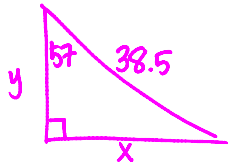


12.5 HW Pg. 450 #1-10

*** Make sure your calculator is in Degree Mode ***

1. One acute angle of a right triangle is 57° , and the hypotenuse is 38.5 mm. Find the lengths of the two legs.



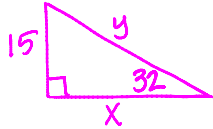
$$\sin(57) = \frac{y}{38.5}$$

$$y \approx 32.29$$

$$\cos(57) = \frac{x}{38.5}$$

$$x \approx 20.97$$

2. One acute angle of a right triangle is 32° , and the leg opposite it is 15 ft. Find the lengths of the adjacent leg and the hypotenuse.



$$\tan(32) = \frac{15}{x}$$

$$x \cdot \tan(32) = 15$$

$$x = 15 / \tan(32)$$

$$x \approx 24.01$$

$$\sin(32) = \frac{15}{y} \text{ so } y \sin(32) = 15$$

$$y = \frac{15}{\sin(32)}$$

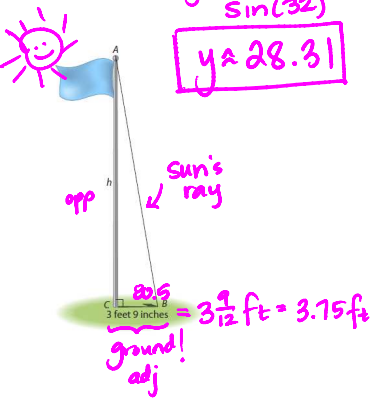
$$y \approx 28.31$$

3. Return to the flagpole problem that you solved in the Activity in Lesson 12.3. See the figure to the left. You can now solve this problem without having to use a stick. Suppose the angle between the sun's rays and the ground is 80.5° . Find the height of the flagpole.

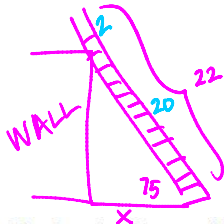
$$\tan(80.5) = \frac{h}{3.75}$$

$$h = 3.75 \tan(80.5)$$

$$h \approx 22.41 \text{ ft}$$



4. A 22-foot ladder is leaning against a wall so that the end of the ladder extends 2 feet above the edge of the wall. If the ladder makes an angle of 75° with the ground, how far is the base of the ladder from the house?

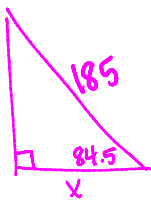


$$\cos 75 = \frac{x}{20}$$

$$x = 20 \cdot \cos(75)$$

$$x \approx 5.2 \text{ feet}$$

5. The Leaning Tower of Pisa is known both for its beauty and its incline. The tower is 185 feet tall and makes an angle of approximately 84.5° with the ground. If the sun were shining directly overhead, how long a shadow would the tower cast?



$$\cos(84.5) = \frac{x}{185}$$

$$x = 185 \cdot \cos(84.5)$$

$$x \approx 17.7 \text{ ft}$$

6. A person is standing 50 meters from a lamp pole. If the angle of elevation is 11.2° and the person's eye is 2 meters above the ground, how tall is the lamp pole?



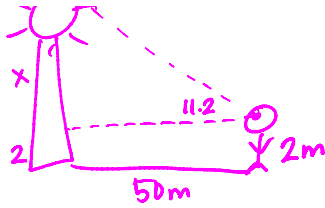
$$\tan(11.2) = \frac{x}{50}$$

11.2° and the person's eye is 2 meters above the ground, how tall is the lamp pole?

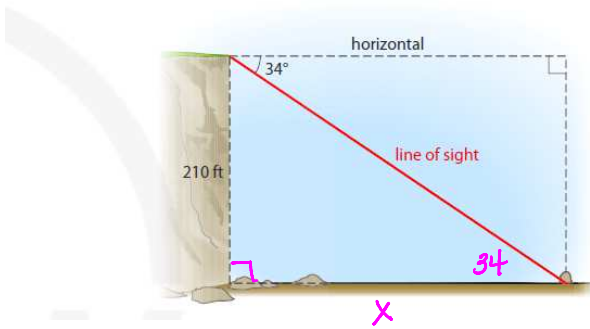
$$\tan(11.2) = \frac{x}{50}$$

$$x = 50 \cdot \tan(11.2) + 2$$

$$x \approx 11.9 \text{ m}$$



7. If an object is located below the horizontal, the angle your line of sight makes with the horizontal is called the **angle of depression**. Suppose the angle of depression from the top of a 210-foot cliff to an object on the ground is 34°. How far is the object from the base of the cliff?



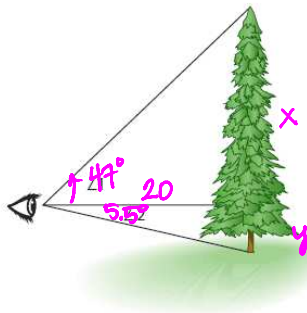
$$\tan(34) = \frac{210}{x}$$

$$x \cdot \tan(34) = 210$$

$$x = \frac{210}{\tan(34)}$$

$$x \approx 311.34 \text{ ft}$$

8. *Hypsometers* are instruments used by the U.S. Forestry Service to measure the heights of trees. They also provide information about slopes of roads and pieces of land. There are many different types of hypsometers, but all operate on the principle illustrated in the figure below.



$$\tan(47) = \frac{x}{20}$$

$$x = 20 \cdot \tan(47)$$

$$\tan(5.5) = \frac{y}{20}$$

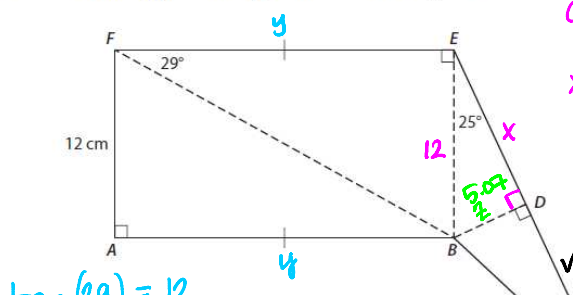
$$y = 20 \cdot \tan(5.5)$$

$$\text{tree} = 20 \cdot \tan(47) + 20 \cdot \tan(5.5)$$

$$\text{tree} \approx 23.37 \text{ m}$$

Suppose a forester standing 20 meters from a tree finds $\angle 1 = 47^\circ$ and $\angle 2 = 5.5^\circ$. Find the height of the tree.

9. Find the approximate perimeter of the figure below.



$$\cos(25) = \frac{x}{12}$$

$$x = 12 \cdot \cos(25)$$

$$x \approx 10.88$$

$$\sin(25) = \frac{z}{12}$$

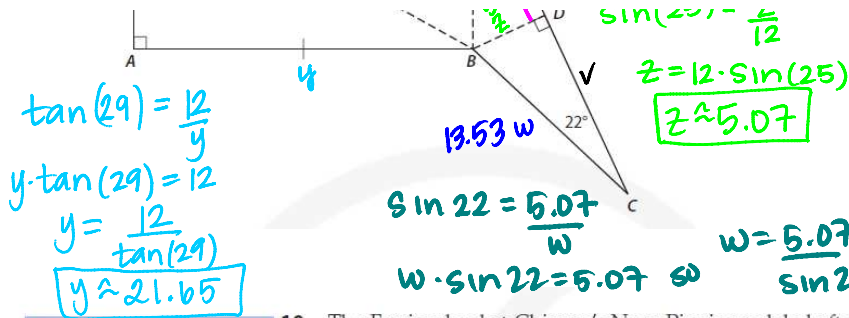
$$z = \frac{12 \cdot \sin(25)}{1}$$

$$P = 12 + 21.65 + 10.88$$

$$12.55 + 13.53 + 21.65$$

$$P \approx 92.26$$

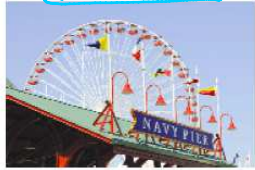
$$\tan(22) = \frac{5.07}{1}$$



$$\tan 22 = \frac{5.07}{v}$$

$$v \cdot \tan 22 = 5.07$$

$$v = \frac{5.07}{\tan 22} \approx 12.55$$



10. The Ferris wheel at Chicago's Navy Pier is modeled after the one that was built for the 1893 Chicago World Columbian Exposition. The attraction can hold up to 240 passengers and offers a fantastic view of Chicago's skyline and lakefront. About how tall is the Ferris wheel if there is a 70° angle of depression from the top of the ride to an object located on the ground 55 feet from the bottom of the ride?

$$\tan(70) = \frac{x}{55}$$

$$x = 55 \tan(70)$$

$$x \approx 151.11 \text{ feet}$$

