500 feet away from my location.