Section 6.2  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.

I. The Six Trigonometric Functions  (Pages 465–467)

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

\[
\begin{align*}
\text{Sine} & \quad \cdots \quad \text{Cosecant} & \quad \cdots \\
\text{Cosine} & \quad \cdots \quad \text{Secant} & \quad \cdots \\
\text{Tangent} & \quad \cdots \quad \text{Cotangent} & \quad \cdots \\
\end{align*}
\]

Let \( \theta \) be an acute angle of a right triangle. Define the six trigonometric functions of the angle \( \theta \) using \( \text{opp} \) = the length of the side opposite \( \theta \), \( \text{adj} \) = the length of the side adjacent to \( \theta \), and \( \text{hyp} \) = the length of the hypotenuse.

\[
\begin{align*}
\sin \theta & = \cdots & \cos \theta & = \cdots \\
\tan \theta & = \cdots & \csc \theta & = \cdots \\
\sec \theta & = \cdots & \cot \theta & = \cdots \\
\end{align*}
\]

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 $\tan \theta$.

![Diagram of a right triangle with labels](image)

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

$\sin 30^\circ = \sin \frac{\pi}{6} = \hspace{1cm}$
$\cos 30^\circ = \cos \frac{\pi}{6} = \hspace{1cm}$
$\tan 30^\circ = \tan \frac{\pi}{6} = \hspace{1cm}$
$\sin 45^\circ = \sin \frac{\pi}{4} = \hspace{1cm}$
$\cos 45^\circ = \cos \frac{\pi}{4} = \hspace{1cm}$
$\tan 45^\circ = \tan \frac{\pi}{4} = \hspace{1cm}$
$\sin 60^\circ = \sin \frac{\pi}{3} = \hspace{1cm}$
$\cos 60^\circ = \cos \frac{\pi}{3} = \hspace{1cm}$
$\tan 60^\circ = \tan \frac{\pi}{3} = \hspace{1cm}$

Cofunctions of complementary angles are _________. If $\theta$ is an acute angle, then:

$\sin(90^\circ - \theta) = \hspace{1cm}$ $\cos(90^\circ - \theta) = \hspace{1cm}$
$\tan(90^\circ - \theta) = \hspace{1cm}$ $\cot(90^\circ - \theta) = \hspace{1cm}$
$\sec(90^\circ - \theta) = \hspace{1cm}$ $\csc(90^\circ - \theta) = \hspace{1cm}$
II. Trigonometric Identities  (Pages 468–469)

List six reciprocal identities:

1) 

2) 

3) 

4) 

5) 

6) 

List two quotient identities:

1) 

2) 

List three Pythagorean identities:

1) 

2) 

3) 

III. Evaluating Trigonometric Functions with a Calculator  
(Pages 468–469)

To evaluate the secant function with a calculator, . . .

Example 2: Use a calculator to evaluate (a) $\tan 35.4^\circ$, and 
(b) $\cos 3$. 
IV. Applications Involving Right Triangles (Pages 470–471)

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

The term **angle of elevation** means . . .

The term **angle of depression** means . . .

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

Additional notes

![Diagram of right triangles with labels x and y]

**Homework Assignment**

Page(s)

Exercises