


Warm-Up


Get out 12.1 Day 2 Notes and do #'s 13 & 14

13. A 16-foot ladder is propped against the side of a building. The angle it forms with the ground measures 55° . How far up the side of the building does the ladder reach?



$\sin 55 = \frac{x}{16}$
 $16 \sin 55 = x$
 $13.1 \approx x$
13.1 ft

14. The walking surface of a treadmill is 5 feet long. A trainer raises the end of the treadmill 6 inches to create an incline. Approximately what angle does the incline of the treadmill form with the ground?



$\sin x = \frac{6}{60}$
 $x = \sin^{-1}\left(\frac{6}{60}\right)$
 $x \approx 5.7^\circ$



Problem Solving with Right Triangles

COMMON CORE STATE STANDARDS

Applied	Developed	Introduced
8.G.7	G.SRT.8	

8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.★

14. The walking surface of a treadmill is 5 feet long. A trainer raises the end of the treadmill 6 inches to create an incline. Approximately what angle does the incline of the treadmill form with the ground?

15. A wheelchair ramp has an incline which forms a 6° angle with the ground and has a height of 32 centimeters. Find the length of the ramp to the nearest tenth centimeter.

Homework:

What questions do you have?

Section 12.2
Angle of Elevation and Depression

LINE OF SIGHT: eye level.

ANGLE OF ELEVATION: seeing an object above your line of sight.

ANGLE OF DEPRESSION: seeing an object below your line of sight.

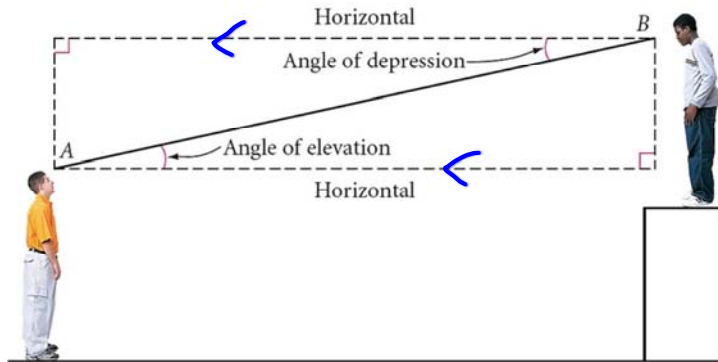


LESSON
12.2

Problem Solving with Right Triangles

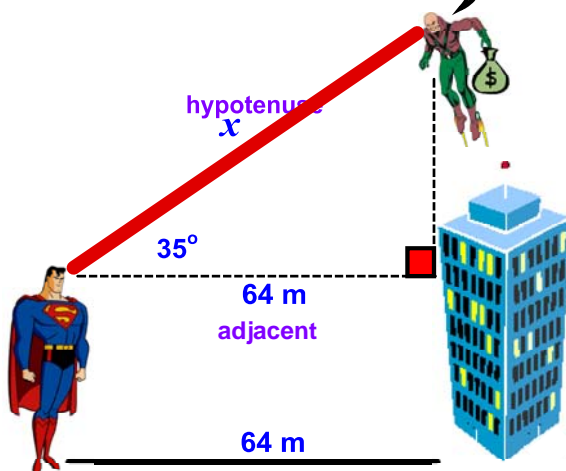
Right triangle trigonometry is often used indirectly to find the height of a tall object. To solve a problem of this type, measure the angle from the horizontal to your line of sight when you look at the top or bottom of the object.

If you look up, you measure the **angle of elevation**. If you look down, you measure the **angle of depression**.



EX 1

Superman is standing 64 meters from the base of a bank where the villainous Lex Luthor is about to fly away with a stash of money he just stole. Superman's angle of elevation to the top of the building is 35° . Find the distance Superman needs to exert his heat vision to stop Lex Luthor from getting away.



🦹 Draw a picture.

🦹 Apply the values.

🦹 $\cos 35 = \frac{64}{x}$

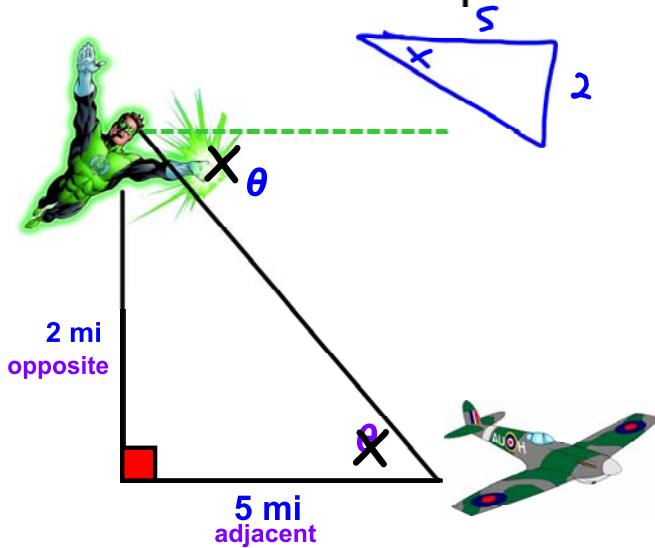
🦹 $x \cos 35 = 64$

🦹 $x = \frac{64}{\cos 35}$

$x \approx 78.1 \text{ m}$

EX 2

Green Lantern is flying at a height of 2 miles above the ground. The distance along the ground from Green Lantern to an airport is 5 miles. What is the angle of depression from Green Lantern to the airport?



ⓐ Draw a picture.

ⓑ Angles are congruent because of alternate interior angles.

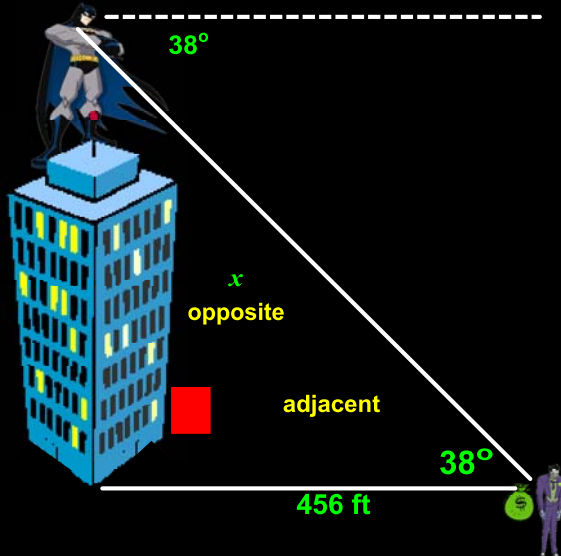
ⓒ $\tan x = \frac{2}{5}$

ⓓ $x = \tan^{-1}\left(\frac{2}{5}\right)$

$x \approx 21.8^\circ$

EX 3

Batman is standing on top of a building making sure crime is being silenced. He spots his archenemy, the Joker, up to no good. Batman's angle of depression from the top of the building to the Joker is 38° and the distance from the base of the building to the Joker is 456 feet. Help Batman capture the Joker by calculating the height of building so that he can swoop down and put an end to the Joker's criminal ways.



ⓐ Draw a picture.

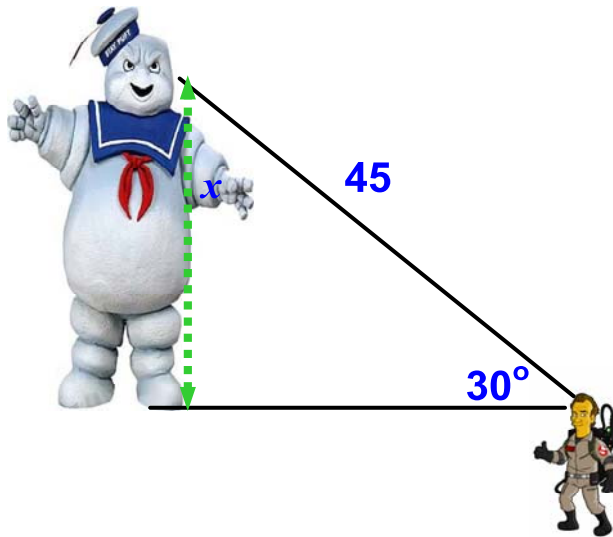
ⓑ $\tan 38^\circ = \frac{x}{456}$

ⓒ $x = 456 \tan 38^\circ$

ⓓ $x \approx 356.27$

EX 4

The "Stay-Puff Marshmallow Man" from the movie Ghost Busters is storming the city. If a ghostbuster's angle of elevation to the top of the Stay-Puff Marshmallow Man is 30° and he wants to blast the top of his head with his plasma gun that only reaches 45 meters, determine the height of the Marshmallow Man to the nearest meter.



Draw a picture.



$$\sin 30 = \frac{x}{45}$$



$$45 \sin 30 = x$$

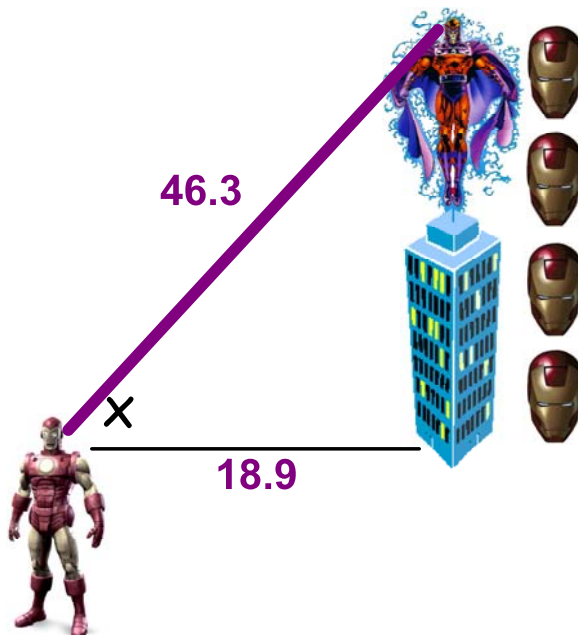


$$22.5 = x$$

$$\boxed{23\text{ft}}$$

EX 5

Ironman is standing 18.9 meters from a building in which Magneto is standing on. In order to stun Magneto, he needs to fire his pulsar beam 46.3 meters. Find the angle of elevation that Ironman needs to fire his pulsar beam.



Draw a picture.



$$\cos x = \frac{18.9}{46.3}$$



$$x = \cos^{-1}\left(\frac{18.9}{46.3}\right)$$



$$x \approx 65.9^\circ$$



$$\boxed{65.9^\circ}$$

Closing Question

Josh wants to measure the height of a tree. He walks exactly 100 feet from the base of the tree and looks up. The angle from the ground to the top of the tree is 35° . How tall is the tree?

Homework:

... Textbook p. 591-593: 10-16

