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SOH CAH TDA

90
25
65°

adj 25,000 ft. hyp d

15° 25°

x y

a. a passenger in an airplane sees two towns directly to the left of the plane.

a. What is the distance d from the airplane to the first town?

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \frac{\cos 65^\circ}{1} \leftarrow \frac{25,000}{d}$$

$$d = \frac{25,000}{\cos 65^\circ}$$

$$d \approx 59,155 \text{ ft}$$

b. What is the horizontal distance x from the airplane to the first town?

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adj 25,000 ft. hyp d

15° 25°

x OPP

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \rightarrow \frac{\tan 65^\circ}{1} = \frac{x}{25,000}$$

$$x = 25,000 \tan 65^\circ$$

$$x \approx 54,000 \text{ ft}$$

c. What is the distance y between the two towns?

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adj 25,000 ft. hyp d

15° 25°

x+y OPP

90°

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \rightarrow \frac{\tan 75^\circ}{1} = \frac{x+y}{25,000}$$

$$x+y = 25,000 \tan 75^\circ$$

$$x+y = 93,000$$

$$\begin{array}{r} x+y = 93,000 \\ x = 54,000 \\ \hline y = 39,000 \end{array}$$

$x = 54,000$
 $53,000$

$93,000$
 $-54,000$
 $\hline 39,000$

$y = 39,000 \text{ ft}$