

4.3...RIGHT TRIANGLE TRIGONOMETRY (DAY ONE)

THE SIX TRIGONOMETRIC FUNCTIONS

sine

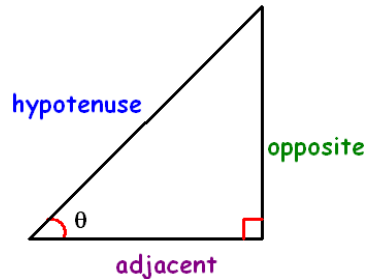
cosecant

cosine

secant

tangent

cotangent



RIGHT TRIANGLE DEFINITIONS OF TRIGONOMETRIC FUNCTIONS

Let θ be an acute angle of a right triangle. Then the six trigonometric functions of angle θ are defined as follows:

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\csc \theta = \frac{\text{hyp}}{\text{opp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\sec \theta = \frac{\text{hyp}}{\text{adj}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

$$\cot \theta = \frac{\text{adj}}{\text{opp}}$$

REMEMBER: **Soh-Cah-Toa**

EXAMPLE #1... True or false.

A. $\sec \theta = \frac{1}{\csc \theta}$

B. $\sin 45^\circ = 1$

C. $\frac{2\pi}{3} \text{ rad} = 120^\circ$

EXAMPLE #2...A right triangle has legs of length 2 and 5. Find the exact value of each of the six trigonometric functions.

$$\sin \theta =$$

$$\csc \theta =$$

$$\cos \theta =$$

$$\sec \theta =$$

$$\tan \theta =$$

$$\cot \theta =$$

COFUNCTION IDENTITIES	
If θ is an acute angle, then the following are true:	
$\sin(90^\circ - \theta) = \cos \theta$	$\cos\left(\frac{\pi}{2} - \theta\right) = \sin \theta$
$\tan(90^\circ - \theta) = \cot \theta$	$\cot\left(\frac{\pi}{2} - \theta\right) = \tan \theta$
$\sec(90^\circ - \theta) = \csc \theta$	$\csc\left(\frac{\pi}{2} - \theta\right) = \sec \theta$

EXAMPLE: $\sin 30^\circ = \frac{1}{2} = \cos 60^\circ$

This occurs because 30° and 60° are **COMPLEMENTARY ANGLES**.

COFUNCTIONS OF COMPLEMENTARY ANGLES ARE EQUAL

EXAMPLE #3...Find each value of θ in degrees ($0^\circ < \theta < 90^\circ$) and radians ($0 < \theta < \frac{\pi}{2}$) without using a calculator.

A. $\sin \theta = \frac{\sqrt{3}}{2}$

B. $\tan \theta = \sqrt{3}$

C. $\sec \theta = \sqrt{2}$