

6 Trigonometric Ratios

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} (y) \quad \csc \theta = \frac{\text{hyp}}{\text{opp}} \left(\frac{1}{y} \right)$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}} (x) \quad \sec \theta = \frac{\text{hyp}}{\text{adj}} \left(\frac{1}{x} \right)$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}} \left(\frac{y}{x} \right) \quad \cot \theta = \frac{\text{adj}}{\text{opp}} \left(\frac{x}{y} \right)$$

✳ on the unit circle ✳

Examples

① Find all 6 trig ratios @ 45°

$$\sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\csc 45^\circ = \frac{2}{\sqrt{2}} \rightarrow \sqrt{2}$$

$$\cos 45^\circ = \frac{\sqrt{2}}{2}$$

$$\sec 45^\circ = \frac{2}{\sqrt{2}} \rightarrow \sqrt{2}$$

$$\tan 45^\circ = \frac{\sqrt{2}}{2} = 1$$

$$\cot 45^\circ = 1$$

Keep
change
flip!
 $\frac{\sqrt{2}}{2}$

$$\frac{\sqrt{2}}{2} \cdot \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2\sqrt{2}} = 1$$

$$\begin{aligned} \frac{2\sqrt{2}}{\sqrt{2}\sqrt{2}} &= \frac{2\sqrt{2}}{\sqrt{4}} \\ &= \frac{2\sqrt{2}}{2} = \sqrt{2} \end{aligned}$$

② Find all 6 trig ratios @ π

$$\sin \pi = \underline{0}$$

$$\cos \pi = \underline{-1}$$

$$\tan \pi = \frac{y}{x} = \frac{0}{-1} = \underline{0}$$

$$\csc \pi = \frac{1}{0} \text{ undefined}$$

$$\sec \pi = \underline{-1}$$

$$\cot \pi = \frac{-1}{0} \text{ undefined}$$

can't ÷ by 0 ;)

#5 HW $\sec \frac{2\pi}{3} = \underline{-2}$

① $\cos \frac{2\pi}{3} = -\frac{1}{2}$ ② Reciprocal!

#11 HW $\cos -30^\circ = \underline{\frac{\sqrt{3}}{2}}$