

Lesson 2: Right Triangle Trigonometry

We are now ready to explore trigonometric functions from two famous right triangles and how these relate to the unit circle. Similar geometric figures have the same shape. *Specifically, their angle measures are equal, and their sides are proportional.*

Trigonometric Functions

Let θ be an acute angle in the right triangle $\triangle ABC$ as shown, then

Sine

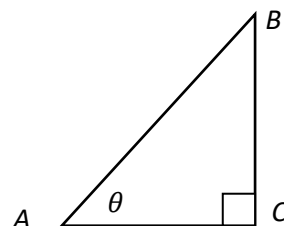
Cosecant

Cosine

Secant

Tangent

Cotangent



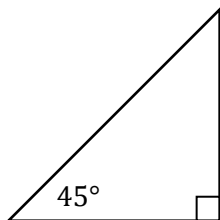
Two Famous Triangles

EX #1: The ratios for these two triangles will play an important role in our unit circle approach to trigonometry. Do you recall the ratios for each triangle from your geometry course?

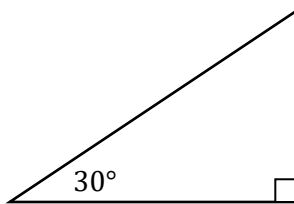
45°-45°-90° Triangle

30°-60°-90° Triangle

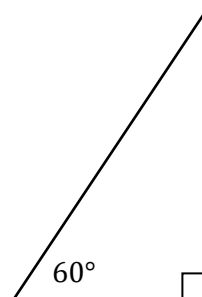
Ratio:



Ratio:



Ratio:



$$\sin 45^\circ =$$

$$\cos 45^\circ =$$

$$\tan 45^\circ =$$

$$\sin 30^\circ =$$

$$\cos 30^\circ =$$

$$\tan 30^\circ =$$

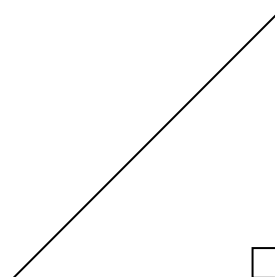
$$\sin 60^\circ =$$

$$\cos 60^\circ =$$

$$\tan 60^\circ =$$

Using One Trig Ratio to Find Others

EX #2: Let θ be an acute angle such that $\sin \theta = \frac{5}{6}$.
Evaluate the other five trigonometric functions of θ .



A. $\sin \theta =$

B. $\cos \theta =$

C. $\tan \theta =$

D. $\csc \theta =$

E. $\sec \theta =$

F. $\cot \theta =$

Getting Answers with a Calculator

EX #3: Find the approximate values for each of the following:

A. $\cos 30^\circ$

B. $\sin 45^\circ$

C. $\tan 90^\circ$

D. $\sin 15^\circ$

E. $\csc 45^\circ$

F. $\cot 45^\circ$

EX #4: A right triangle with a hypotenuse of 8 includes a 36° angle. Find the lengths of the other two sides and the measures of the other two angles.

EX #5: The sides of a rectangle are 8 in and 25 in. What is the measure, to the *nearest degree*, of the angle formed by the short side and a diagonal of the rectangle?

EX #6: Sketch a right triangle corresponding to $\tan \theta = 3$. Use the Pythagorean Theorem to determine the third side and then find the other five trigonometric functions of θ .

Application: Finding the Height of a Building

EX #7: From a point 340-feet away from the base of the Peachtree Center Plaza in Atlanta, the angle of elevation to the top of the building is 65° . Find the height of the building.

