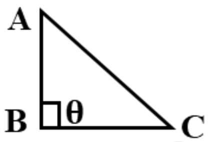
MIND MAP

Introduction to Trigonometry

Trigonometry

A branch of mathematics in which we study the relationships between the sides and angles of a triangle, is called trigonometry.

In a right triangle ABC.



$\sin\theta = \dfrac{\text{side opposite to angle } \theta}{\text{hypotenuse}}$,

$\cos\theta = \dfrac{\text{side adjacent to angle } \theta}{\text{hypotenuse}}$,

$\tan\theta = \dfrac{\text{side opposite to angle } \theta}{\text{side adjacent to angle } \theta}$

$\text{cosec}A = \dfrac{1}{\sin A}$; $\sec A = \dfrac{1}{\cos A}$;

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

Remarks :

1. sin A. cosec A = 1
2. cos A. sec A = 1
3. tan A. cot A = 1

Trigonometry → Tri Gonos Metron → Measuring Triangle

Important trigonometric identities:

$\boxed{\sin^2 A + \cos^2 A = 1}$

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

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

$\boxed{1 + \tan^2 A = \sec^2 A}$

$\sec^2 A - \tan^2 A = 1$

$\tan^2 A = \sec^2 A - 1$

$\boxed{1 + \cot^2 A = \text{cosec}^2 A}$

$\text{cosec}^2 A - \cot^2 A = 1$

$\cot^2 A = \text{cosec}^2 A - 1$

Trigonometric Ratios of specific angles

Ratio \ Angle θ	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	$\sqrt{3}$	N. D.
$\cot\theta$	N. D.	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	N. D.
$\text{cosec}\,\theta$	N. D.	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

Trigonometric ratios of complementary angles.

(i) $\sin(90^\circ - \theta) = \cos\theta$

(ii) $\cos(90^\circ - \theta) = \sin\theta$

(iii) $\tan(90^\circ - \theta) = \cot\theta$

(iv) $\cot(90^\circ - \theta) = \tan\theta$

(v) $\sec(90^\circ - \theta) = \text{cosec}\theta$

(vi) $\text{cosec}(90^\circ - \theta) = \sec\theta$