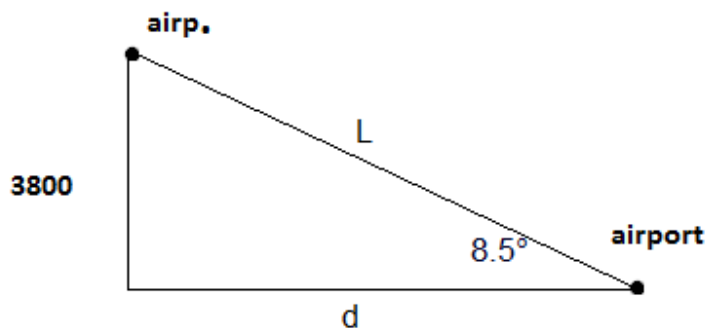


**Sample: Trigonometry - Trigonometry in a Triangle****Question 1**

An airplane is 3800 feet above the ground. The angle of depression between the airplane and the airport is 8.5° . How far does the plane have to fly in order to land?

Solution.

The situation described can be represented as the following figure:



The plane has to fly a distance marked as L (distance between airport and airplane) in order to land. From the triangle above it is clear that:

$$3800 / L = \sin(8.5^\circ)$$

Thus,

$$L = 3800 / \sin(8.5^\circ) \approx 25708.8 \text{ feet.}$$

Question 2

An airplane is 3800 feet above the ground. The angle of depression between the airplane and the airport is 8.5° . What is the plane's ground distance to the airport?

**Solution.**

The plane's ground distance to the airport is marked by d at the figure above. So, we get:

$$3800 / d = \tan(8.5^\circ)$$

And thus:

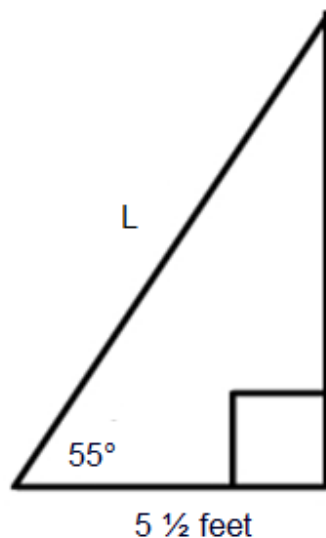
$$d = 3800 / \tan(8.5^\circ) \approx 25426.4 \text{ feet.}$$

Question 3

A ladder is leaning against a wall. It is $5 \frac{1}{2}$ feet from the wall and has an angle of elevation 55° . How long is the ladder?

Solution.

The situation described can be represented as the following figure:



Length of the ladder is marked as L . Thus, we get:

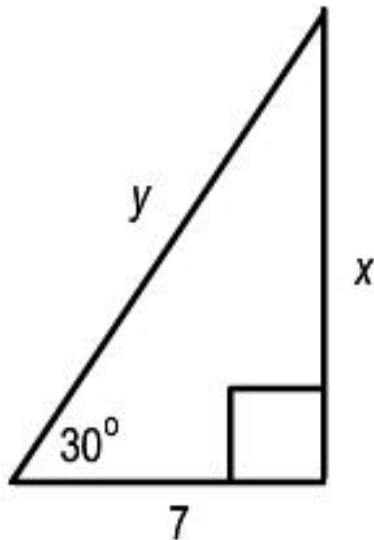
$$5 \frac{1}{2} \text{ feet} / L = \cos(55^\circ)$$



And we obtain

$$L = 5 \frac{1}{2} \text{ feet} / \cos(55^\circ) \approx 9.59 \text{ feet}$$

Use the following triangle for problems 4 and 5.



Question 4

Find the exact value of x .

Solution.

By definition of a tangent:

$$x/7 = \tan(30^\circ)$$

Thus:

$$x = 7 * \tan(30^\circ) = 7/\sqrt{3}.$$

**Question 5**

Find the exact value of y .

Solution.

By definition of a cosine:

$$7 / y = \cos(30^\circ)$$

Thus:

$$y = 7 / \cos(30^\circ) = 7 / (\sqrt{3} / 2) = 14 / \sqrt{3}.$$