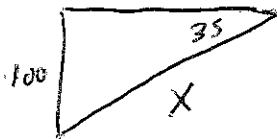


Applying Trigonometric Functions to Real Situations

Draw a picture for each story problem below and then solve. Round your answers to three decimal places.

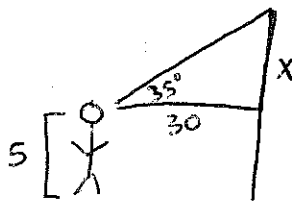
1. A forest ranger looking out from a ranger's station can see a forest fire at a 35° angle of depression. The ranger's position is 100 feet above the ground. How far is it from the ranger's station to the fire?



$$\sin 35 = \frac{100}{X}$$

$$X = 174.3 \text{ ft.}$$

2. A person standing 30 ft from a flag pole can see the top of the pole at a 35° angle of elevation. The person's eye level is 5 ft from the ground. Find the height of the flag pole to the nearest foot.

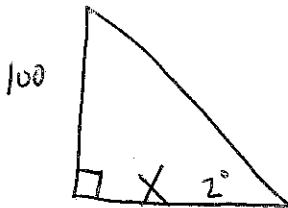


$$\tan 35 = \frac{X}{30}$$

$$X = 21$$

$$\text{Height} = 21 + 5 = 26$$

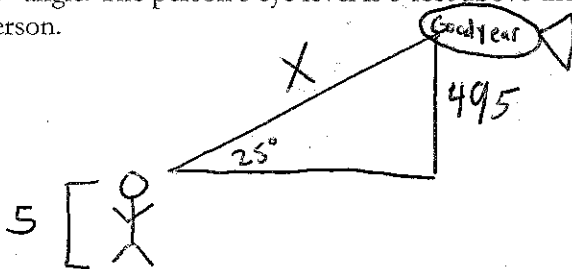
3. The captain of a boat knows that a lighthouse on the coast is 100 ft tall. If she measures the angle of elevation to be 2° , how far is the boat from the coast?



$$\tan 2 = \frac{100}{X}$$

$$X = \frac{100}{\tan 2} = 2863.6 \text{ Ft.}$$

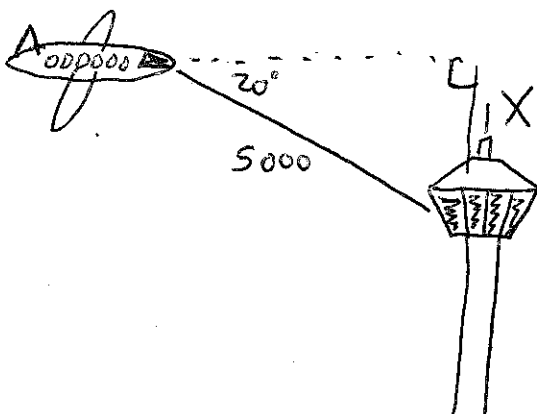
4. A blimp is flying 500 ft above the ground. A person on the ground sees the blimp by looking up at a 25° angle. The person's eye level is 5 feet above the ground. Find the distance from the blimp to the person.



$$\sin 25 = \frac{495}{X}$$

$$X = \frac{495}{\sin 25} = 1171.3$$

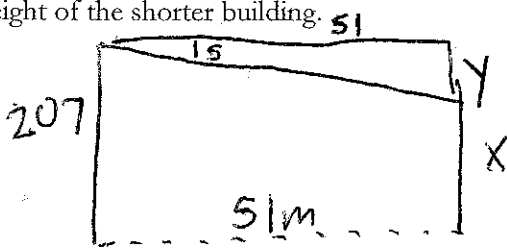
5. An airplane pilot can see the top of a traffic control tower at a 20° angle of depression. The airplane is 5,000 ft from the tower. How far above the tower is the airplane?



$$\sin 20 = \frac{X}{5000}$$

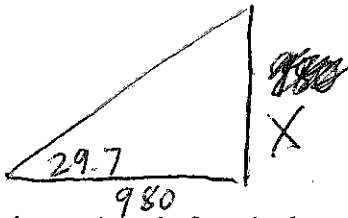
$$X = 1710.1$$

6. Two office buildings are 51 m apart. The height of the taller building is 207 m. The angle of depression from the top of the taller building to the top of the shorter building is 15° . Find the height of the shorter building.



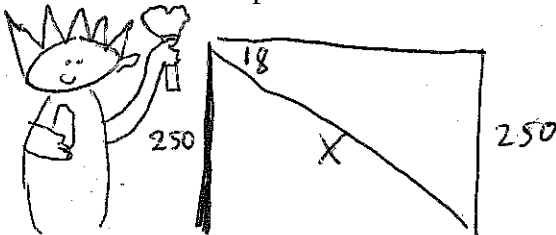
$$\begin{aligned} \tan 15 &= \frac{Y}{51} \\ Y &= 13.6 \\ X &= 207 - 13.6 \\ X &= 193.4 \end{aligned}$$

7. A surveyor is 980 ft from the base of the world's tallest fountain at Fountain Hills, Arizona. The angle of elevation to the top of the column of water is 29.7° . His angle measuring device is at the same level as the base of the fountain. Find the height of the column of water to the nearest 10 ft.



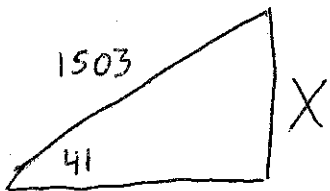
$$\begin{aligned} \tan 29.7 &= \frac{X}{980} \\ X &= 560 \text{ Ft.} \end{aligned}$$

8. On the observation platform in the crown of the Statue of Liberty, Miguel is approximately 250 ft about ground. He sights a ship in New York harbor and measures the angle of depression as 18° . Find the distance from the ship to the base of the statue.



$$\begin{aligned} \sin 18 &= \frac{250}{X} \\ X &= \frac{250}{\sin 18} = 809 \text{ Ft.} \end{aligned}$$

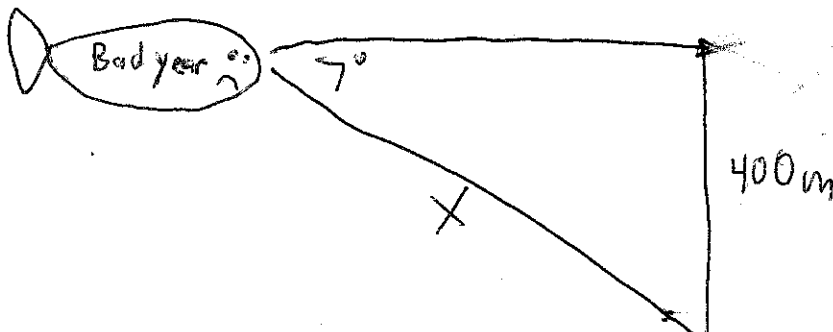
9. A meteorologist measures the angle of elevation of a weather balloon as 41° . A radio signal from the balloon indicates that it is 1503 m from her location. How high is the weather balloon above the ground?



$$\sin 41 = \frac{X}{1503}$$

$$X = \sin 41 \cdot 1503 = 986$$

10. A blimp is flying to cover a football game. The pilot sights the stadium at a 7° angle of depression. The blimp is flying at an altitude of 400 m. How many kilometers is the blimp from the point 400 m above the stadium?



$$\sin 7 = \frac{400}{X}$$

$$X = \frac{400}{\sin 7}$$

$$X = 3282 \text{ m}$$

$$3.282 \text{ km}$$