# 2.3 Trigonometry Application

Trigonometry: Application   Name: _____

Example: A tiny but horrible alien is standing at the top of the Eiffel Tower (which is 324 meters tall) and threatening to destroy the city of Paris! A Men In Black agent is standing at ground level, 54 meters across the Eiffel square, aiming his laser gun at the alien. At what angle, *in degrees*, should the agent shoot his laser gun? *Round your final answer to the nearest tenth.*
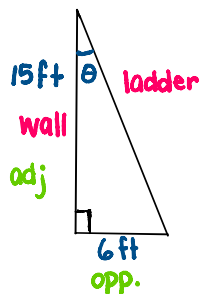
opp.

324

?

54 adj.
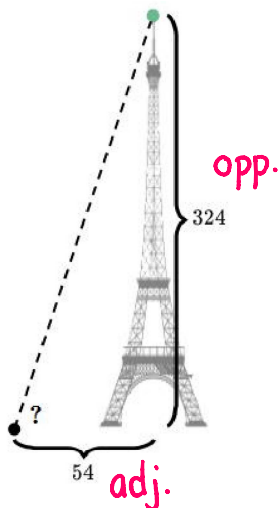
$$\tan \theta = \frac{324}{54}$$

$$\theta = \tan^{-1}\left(\frac{324}{54}\right)$$

$$\theta = 80.5°$$

Example: A ladder leans against a brick wall. The foot of the ladder is 6 feet from the wall. The ladder reaches a height of 15 feet on the wall. Find the angle the ladder makes with the wall, to the nearest degree.
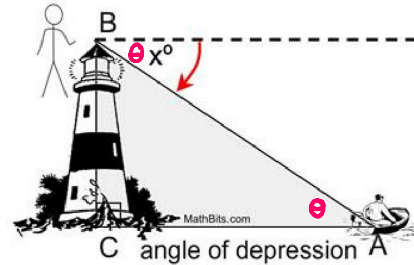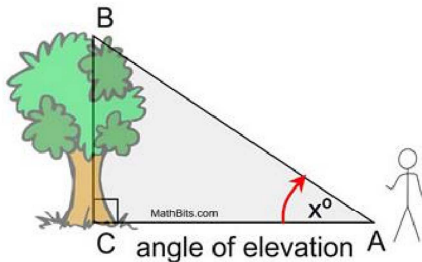
15ft θ ladder

wall

adj

6 ft
opp.

$$\tan \theta = \frac{6}{15}$$
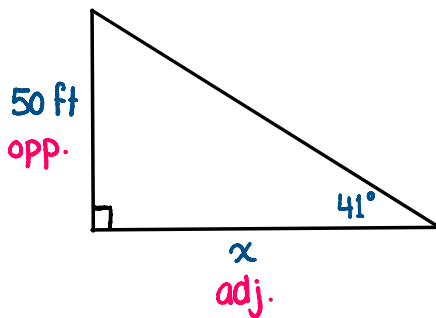
$$\theta = \tan^{-1}\left(\frac{6}{15}\right)$$

$$\theta = 21.8$$

$$\Rightarrow \theta = 22°$$

Angles of Elevation and Depression:

Example: A building is 50 feet high. At a distance away from the building, an observer notices that the angle of elevation to the top of the building is 41°. How far is the observer from the base of the building?
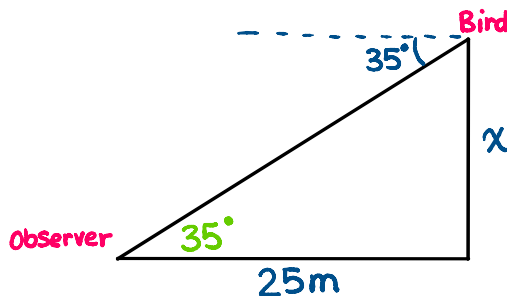

50 ft
opp.

41°

x
adj.

$$\tan 41° = \frac{50}{x}$$

$$x = \frac{50}{\tan 41°}$$

$$x \doteq 57.5 \text{ ft}$$

Example: A bird sits on top of a lamppost. The angle of depression from the bird to the feet of an observer standing away from the lamppost is 35°. The distance from the bird to the observer is 25 meters. How tall is the lamppost?

Bird

35°

x

observer   35°

25m

$$\tan 35° = \frac{x}{25}$$

$$25 \tan 35° = x$$

$$x \doteq 17.5 \text{ m}$$

Assignment: p.41 #7, 8, 10, 13   p.45 #5, 9 ,10