

Math Class 11 Chapter 9 Formulae



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CONVERSION OF DEGREE INTO RADIAN AND RADIAN INTO DEGREE

$$1 \text{ Radian} = \left(\frac{180}{\pi}\right) \text{Degrees} \approx 57.3^\circ$$

$$1 \text{ Degree} = \left(\frac{\pi}{180}\right) \text{Radian} \approx 0.0175 \text{ rad}$$

$\Rightarrow$ Note: π radian = 180°

RELATION BETWEEN ARC-LENGTH, RADIUS AND GENERAL ANGLE

$$S = \theta r$$

where "**S**" is arc length of circle, " **θ** " is angle at the center of circle and "**r**" is radius of circle.

$\Rightarrow$ Note: Unit circle is a circle having radius of 1 unit.

TRIGNOMETRIC RATIOS/FUNCTIONS

$$1. \sin = \frac{P}{H}$$

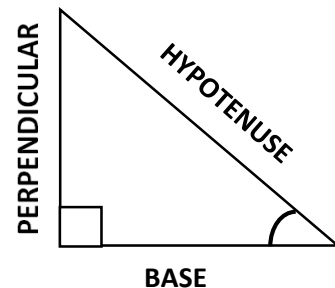
$$2. \cos = \frac{B}{H}$$

$$3. \tan = \frac{P}{B}$$

$$4. \cot = \frac{B}{P}$$

$$5. \sec = \frac{H}{B}$$

$$6. \csc = \frac{H}{P}$$



AL-HUDA SCIENCE ACADEMY

VALUES OF TRIGNOMETRIC FUNCTION WHEN ANGLE IS (-VE)

$$\sin(-\theta) = -\sin \theta$$

$$\cos(-\theta) = \cos \theta$$

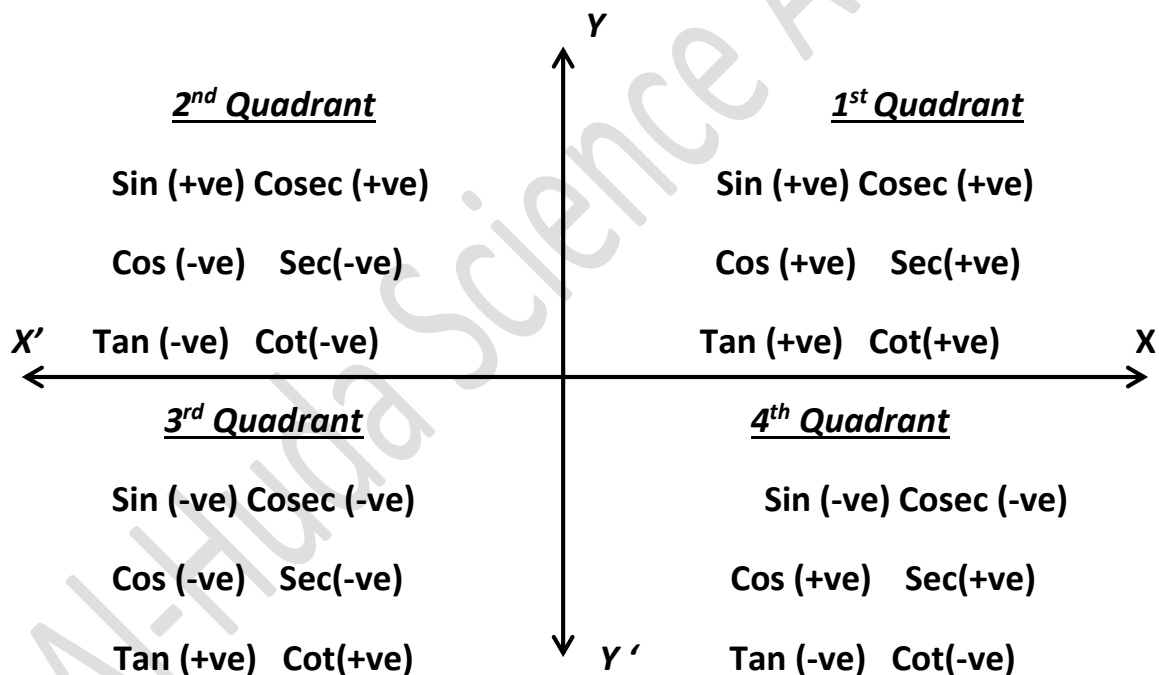
$$\tan(-\theta) = -\tan \theta$$

$$\cot(-\theta) = -\cot \theta$$

$$\sec(-\theta) = \sec \theta$$

$$\csc(-\theta) = -\csc \theta$$

VALUE OF TRIG: RATIOS IN FOUR QUADRANTS



FUNDAMENTAL TRIGNOMETRIC IDENTITIES

1. $\sin^2 \theta + \cos^2 \theta = 1$

$$\Rightarrow \sin^2 \theta = 1 - \cos^2 \theta$$

$$\Rightarrow \cos^2 \theta = 1 - \sin^2 \theta$$

2. $1 + \tan^2 \theta = \sec^2 \theta$

$$\Rightarrow \sec^2 \theta - \tan^2 \theta = 1$$

3. $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$

$$\Rightarrow \operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

RECIPROCAL RELATION BETWEEN TRIGONOMETRIC RATIOS

$$\operatorname{cosec} \theta = \frac{1}{\sin \theta} \quad \Rightarrow \sin \theta = \frac{1}{\operatorname{cosec} \theta}$$

$$\sec \theta = \frac{1}{\cos \theta} \quad \Rightarrow \cos \theta = \frac{1}{\sec \theta}$$

$$\cot \theta = \frac{1}{\tan \theta} \quad \Rightarrow \tan \theta = \frac{1}{\cot \theta}$$

Note: The product of two reciprocal trigonometric functions to each other is 1.
i.e; $\cos \theta \cdot \sec \theta = 1$

QUOTIENT FORMS

$$\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \cot \theta = \frac{\cos \theta}{\sin \theta}$$