

## Trigonometry Word Problem Worksheet 1

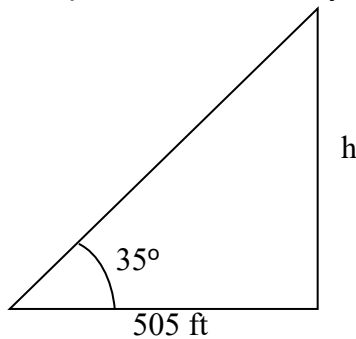
**Draw diagrams for each word problem and show the trig function used to solve the problem.**

1. A monument stands on level ground. The angle of elevation to the top of the monument taken at a point 505 feet away is  $35^\circ$ . Find the height of the monument.
2. A boy flying a kite lets out 180 feet of string that makes an angle of  $65^\circ$  with the ground. If the string forms a straight line, how high is the kite above the ground?
3. A person in a balloon which is 2,500 feet above the airport finds that the angle of depression to a ship out at sea is  $23^\circ$ . Find the horizontal distance between the balloon and the ship. (or the distance from the airport to the ship)
4. An airplane climbs at an angle of  $11^\circ$  with the ground. Find the distance it has traveled when it has attained an altitude of 450 feet.
5. Find the angle of elevation of the sun when a 24 foot tree casts a shadow of 36 feet.
6. A 40-foot ladder is leaning against a building. The foot of the ladders is 32 feet from the building. Find the angle that the ladder makes with the building.
7. A television tower is 180 feet high and an observer is 150 feet from the base of the tower. Find the angle of elevation to the top of the tower from the place where the observer is standing.
8. A 50-foot ladder which is leaning against a wall reaches the wall at a point 45 feet from the ground. Find the angle that the ladder makes with the ground.

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### Solutions:

Problem 1: A monument stands on level ground. The angle of elevation to the top of the monument taken at a point 505 feet away is  $35^\circ$ . Find the height of the monument.



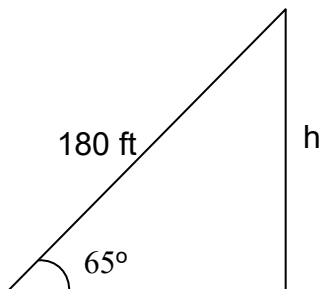
$$\tan 35^\circ = \frac{h}{505}$$

$$505 \times \tan 35^\circ = 505 \times \frac{h}{505}$$

$$h = 505 \times \tan 35^\circ$$

$$h = 353.60 \text{ ft}$$

Problem 2: A boy flying a kite lets out 180 feet of string that makes an angle of  $65^\circ$  with the ground. If the string forms a straight line, how high is the kite above the ground?



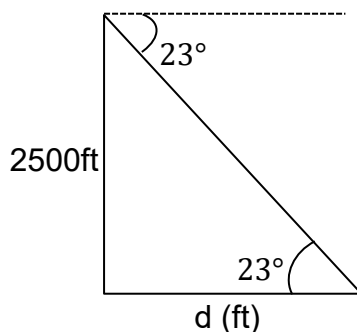
$$\sin 65^\circ = \frac{h}{180}$$

$$180 \times \sin 65^\circ = 180 \times \frac{h}{180}$$

$$h = 180 \times \sin 65^\circ$$

$$h = 163.14 \text{ ft}$$

Problem 3: A person in a balloon which is 2,500 feet above the airport finds that the angle of depression to a ship out at sea is  $23^\circ$ . Find the horizontal distance between the balloon and the ship. (or the distance from the airport to the ship)



$$\cos 23^\circ = \frac{d}{2500}$$

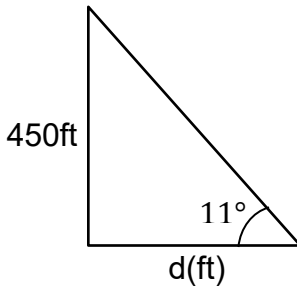
$$2500 \times \cos 23^\circ = 2500 \times \frac{d}{2500}$$

$$d = 2500 \times \cos 23^\circ$$

$$d = 163.14 \text{ ft}$$

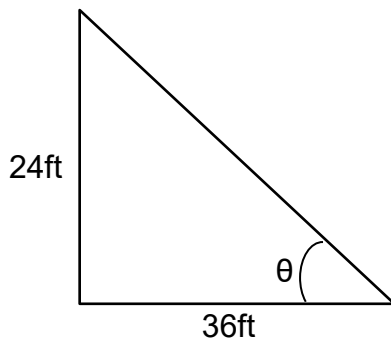
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Problem 4: An airplane climbs at an angle of  $11^\circ$  with the ground. Find the distance it has traveled when it has attained an altitude of 450 feet.



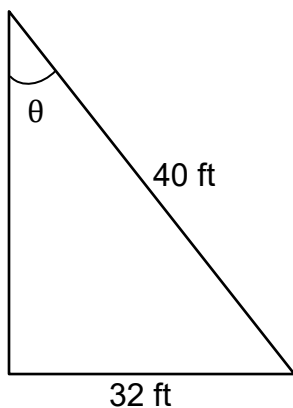
$$\begin{aligned}\tan 11^\circ &= \frac{450}{d} \\ d \times \tan 11^\circ &= d \times \frac{450}{d} \\ d \times \tan 11^\circ &= 450 \\ d &= \frac{450}{\tan 11^\circ} \\ d &= 2315.05 \text{ ft}\end{aligned}$$

Problem 5: Find the angle of elevation of the sun when a 24 feet tree casts a shadow of 36 feet.



$$\begin{aligned}\tan \theta &= \frac{24}{36} \\ \theta &= \tan^{-1}\left(\frac{24}{36}\right) \\ \theta &= 33.69^\circ\end{aligned}$$

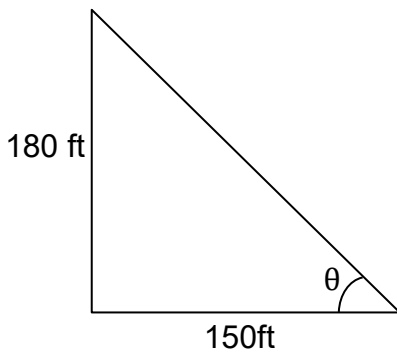
Problem 6: A 40 feet ladder is leaning against a building. The foot of the ladders is 32 feet from the building. Find the angle that the ladder makes with the building.



$$\begin{aligned}\sin \theta &= \frac{32}{40} \\ \theta &= \sin^{-1}\left(\frac{32}{40}\right) \\ \theta &= 53.13^\circ\end{aligned}$$

## Trigonometry Word Problem Worksheet 1

Problem 7: A television tower is 180 feet high and an observer is 150 feet from the base of the tower. Find the angle of elevation to the top of the tower from the place where the observer is standing.

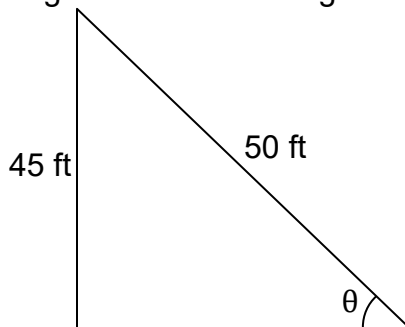


$$\tan \theta = \frac{180}{150}$$

$$\theta = \tan^{-1}\left(\frac{180}{150}\right)$$

$$\theta = 50.19^\circ$$

Problem 8: A 50 feet ladder which is leaning against a wall reaches the wall at a point 45 feet from the ground. Find the angle that the ladder makes with the ground.

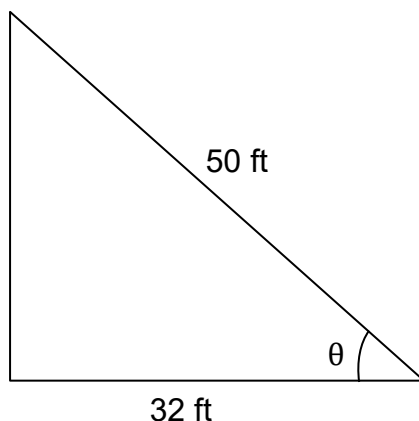


$$\sin \theta = \frac{45}{50}$$

$$\theta = \sin^{-1}\left(\frac{45}{50}\right)$$

$$\theta = 64.16^\circ$$

Problem 9: A 50 feet ladder is leaning against a wall. The foot of the ladders is 32 feet from the building. Find the angle that the ladder makes with the ground.



$$\cos \theta = \frac{32}{50}$$

$$\theta = \cos^{-1}\left(\frac{32}{50}\right)$$

$$\theta = 50.2^\circ$$