# Word Problems Using Right Triangle Trig

Draw pictures! Make all answers accurate to the nearest tenth.

1. A damsel is in distress and is being held captive in a tower. Her knight in shining armor is on the ground below with a ladder. When the knight stands 15 feet from the base of the tower and looks up at his precious damsel, the angle of elevation to her window is 60 degrees. How long does the ladder have to be?

$\cos(60) = 15/x$ $x = 30 ft$
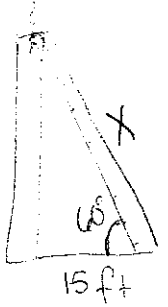
2. You are 200 yards from a river. Rather than walking directly to the river, you walk 400 yards along a straight path to the river's edge. Find the acute angle between path and the river's edge.
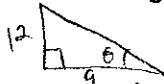
$\sin^{-1}(200/400)$

$\theta = 30°$ Depression

3. A 12 meter flagpole casts a 9 meter shadow. Find the angle of elevation of the sun.

$\tan \theta = 12/9$ $\tan^{-1}(12/9) = 53.1$

4. Suppose you're flying a kite, and it gets caught at the top of the tree. You've let out all 100 feet of string for the kite, and the angle that the string makes with the ground is 75 degrees. Instead of worrying about how to get your kite back, you wonder. "How tall is that tree?"
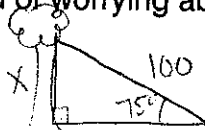
$\sin 75 = \frac{x}{100}$ $x = 96.6 ft$ Angle of elevation

5. Suppose that Mike and Dave are making measurements for the road-paving crew. They need to know how much the land slopes downward along a particular stretch of road. Dave walks 80 feet from Mike and holds up a long pole, perpendicular to the ground, that has markings every inch along it. Mike looks at the pole through a sighting instrument. Looking straight across, parallel to the horizon, Mike sights a point on the pole 50 inches above the ground- call it point A. Then Mike looks through the instrument at the bottom of the pole, creating an angle of depression. Which is the angle of depression or slope of the road, to where Mike is standing?
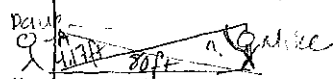
$\tan(x) = 80/4.17 = 87$ $90 - 87 = 3°$
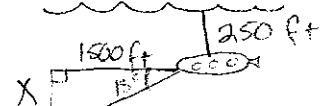
6. A submersible traveling at a depth of 250 feet dives at an angle of 15º with respect to a line parallel to the water's surface. It travels a horizontal distance of 1500 feet during the dive. What is the depth of the submersible after the dive?

$402 + 250 = 652 ft$ $\tan 15 = x/1500$ $401.9 = x$ depression

7. A fire department's longest ladder is 110 feet long, and the safety regulation states that they can use it for rescues up to 100 feet off the ground. What is the maximum safe angle of elevation for the rescue ladder?

$\sin \theta = 100/110$ $\sin^{-1}(100/110) = 65.38°$

8. Brothers Bob and Tom Katz buy a tent that has a center pole 6.25 feet high. If the sides of the tent are supposed to make a 50° angle with the ground, how wide is the tent?
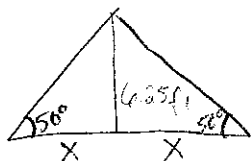
$\tan(50) = 6.25/x$ $x = 5.24$ $x2 = 10.48 ft$ elevation
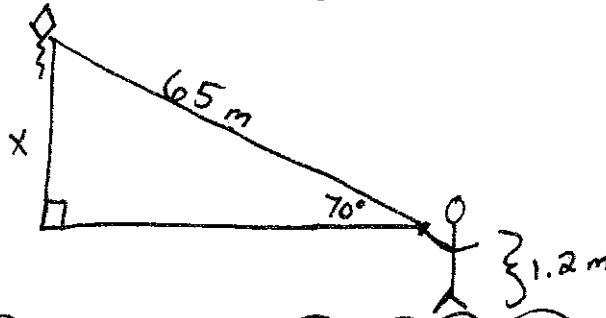
Name __Key__   Date_____

Angle of Elevation & Depression Trig Worksheet
*Draw and label a picture for each problem

1. Brian's kite is flying above a field at the end of 65 m of string. If the angle of elevation to the kite measures 70°, and Brian is holding the kite 1.2 m off the ground. How high above the ground is the kite flying?
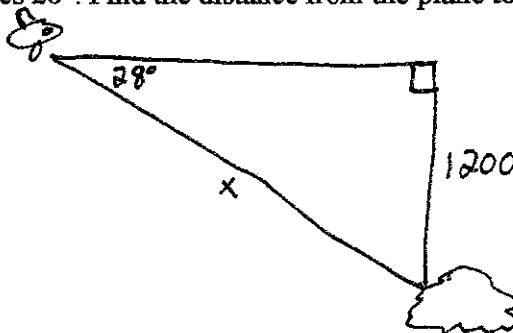
$\sin(70) = \frac{x}{65}$

$65 * \sin(70) = x$

$61.08 = x$

$height = 61.08 + 1.$
$= 62.28\ m$

2. From an airplane at an altitude (height) of 1200 m, the angle of depression to a rock on the ground measures 28°. Find the distance from the plane to the rock.
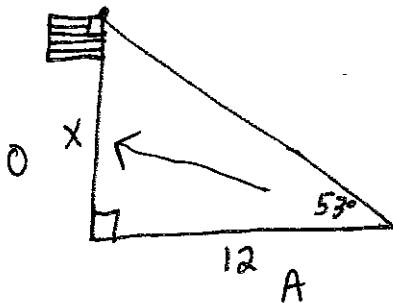
$\sin(28) = \frac{1200}{x}$

$x * \sin(28) = 1200$

$x = \frac{1200}{\sin(28)}$

$x = 2556.065\ m$
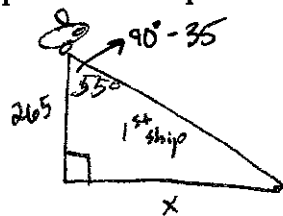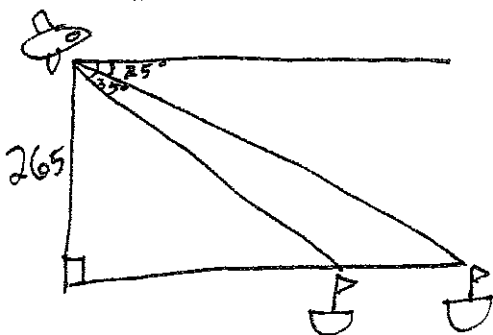
3. From a point on the ground 12 ft from the base of a flagpole, the angle of elevation of the top of the pole measures 53°. How tall is the flagpole?
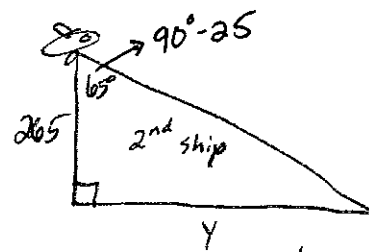
$\tan(53) = \frac{x}{12}$

$X = 15.92$

4. From a plane flying due east at 265 m above sea level, the angles of depression of two ships sailing due east measure 35° and 25 °. How far apart are the ships?

$90° - 35$

$90° - 25$

$\tan(55) = \frac{x}{265}$

$\tan(65) = \frac{y}{265}$