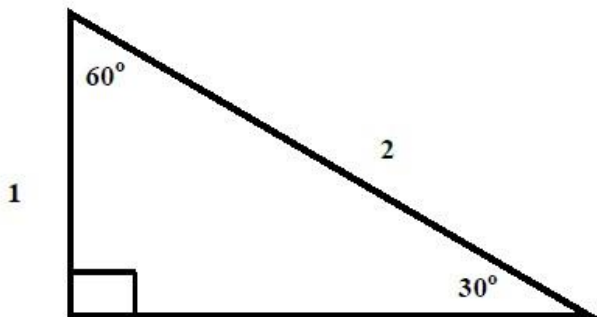


Trigonometry Fundamentals and the Unit Circle

The six trigonometric functions sine, cosine, tangent, cosecant, secant, cotangent are derived from relationships with right triangles. Common values result from two right triangles:

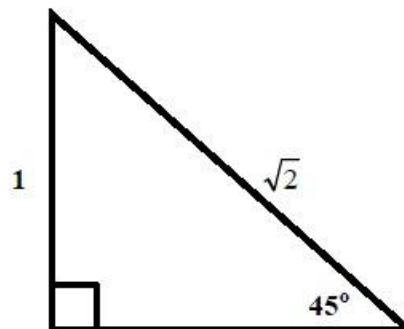


$$\sin(30^\circ) = \frac{\text{OPP}}{\text{HYP}} = \frac{1}{2}$$

$$\cos(30^\circ) = \frac{\text{ADJ}}{\text{HYP}} = \frac{\sqrt{3}}{2}$$

$$\tan(30^\circ) = \frac{\text{OPP}}{\text{ADJ}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

(Note: values for 60° are found similarly.)



$$\sin(45^\circ) = \frac{\text{OPP}}{\text{HYP}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\cos(45^\circ) = \frac{\text{ADJ}}{\text{HYP}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\tan(45^\circ) = \frac{\text{OPP}}{\text{ADJ}} = \frac{1}{1} = 1$$

“SOH CAH TOA”



SOH $\sin \theta = \frac{\text{OPP}}{\text{HYP}}$

CAH $\cos \theta = \frac{\text{ADJ}}{\text{HYP}}$

TOA $\tan \theta = \frac{\text{OPP}}{\text{ADJ}}$

csc $\theta = \frac{\text{HYP}}{\text{OPP}}$

sec $\theta = \frac{\text{HYP}}{\text{ADJ}}$

cot $\theta = \frac{\text{ADJ}}{\text{OPP}}$

“All Students Take Calculus”

Students	All
Sin positive sin: + cos: - tan: -	All positive sin: + cos: + tan: +
Take	Calculus
Tan positive sin: - cos: - tan: +	Cos positive sin: - cos: + tan: -

The Unit Circle – the center at the origin; a radius of 1.

Coordinates of $(\cos \theta, \sin \theta)$

