

## Section 4.3 Right Triangle Trigonometry

**Objective:** In this lesson you learned how to evaluate trigonometric functions of acute angles and how to use the fundamental trigonometric identities.

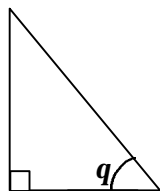
Course Number

Instructor

Date

### I. The Six Trigonometric Functions (Pages 370–372)

In the right triangle shown below, label the three sides of the triangle relative to the angle labeled  $q$  as (a) the **hypotenuse**, (b) the **opposite side**, and (c) the **adjacent side**.



#### *What you should learn*

How to evaluate trigonometric functions of acute angles

Let  $q$  be an acute angle of a right triangle. Define the six trigonometric functions of the angle  $q$  using opp = the length of the side opposite  $q$ , adj = the length of the side adjacent to  $q$ , and hyp = the length of the hypotenuse.

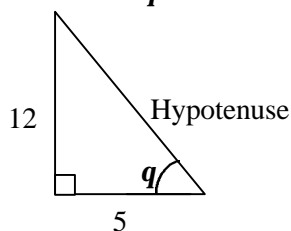
$$\sin q = \frac{\text{opp}}{\text{hyp}} \qquad \cos q = \frac{\text{adj}}{\text{hyp}}$$

$$\tan q = \frac{\text{opp}}{\text{adj}} \qquad \csc q = \frac{\text{hyp}}{\text{opp}}$$

$$\sec q = \frac{\text{hyp}}{\text{adj}} \qquad \cot q = \frac{\text{adj}}{\text{opp}}$$

The cosecant function is the reciprocal of the \_\_\_\_\_ function. The cotangent function is the reciprocal of the \_\_\_\_\_ function. The secant function is the reciprocal of the \_\_\_\_\_ function.

**Example 1:** In the right triangle below, find  $\sin q$ ,  $\cos q$ , and  $\tan q$ .



Give the sines, cosines, and tangents of the following special angles:

$$\sin 30^\circ = \sin \frac{p}{6} = \underline{\hspace{2cm}}$$

$$\cos 30^\circ = \cos \frac{p}{6} = \underline{\hspace{2cm}}$$

$$\tan 30^\circ = \tan \frac{p}{6} = \underline{\hspace{2cm}}$$

$$\sin 45^\circ = \sin \frac{p}{4} = \underline{\hspace{2cm}}$$

$$\cos 45^\circ = \cos \frac{p}{4} = \underline{\hspace{2cm}}$$

$$\tan 45^\circ = \tan \frac{p}{4} = \underline{\hspace{2cm}}$$

$$\sin 60^\circ = \sin \frac{p}{3} = \underline{\hspace{2cm}}$$

$$\cos 60^\circ = \cos \frac{p}{3} = \underline{\hspace{2cm}}$$

$$\tan 60^\circ = \tan \frac{p}{3} = \underline{\hspace{2cm}}$$

Cofunctions of complementary angles are  $\underline{\hspace{2cm}}$ . If  $q$  is an acute angle, then:

$$\sin(90^\circ - q) = \underline{\hspace{2cm}} \quad \cos(90^\circ - q) = \underline{\hspace{2cm}}$$

$$\tan(90^\circ - q) = \underline{\hspace{2cm}} \quad \cot(90^\circ - q) = \underline{\hspace{2cm}}$$

$$\sec(90^\circ - q) = \underline{\hspace{2cm}} \quad \csc(90^\circ - q) = \underline{\hspace{2cm}}$$

## II. Trigonometric Identities (Pages 373–374)

List six reciprocal identities:

1)

2)

3)

4)

5)

6)

***What you should learn***

How to use the fundamental trigonometric identities

List two quotient identities:

1)

2)

List three Pythagorean identities:

1)

2)

3)

### III. Evaluating Trigonometric Functions with a Calculator (Page 374)

To use a calculator to evaluate trigonometric functions of angles measured in degrees, . . .

***What you should learn***  
How to use a calculator to evaluate trigonometric functions

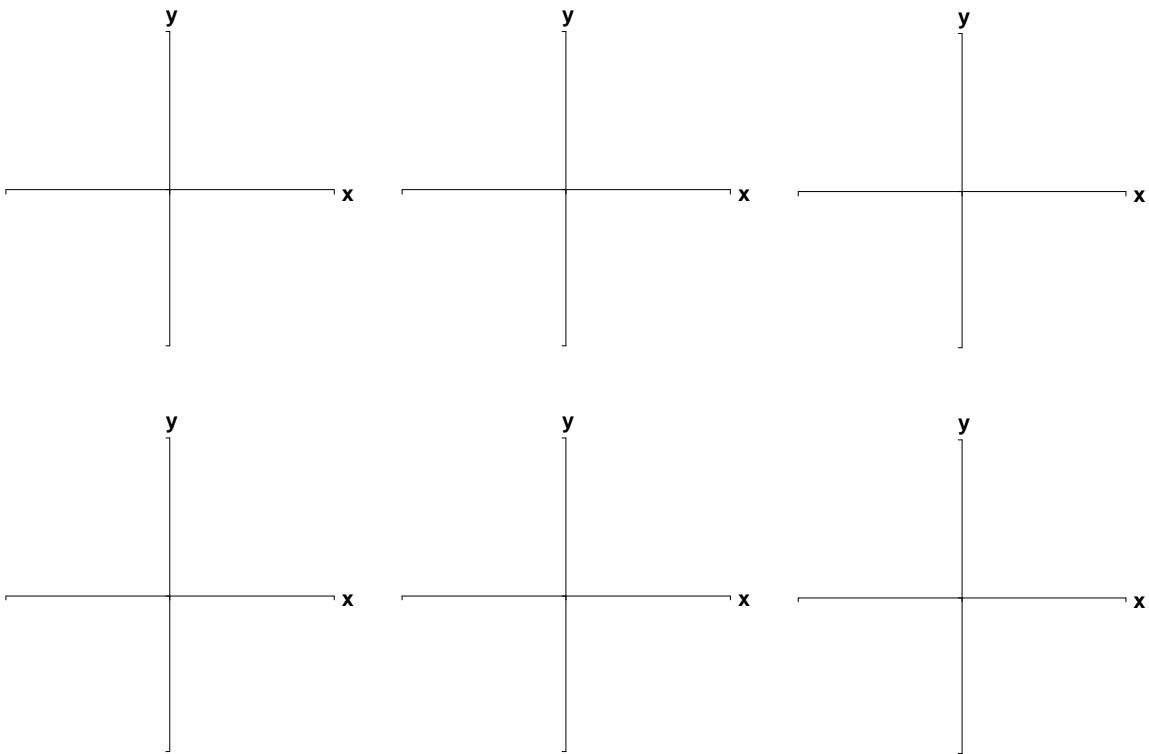
**Example 2:** Use a calculator to evaluate (a)  $\tan 35.4^\circ$ , and  
(b)  $\cos 3.25^\circ$

### IV. Applications Involving Right Triangles (Pages 375–376)

What does it mean to “solve a right triangle?”

***What you should learn***  
How to use trigonometric functions to model and solve real-life problems

Describe a real-life situation in which solving a right triangle would be appropriate or useful.

**Additional notes****Homework Assignment**

Page(s)

Exercises