

Warm-Up

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?



Problem Solving with Right Triangles

COMMON CORE STATE STANDARDS

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

12.2 Problem Solving with Right Triangles Day 1

- a. I can solve application problems using trigonometry ratios.



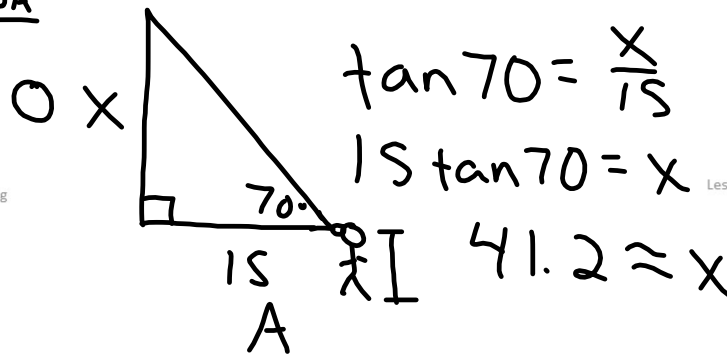
Warm-up: Problem Solving with Right Triangles

Launch – Read the situation and answer the question with your group.

If you are standing 15 feet from a tree and you can see the top of a tree from a 70° angle, how can you find the height of the tree?

(Brainstorm with your group and sketch a diagram)

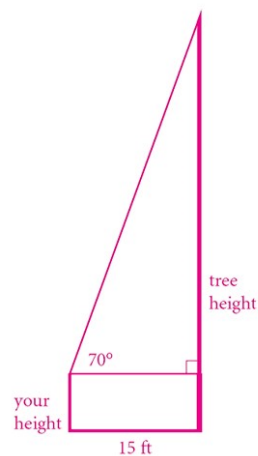
SOH-CAH-TOA



Problem Solving with Right Triangles

Launch

Answers will vary. Students may create a diagram like this.



Practice: For each problem, sketch a model of the described situation, write an equation, solve it, and answer the question. Round your answers to the nearest tenths place.

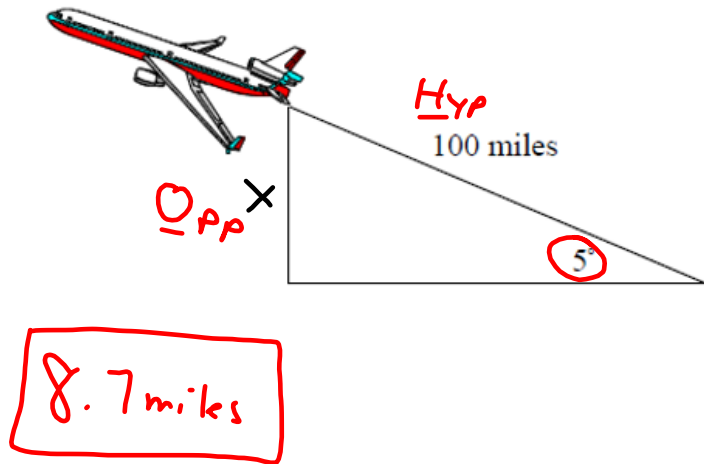
1. An airplane takes off at an angle of 5° with respect to the ground. After the airplane travels 100 miles along the flight path, how far above the ground is it?

SOH-CAH-TOA

$$\sin 5 = \frac{x}{100}$$

$$100 \sin 5 = x$$

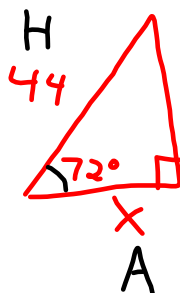
$$8.7 \approx x$$



8.7 miles

Practice: For each problem, sketch a model of the described situation, write an equation, solve it, and answer the question. Round your answers to the nearest tenths place.

2. A 44 foot extension ladder leans against a building and makes an angle of 72° with the ground. What is the distance from the base of the ladder to the building?



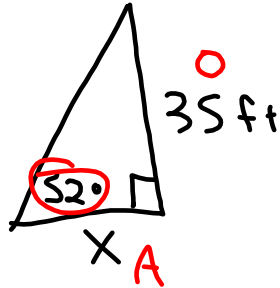
$$\cos 72 = \frac{x}{44}$$

$$44 \cos 72 = x$$

$$13.6 \approx x$$

Practice: For each problem, sketch a model of the described situation, write an equation, solve it, and answer the question. Round your answers to the nearest tenths place.

3. A wire is stretched from a point on the ground to the top of a 35 foot telephone pole. The angle formed by the wire with respect to the ground is 52° . What is the distance from the point on the ground where the wire is attached to the base of the telephone pole?



$$x \cdot \tan 52 = \frac{35}{x} \cdot x$$

$$\frac{x \tan 52}{\tan 52} = \frac{35}{\tan 52}$$

$$x \approx 27.3$$

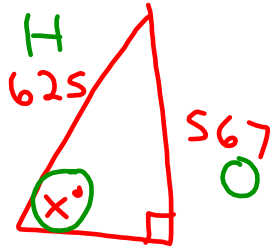
Practice: For each problem, sketch a model of the described situation, write an equation, solve it, and answer the question. Round your answers to the nearest tenths place.

4. A hot air balloon is tethered to the ground by a cable. Due to the wind, the angle formed by the cable and the ground is 75° . If the altitude reached by the balloon is 95 feet when the cable is pulled tight, what is the length of the cable?

$$98.4 \text{ ft}$$

Practice: For each problem, sketch a model of the described situation, write an equation, solve it, and answer the question. Round your answers to the nearest tenths place.

5. A 625 foot long wire is extended from the top of a tower to a point on the ground. If the height of the tower is 567 feet, what is the measurement of the angle formed by the wire and the ground?



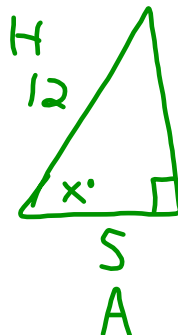
$$\sin x = \frac{567}{625}$$

$$x = \sin^{-1}\left(\frac{567}{625}\right)$$

$$x \approx 65.1^\circ$$

Practice: For each problem, sketch a model of the described situation, write an equation, solve it, and answer the question. Round your answers to the nearest tenths place.

6. A 12 foot ladder has its base 5ft from the edge of the building against which it is leaning. In order to be stable, the angle that the ladder makes with the ground must be less than 60° . Is this ladder stable?



$$\cos x = \frac{5}{12}$$

$$x = \cos^{-1}\left(\frac{5}{12}\right)$$

$$x \approx 65.4^\circ$$

Not stable

Homework:

**12.2 Problem Solving with Right Triangles – Day 1
Homework**