

CHAPTER 08

Introduction to Trigonometry

Synopsis:

Trigonometric ratios:

In right angle triangle, the ratio of sides of a right angles triangle is called the 'Trigonometric ratio of angles'.

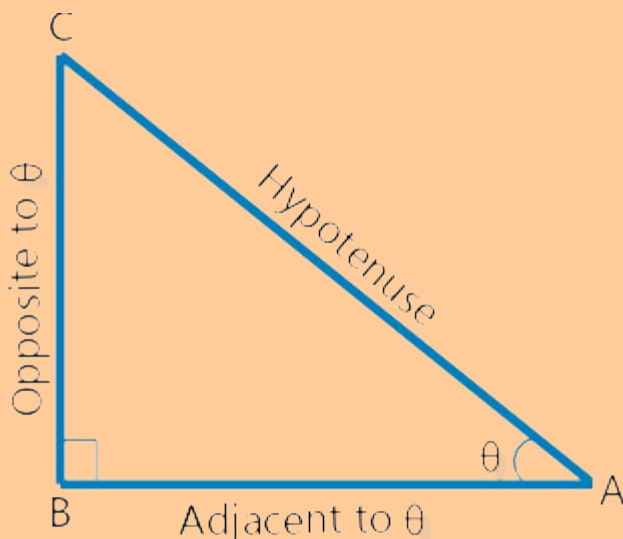
Consider a right – angled $\triangle ABC$ with $\angle B = 90^\circ$ w.r.t its acute

$\angle A = \theta$ (Say)

BC = Side opposite to θ is called Opposite side (θ)

AB = Side adjacent to θ is called Adjacent side (A)

AC = Side opposite to 90° is called Hypotenuse (H)



The trigonometric ratios of $\angle A$, i.e. θ in the right – angled $\triangle ABC$ (**Angle of reference**) are defined as below:

There are six trigonometric ratios in the right angle triangle ABC.

- The ratio $\frac{BC}{AC}$ is called the Sine of A and is written as SinA.

$$\text{i.e. } \sin A = \frac{\text{Opposite side}}{\text{Hypotenuse}} = \frac{O}{H}$$

- The ratio $\frac{AB}{AC}$ is called the Cosine of A and is written as CosA.

$$\text{i.e. } \cos A = \frac{\text{Adjacent side}}{\text{Hypotenuse}} = \frac{A}{H}$$

- The ratio $\frac{BC}{AB}$ is called the Tangent of A and is written as TanA.

$$\text{i.e. } \tan A = \frac{\text{Opposite side}}{\text{Adjacent side}} = \frac{O}{A}$$

- The ratio $\frac{AB}{BC}$ is called the Cotangent of A and is written as CotA.

$$\text{i.e. CotA} = \frac{\text{Adjacent side}}{\text{Opposite side}} = \frac{A}{O}$$

- The ratio $\frac{AC}{AB}$ is called the Secant of A and is written as SecA.

$$\text{i.e. SecA} = \frac{\text{Hypotenuse}}{\text{Adjacent side}} = \frac{H}{A}$$

- The ratio $\frac{AC}{BC}$ is called the Cosecant of A and is written as CosecA.

$$\text{i.e. CosecA} = \frac{\text{Hypotenuse}}{\text{Opposite side}} = \frac{H}{O}$$

Note:



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Multiplicative Inverse of

$$\text{SinA} = \text{CosecA}$$

$$\text{CosA} = \text{SecA}$$

$$\text{TanA} = \text{CotA}$$

- SinA is one symbol and SinA does not mean $\text{Sin} \times A$.

Similarly, in the case for other trigonometric ratios.

- $\sin^k A = (\sin A)^k$ but $\sin(A^k) \neq (\sin A)^k$, where 'k' is any natural number.
- The value of $\sin A$ or $\cos A$ is always less than 1 (Or in particular equal to 1).
- Every trigonometric ratio is a real number.
- In short, trigonometric ratio are written as t – ratios.

