# # Trigonometry

Syllabus.
- Trigonometric ratio of an acute angle of a right-angled triangle.
- Value of Trigonometric ratios of $30°$, $45°$ and $60°$.
- Relationships between the ratios.
- Trigonometric Identity
- Angle of elevation
- Angle of Despression.

Trigonometric Ratio

The ratios of the sides of a right angled triangle with respect to its acute angles, are called Trigonometric Ratios.
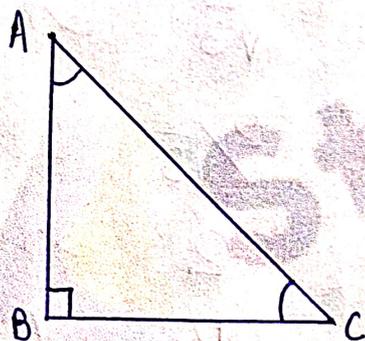
Angle of referance $\angle A$	Angle of referance $\angle C$
perpendicular = BC	perpendicular = AB
Base = AB	Base = BC
hypotenuse = AC	hypotenuse = AC

$$\underset{\text{Pandit (P)}}{\sin A} \quad \underset{\text{Badari(b)}}{\cos A} \quad \underset{\text{Prasad (P)}}{\tan A}$$
$$\underset{\text{Har (h)}}{} \quad \underset{\text{Har (h)}}{} \quad \underset{\text{Bholay(b)}}{}$$

$$\sin\theta = \frac{P}{h} \quad , \quad cosec\,\theta = \frac{h}{P} \quad , \quad \sin\theta \times cosec\,\theta = 1$$

$$\cos\theta = \frac{b}{h} \quad , \quad \sec\theta = \frac{h}{b} \quad , \quad \cos\theta \times \sec\theta = 1$$

$$\tan\theta = \frac{P}{b} \quad , \quad \cot\theta = \frac{b}{P} \quad , \quad \tan\theta \times \cot\theta = 1$$

$$P = Perpendicular \quad , \quad b = base \quad , \quad h = hypotenuse$$

Pythagoras Theorem
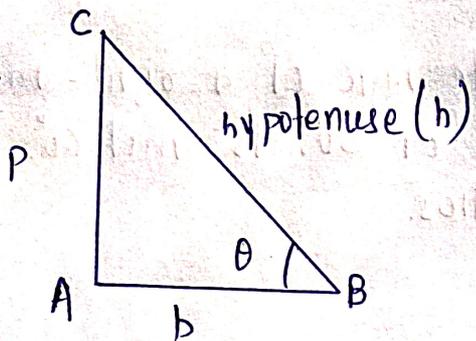
$$BC^2 = AB^2 + AC^2$$

$$h^2 = P^2 + b^2$$

Trigonometric Ratios of Some Specific Angles

	$0°$	$30°$	$45°$	$60°$	$90°$
$\sin\theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
$\csc\theta$	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
$\cot\theta$	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0

Trigonometric Identities

# $\sin^2\theta + \cos^2\theta = 1$	# $\sec^2\theta - \tan^2\theta = 1$	# $\csc^2\theta - \cot^2\theta = 1$
# $\sin^2\theta = 1 - \cos^2\theta$	# $\sec^2\theta = 1 + \tan^2\theta$	# $\csc^2\theta = 1 + \cot^2\theta$
# $\cos^2\theta = 1 - \sin^2\theta$	# $\tan^2\theta = \sec^2\theta - 1$	# $\cot^2\theta = \csc^2\theta - 1$

$\tan\theta = \dfrac{\sin\theta}{\cos\theta}$

$\cot\theta = \dfrac{\cos\theta}{\sin\theta}$
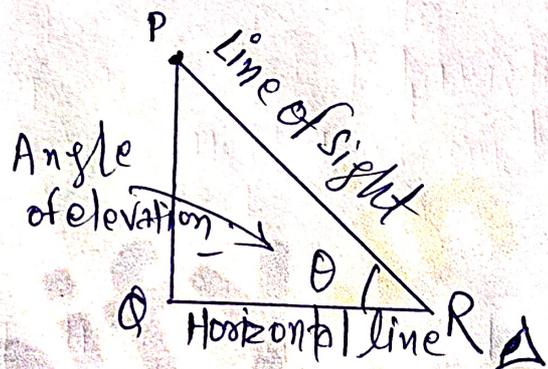
Height and Distance
Some Applications of Trigonometry

Line of Sight

The line of sight is the line drawn from the eye of an observer to the point in the object viewed by the observer.
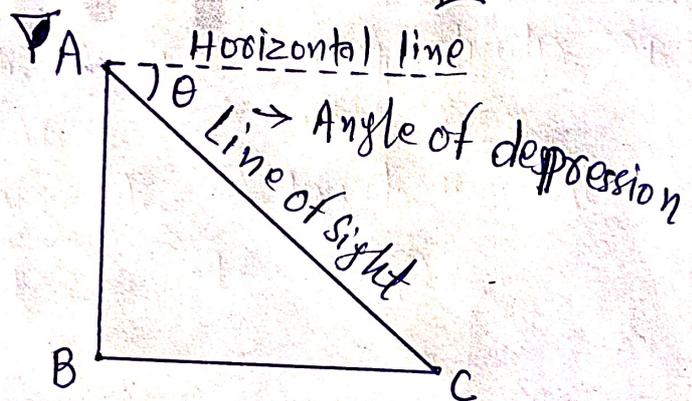
Angle of Elevation

The angle formed by the line of sight with the horizontal. (Bottom to Top)

Angle of Depression

The angle formed by the line of sight with the horizobl. (Top to Bottom).

── The End ──→