12.2 Problem Solving with Right Triangles Day 1

a. I can solve application problems using trigonometry ratios.

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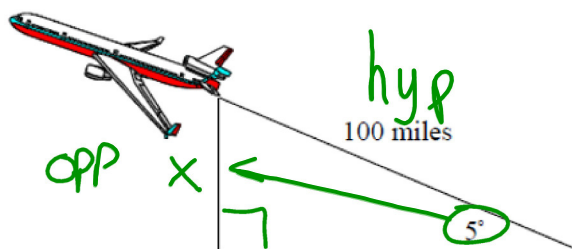
1. An airplane takes off at an angle of 5° with respect to the ground. After the airplane travels 100 miles along the flight path, how far above the ground is it?

$$S\frac{O}{H}C\frac{A}{H}T\frac{O}{A}$$

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

hyp
100 miles
OPP x
5°

$$x = 100 \cdot \sin 5°$$

$$\boxed{x = 8.7 \text{ miles}}$$

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?

hyp 44

adj x

72°
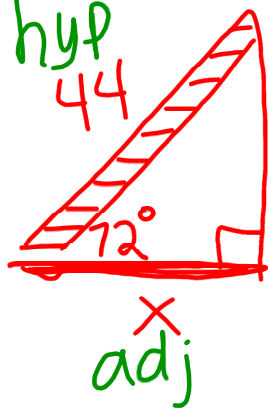
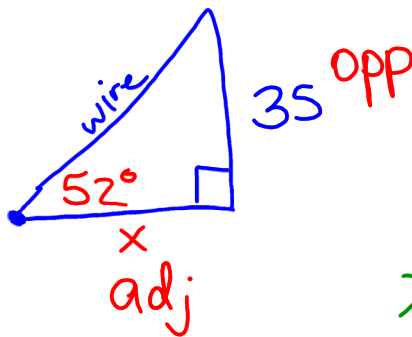$$S\frac{O}{H} C\frac{A}{H} T\frac{O}{A}$$

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

$$x = 44 \cdot \cos 72$$

$$\boxed{x = 13.6 \text{ ft}}$$

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.

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?
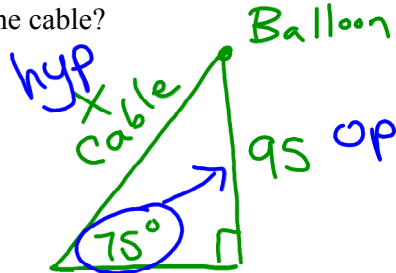
wire

35 opp

52°

x adj

$$S\frac{O}{H} C\frac{A}{H} T\frac{O}{A}$$

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

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

$$\boxed{x = 27.3 \text{ ft}}$$

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.

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?

Balloon

hyp

x cable
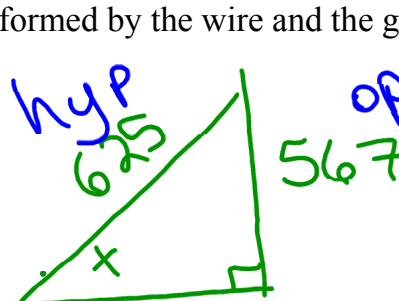
cable

95 opp

75°

$S\frac{O}{H} C\frac{A}{H} T\frac{O}{A}$

$\sin 75 = \frac{95}{x}$

$\frac{x \cdot \sin 75}{\sin 75} = \frac{95}{\sin 75}$

$\boxed{x = 98.4 \text{ ft}}$

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?

hyp 625

opp 567

x

$S\frac{O}{H}$

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

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

$\boxed{X = 65.1°}$

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?

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

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

$$x = 65.4°$$

NOT Stable!
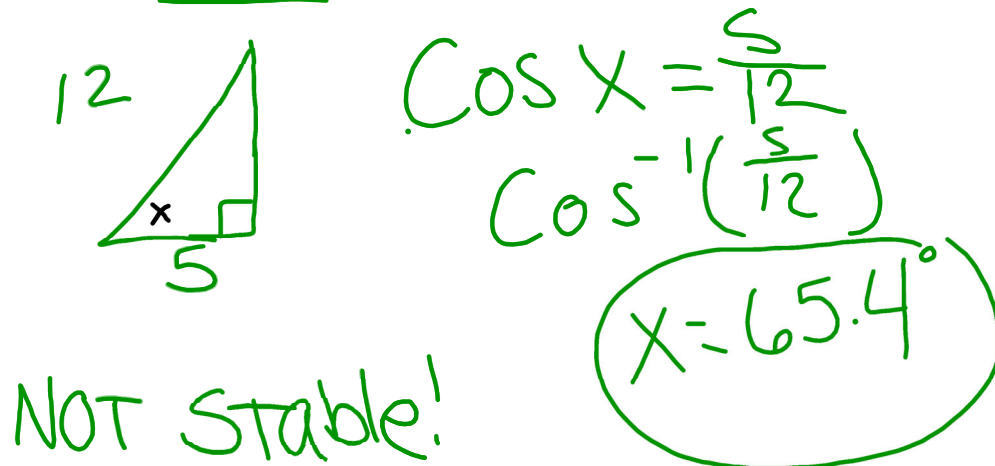
Homework:

12.2 Problem Solving with Right Triangles – Day 1 Homework