# Trig 1.3 ~ RIGHT TRIANGLE TRIGONOMETRY

In this lesson you will learn to:
- Evaluate trigonometric functions of acute angles in a right triangle.
- Use the fundamental trigonometric identities.
- Use a calculator to evaluate trigonometric functions.
- Use trigonometric functions to model and solve problems.

Right triangle with an acute angle θ.

Label the hypotenuse.
Label the side opposite θ .
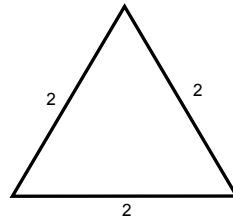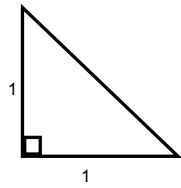Label the side adjacent to θ .

$\sin \theta$ =

$\cos \theta$ =

$\tan \theta$ =

$\csc \theta$ =

$\sec \theta$ =

$\cot \theta$ =
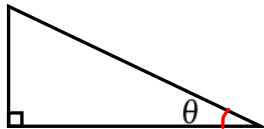
Let's verify with two special triangles:

sin 45º =	sin 60º =	sin 30º =
cos 45º =	cos 60º =	cos 30º =
tan 45º =	tan 60 º =	tan 30 º =

Notice that co-functions of complementary angles are equal.

sin (90º - θ) = cos θ

tan (90º - θ) =

sec (90º - θ) =

Trigonometric identities:

Reciprocal Identities:

$\sin \theta =$ $\cos \theta =$ $\tan \theta =$

Quotient Identities:

$\tan \theta =$ $\cot \theta =$

Pythagorean Identities:

$\sin^2 \theta + \cos^2 \theta = 1$

$1 + \tan^2 \theta = \sec^2 \theta$

$1 + \cot^2 \theta = \csc^2 \theta$

Example 1:

Two ways to get information:

Right triangle   Use identities

If $\tan \theta = 2$, find $\sec \theta$.

Using a calculator to evaluate trigonometric functions.

Use your calculator (be careful of the mode, radians or degrees) to determine these:
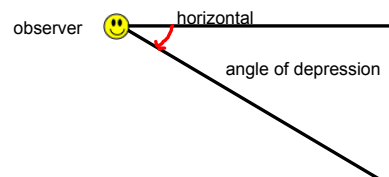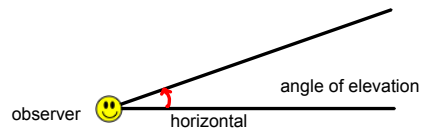
sin 35º   cos 75º   tan 20º

sec 24º   cot 15º   csc 80º

tan π/8   sec 3π/5   csc 2π/5

Angles when sighting

Example 2:

If you are standing 50 meters from the base of a tall building and you determine the angle of elevation to the top of the building to be 80°.
   a. Determine the height of the building.

b. If you wish to string a wire from you to the top of the building, how long does the wire need to be?