

CBSE Class 10 MATHEMATICS
Revision Notes
CHAPTER 8
INTRODUCTION TO TRIGONOMETRY

- **Trigonometry** literally means measurement of sides and angles of a triangle.
- **Positive and Negative angles:** Angles in anti-clockwise direction are taken as positive angles and angles in clockwise direction are taken as negative angles.
- **Trigonometric Ratios of an acute angle of a right angled triangle:**

1. In a right triangle ABC, right-angled at B,

$$2. \sin A = \frac{\text{side opposite to angle } A}{\text{hypotenuse}}$$

$$3. \cos A = \frac{\text{side adjacent to angle } A}{\text{hypotenuse}}$$

$$4. \tan A = \frac{\text{side opposite to angle } A}{\text{side adjacent to angle } A}$$

$$5. \cot A = \frac{\text{Hypotenuse}}{\text{Side opposite to angle } A}$$

$$6. \sec A = \frac{\text{Hypotenuse}}{\text{Side adjacent to angle } A}$$

$$\operatorname{cosec} A = \frac{1}{\sin A}; \quad \sec A = \frac{1}{\cos A}$$

$$\tan A = \frac{1}{\cot A}, \quad \cot A = \frac{\sin A}{\cos A}$$

$$\cot A = \frac{1}{\tan A}, \quad \tan A = \frac{\cos A}{\sin A}$$

- If one of the trigonometric ratios of an acute angle is known, the remaining trigonometric ratios of the angle can be easily determined.

(a) Find the sides of the right triangle in terms of k.

(b) Use Pythagoras Theorem and find the third side of the right triangle.

(c) Use definitions of t-ratios and substitute the values of sides.

(d) k is cancelled from numerator and denominator and the value of t-ratio is obtained.

- **Trigonometric Ratios of some specified angles:**

The values of trigonometric ratios for angles 0° , 30° , 45° , 60° and 90° .

Angle A	0°	30°	45°	60°	90°
$\sin A$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos A$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan A$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
$\cot A$	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\operatorname{cosec} A$	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
$\sec A$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞

- The value of $\sin A$ or $\cos A$ never exceeds 1, whereas the value of $\sec A$ or $\operatorname{cosec} A$ is always greater than or equal to 1.

- **Trigonometric Ratios of Complementary Angles:**

$$\sin(90^\circ - A) = \cos A, \quad \cos(90^\circ - A) = \sin A;$$

$$\tan(90^\circ - A) = \cot A, \quad \cot(90^\circ - A) = \tan A;$$

$$\sec(90^\circ - A) = \operatorname{cosec} A, \quad \operatorname{cosec}(90^\circ - A) = \sec A.$$

- **Trigonometric Identities:**

$$\sin^2 A + \cos^2 A = 1$$

$$\sec^2 A - \tan^2 A = 1 \quad \text{for } 0^\circ \leq A < 90^\circ,$$

$$\operatorname{cosec}^2 A - \cot^2 A = 1 \quad \text{for } 0^\circ < A \leq 90^\circ.$$