

# ICM Trigonometry Worksheet #1

Use the definitions of the trigonometric functions to label the correct sides of the triangle. Then find the length of the third side and the values of the other five trigonometric functions.

1) If  $\cos \theta = \frac{9}{41}$ , find the following:

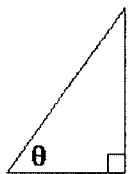
$$\sin \theta = \frac{40}{41}$$

$$\tan \theta = \frac{40}{9}$$

$$\cot \theta = \frac{9}{40}$$

$$\sec \theta = \frac{41}{9}$$

$$\csc \theta = \frac{41}{40}$$



2) If  $\tan \theta = \frac{7}{24}$ , find the following:

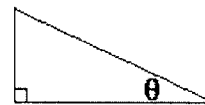
$$\sin \theta = \frac{7}{25}$$

$$\cos \theta = \frac{24}{25}$$

$$\cot \theta = \frac{24}{7}$$

$$\sec \theta = \frac{25}{24}$$

$$\csc \theta = \frac{25}{7}$$



In the problems below, you will also need to draw your triangle for reference.

3) If  $\csc \theta = \frac{37}{12}$ , find the following:

$$\sin \theta = \frac{12}{37}$$

$$\cos \theta = \frac{35}{37}$$

$$\tan \theta = \frac{12}{35}$$

$$\cot \theta = \frac{35}{12}$$

$$\sec \theta = \frac{37}{35}$$

4) If  $\cot \theta = \frac{5}{4}$ , find the following:

$$\sin \theta = \frac{4}{\sqrt{41}}$$

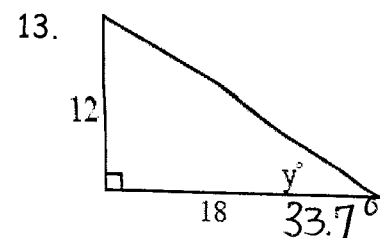
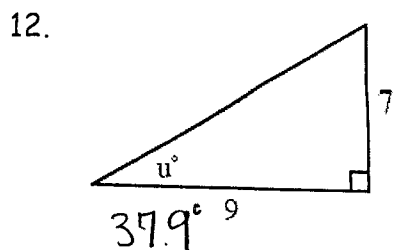
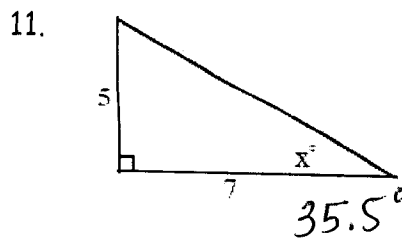
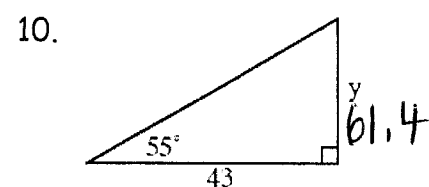
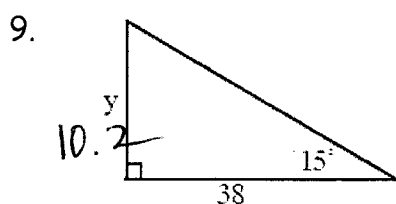
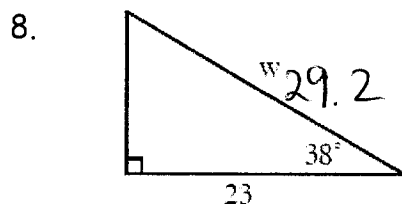
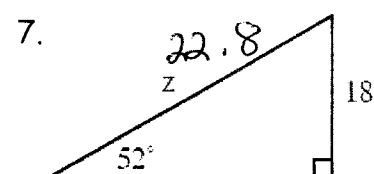
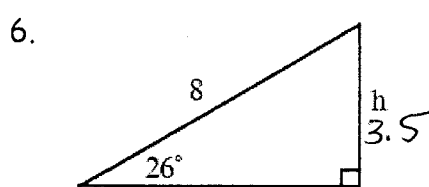
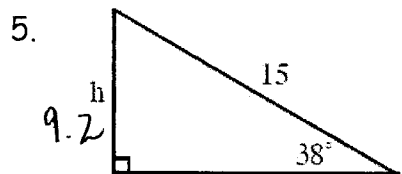
$$\cos \theta = \frac{5}{\sqrt{41}}$$

$$\tan \theta = \frac{4}{5}$$

$$\sec \theta = \frac{\sqrt{41}}{5}$$

$$\csc \theta = \frac{\sqrt{41}}{4}$$

Use trig ratios to solve for the missing side or angle. Round to the nearest tenth.



Draw a triangle and label for each problem. Show your work. Round to the nearest tenth.

- 14 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?

30 ft

- 15 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.

30°

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

53.1°

- 17 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?

10.5 ft

- 18 A submersible traveling at a depth of 250 feet dives at an angle of 15° 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?

651.9 ft