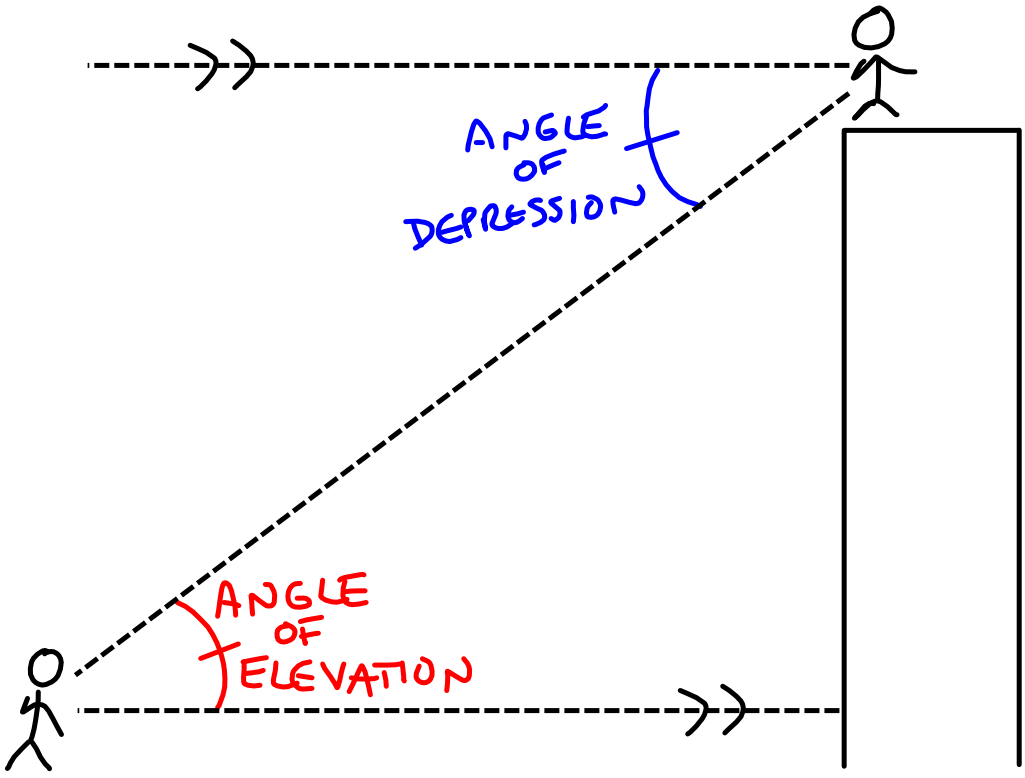
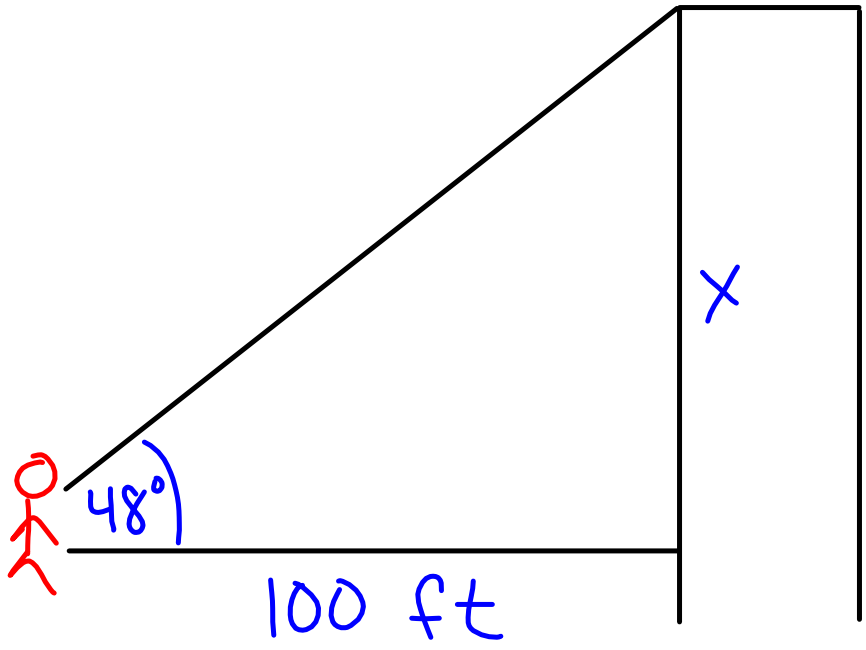
Suppose you stand and look up at a point in the distance. The angle that your line of sight makes with a line drawn horizontally from you is called the ANGLE OF ELEVATION.

The ANGLE OF DEPRESSION is the same type of angle for a person looking back down at you.



You are measuring the height of a building. You stand 100 feet from the base of the building. The angle of elevation from you to the top of the building is 48°. Estimate the height of the building.



$\angle = 48$

$adj = 100$

$opp = x$

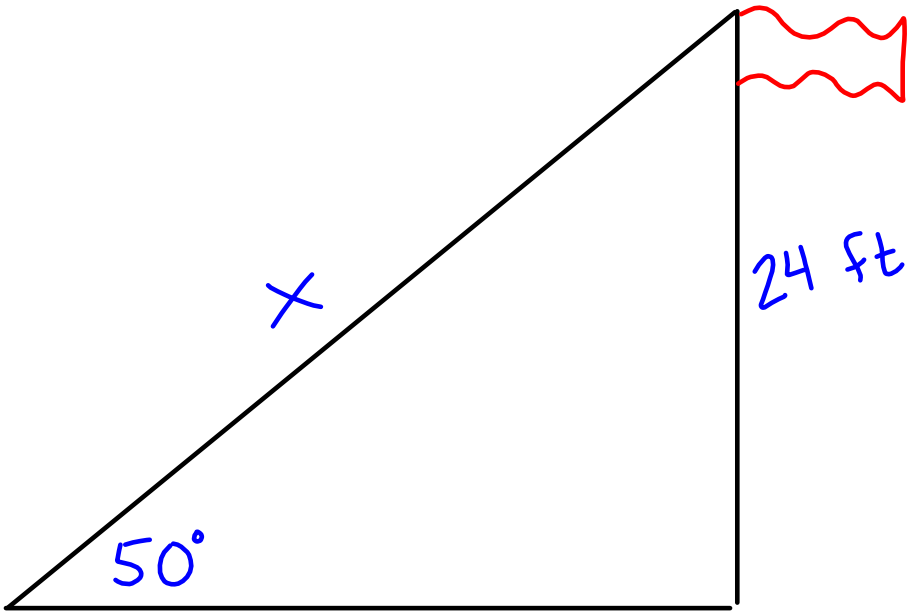
$\tan 48 = \frac{x}{100}$

$x = 100 \tan 48$

$x \approx 111.061$

$\therefore$ THE HEIGHT OF THE BUILDING IS APPROX 111.061 ft

A wire runs from a point on the ground to the top of a 24-ft flagpole. The angle of elevation of the wire is 50°. How long is the wire?



$\angle = 50$

opp = 24

hyp = x

$$\frac{\sin 50}{1} = \frac{24}{x}$$

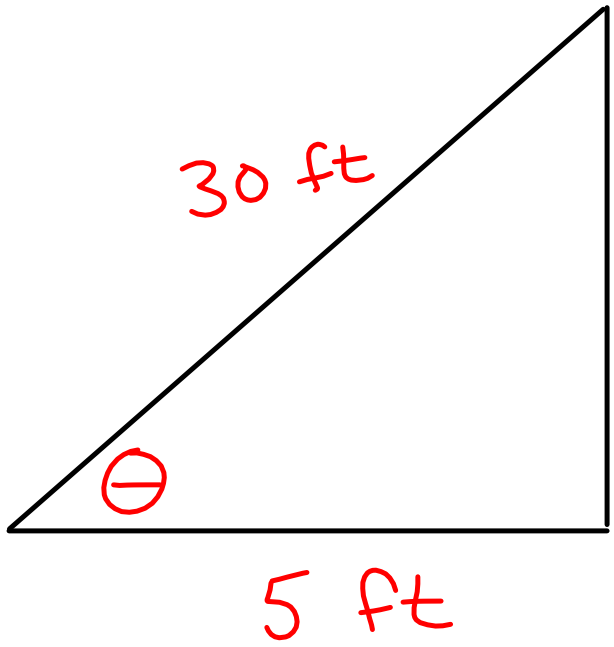
$$x \sin 50 = 24$$

$$x = \frac{24}{\sin 50}$$

$$x \approx 31.330$$

∴ THE WIRE IS APPROX. 31.330 ft LONG

A 30-ft ladder is placed against a wall so that the foot of the ladder is 5 ft from the wall. What is the angle of elevation of the ladder?



$\angle = \theta$

$adj = 5$

$hyp = 30$

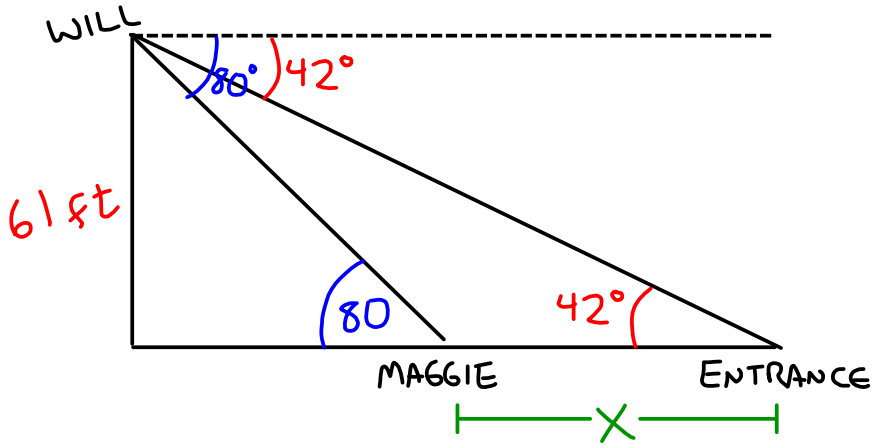
$\cos\theta = \frac{5}{30}$

$\theta = \cos^{-1}\left(\frac{5}{30}\right)$

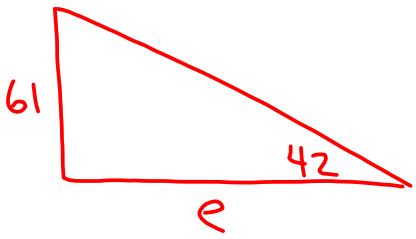
$\theta \approx 80.406$

∴ THE ANGLE OF ELEVATION OF THE LADDER IS APPROX 80.406°

Will is 61-ft high on an amusement park ride. His angle of depression to the park entrance is 42°, and his angle of depression to his sister Maggie standing below is 80°. How far from the entrance is Maggie standing?



WILL TO ENTRANCE

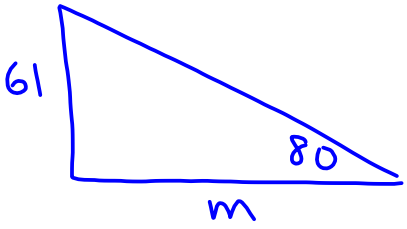


$\tan 42 = \frac{61}{e}$

$e = \frac{61}{\tan 42}$

$e \approx 67.747$

WILL TO MAGGIE



$\tan 80 = \frac{61}{m}$

$m = \frac{61}{\tan 80}$

$m \approx 10.756$

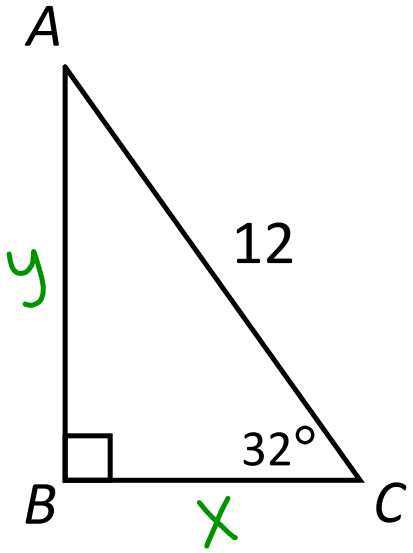
$x = e - m$

$x \approx 56.991$

Therefore, Maggie is approx. 56.991 ft away from the park entrance.

Solving Right Triangles

** FIND EVERYTHING!!



90-32

$AB = 6.359$ $\angle A = 58°$

$BC = 10.177$ $\angle B = 90°$

$AC = 12$ $\angle C = 32°$

AB

$\angle = 32$

opp = y

hyp = 12

$\sin 32 = \frac{y}{12}$

$y = 12 \sin 32$

$y \approx 6.359$

BC

$\angle = 32$

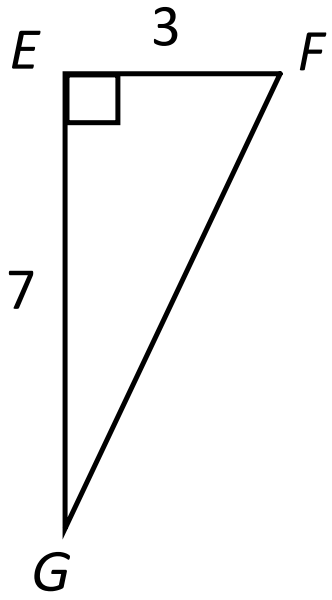
adj = x

hyp = 12

$\cos 32 = \frac{x}{12}$

$x = 12 \cos 32$

$x \approx 10.177$



$EF = 3$ $\quad \angle E = 90°$

$EG = 7$ $\quad \angle F = 66.801°$

$FG = \sqrt{58}$ $\quad \angle G = 23.199°$

$EF^2 + EG^2 = GF^2$

$3^2 + 7^2 = GF^2$

$9 + 49 = GF^2$

$58 = GF^2$

$GF = \sqrt{58}$

m∠G

$\angle = \theta$

$opp = 3$

$adj = 7$

$\tan\theta = \frac{3}{7}$

$\theta = \tan^{-1}\left(\frac{3}{7}\right)$

$\theta \approx 23.199°$

m∠F

$\angle = \theta$

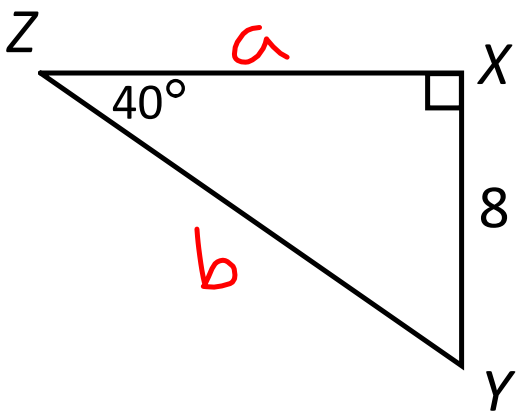
$opp = 7$

$adj = 3$

$\tan\theta = \frac{7}{3}$

$\theta = \tan^{-1}\left(\frac{7}{3}\right)$

$\theta \approx 66.801°$



$XY = 8$ $\angle X = 90^\circ$

$XZ = 9.534$ $\angle Y = 50^\circ$

$YZ = 12.446$ $\angle Z = 40^\circ$

$XZ \Rightarrow \angle = 40^\circ$

$opp = 8$

$adj = a$

$\tan 40 = \frac{8}{a}$

$a = \frac{8}{\tan 40}$

$a \approx 9.534$

$YZ \Rightarrow \angle = 40$

$hyp = b$

$opp = 8$

$\sin 40 = \frac{8}{b}$

$b = \frac{8}{\sin 40}$

$b \approx 12.446$