

Trigonometric Ratios

Triangles in Quadrant I

a *Trig Ratio* is ...

... a ratio of the lengths of two sides of a right Δ

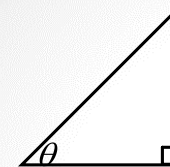
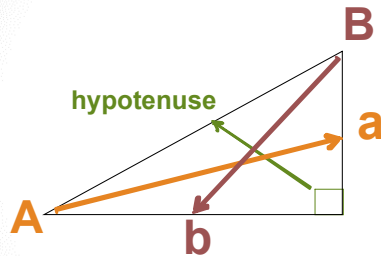
3 Basic Trig Ratios

- Sine (sin)
- Cosine (cos)
- Tangent (tan)

These trig ratios (or trig functions) can be used to SOLVE a right triangle ... that means to find all the side lengths and angle measures of the right triangle.

Right Triangles

- The hypotenuse is opposite the right angle.
- The shortest leg is opposite the smallest angle.
- The longest leg is opposite the largest angle.



- $\sin\theta = \frac{\textit{opposite}}{\textit{hypotenuse}}$
- $\cos\theta = \frac{\textit{adjacent}}{\textit{hypotenuse}}$
- $\tan\theta = \frac{\textit{opposite}}{\textit{adjacent}}$

Just remember Chief...

SOHCAHTOA

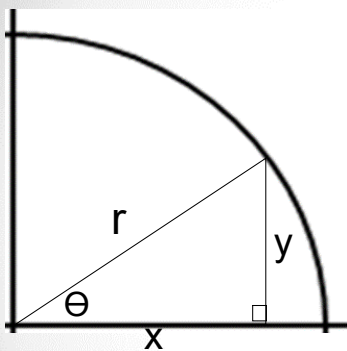
ine pposite ypotenuse osine djacent ypotenuse angent pposite djacent

Each trig function has a **RECIPROCAL** function.

- sine → cosecant (csc)
- cosine → secant (sec)
- tangent → cotangent (cot)

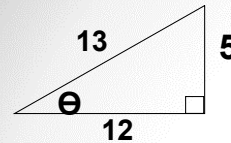
$$\begin{array}{lll} \sin \theta = \frac{opp}{hyp} & \cos \theta = \frac{adj}{hyp} & \tan \theta = \frac{opp}{adj} \\ \csc \theta = \frac{hyp}{opp} & \sec \theta = \frac{hyp}{adj} & \cot \theta = \frac{adj}{opp} \end{array}$$

Six Trig Ratios of $\angle \Theta$



$$\begin{array}{ll} \sin \theta = \frac{y}{r} & \csc \theta = \frac{r}{y} \\ \cos \theta = \frac{x}{r} & \sec \theta = \frac{r}{x} \\ \tan \theta = \frac{y}{x} & \cot \theta = \frac{x}{y} \end{array}$$

Ex. 1 Find the ratios for the 6 trig functions.

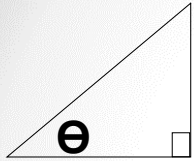


$$\begin{array}{ll} \sin \Theta = & \csc \Theta = \\ \cos \Theta = & \sec \Theta = \\ \tan \Theta = & \cot \Theta = \end{array}$$

Ex. 2 Find the ratios for the 6 trig functions.

*Use Pythagorean Theorem
to find the missing side length!*

Given: $\csc \theta = 5/3$



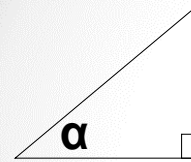
$$\sin \theta = \quad \csc \theta =$$

$$\cos \theta = \quad \sec \theta =$$

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

Ex. 3 Find the ratios for the 6 trig functions.

Given: $\tan \alpha = 4$



$$\sin \alpha = \quad \csc \alpha =$$

$$\cos \alpha = \quad \sec \alpha =$$

$$\tan \alpha = \quad \cot \alpha =$$