

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.

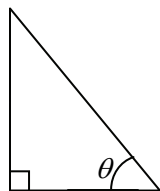
Course Number

Instructor

Date

I. The Six Trigonometric Functions (Pages 277–279)

In the right triangle shown below, label the three sides of the triangle relative to the angle labeled θ 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 θ be an acute angle of a right triangle. Define the six trigonometric functions of the angle θ using opp = the length of the side opposite θ , adj = the length of the side adjacent to θ , and hyp = the length of the hypotenuse.

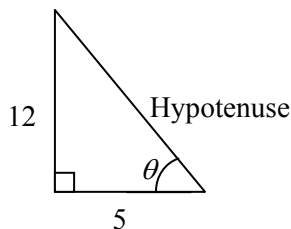
$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \qquad \cos \theta = \frac{\text{adj}}{\text{hyp}}$$

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

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

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 $\sin \theta$, $\cos \theta$, and $\tan \theta$.



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

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

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

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

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

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

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

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

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

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

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

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

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

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

II. Trigonometric Identities (Pages 280–281)

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 281)

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 281–283)

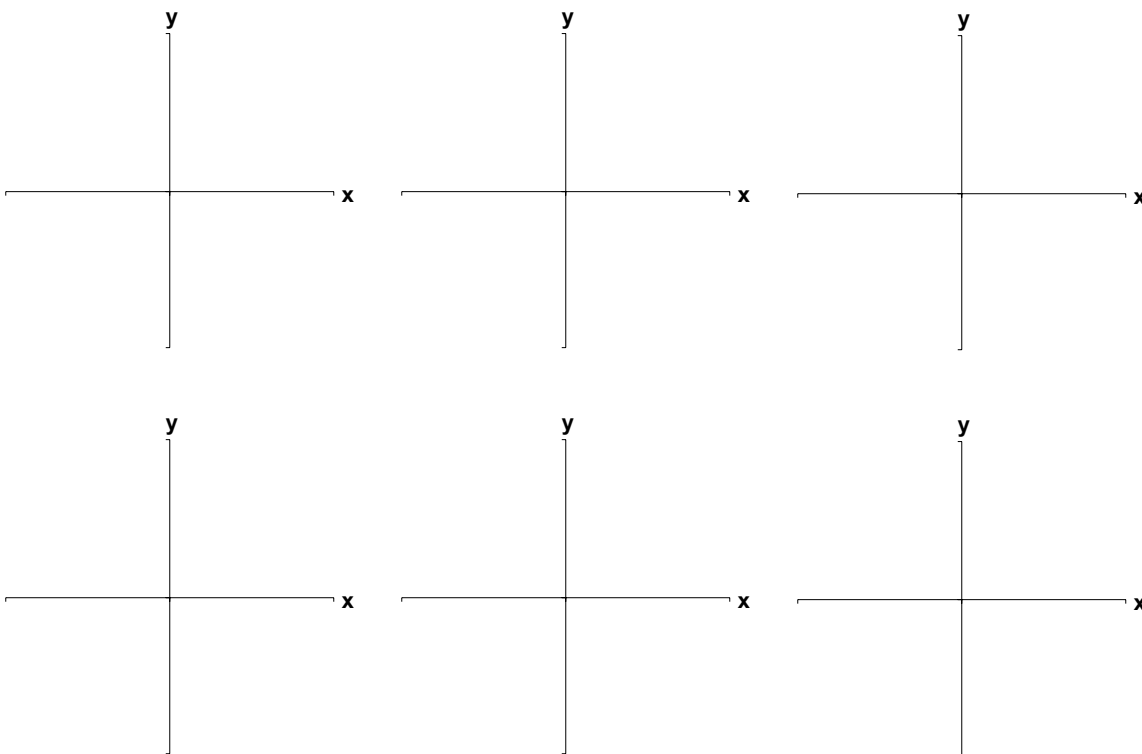
What does it mean to “solve a right triangle?”

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

An **angle of elevation** is . . .

An **angle of depression** is . . .

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

Additional notes**Homework Assignment**

Page(s)

Exercises