# Introduction to Trigonometric Ratios

*There are six trigonometric ratios that you should know: sine, cosine, tangent, cotangent, secant, and cosecant. They are abbreviated sin, cos, tan, cot, sec, and csc, respectively.

*These ratios relate the lengths of two sides of a given triangle. From any given angle, one can designate the following sides: adjacent, opposite, and the hypotenuse.
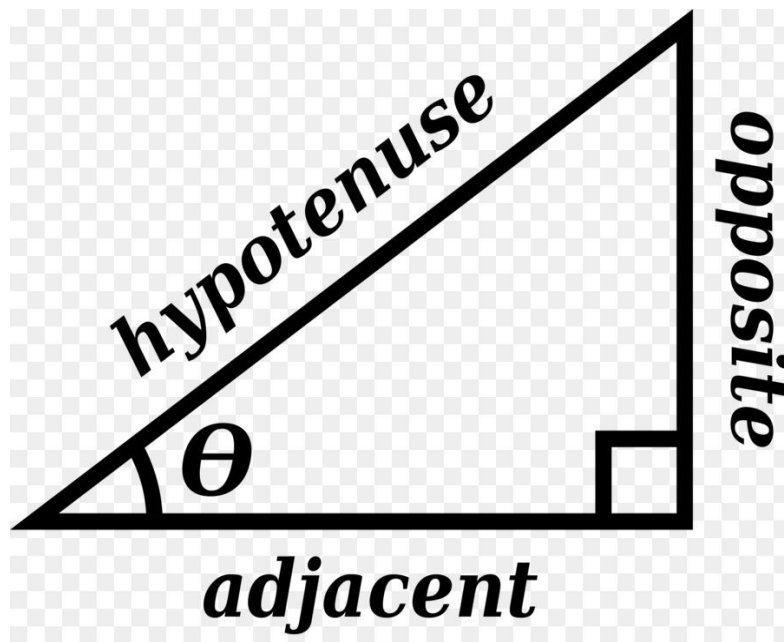
*Below are the six trigonometric ratios defined In terms of lengths of sides of the triangle.

$$\sin \Theta = \frac{opposite}{hypotenuse} \qquad \cos \Theta = \frac{adjacent}{hypotenuse} \qquad \tan \Theta = \frac{opposite}{adjacent}$$

$$\csc \Theta = \frac{hypotenuse}{opposite} \qquad \sec \Theta = \frac{hypotenuse}{adjacent} \qquad \cot \Theta = \frac{adjacent}{opposite}$$

*Here is an illustration that relates the first three trigonometric ratios.
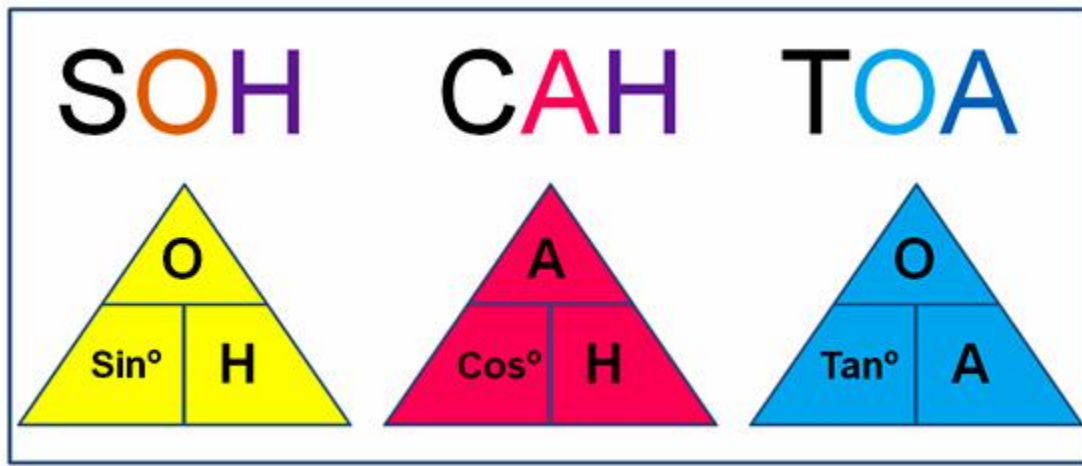
*Example 1: The lengths of the sides of a given right triangle are as follows:

    Adjacent = 3 inches   Opposite = 4 inches   Hypotenuse = 5 inches

$\sin \Theta = \frac{4}{5}$ $\cos \Theta = \frac{3}{5}$ $\tan \Theta = \frac{4}{3}$ $\csc \Theta = \frac{5}{4}$ $\sec \Theta = \frac{5}{3}$ $\cot \Theta = \frac{3}{4}$

*Example 2: For the given triangle with the given side lengths, determine the six trigonometric ratios.

1 m $\sqrt{10}$ m

Θ

3 m