

MISSION SELECTION

एसएससी CGL/CHSL/CPO SERIES



MATHS

Trigonometry (त्रिकोणमिति)

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MATHEMATICS INTERACTIVE CLASS (MIC) BATCH STARTS ON EVERY WEDNESDAY

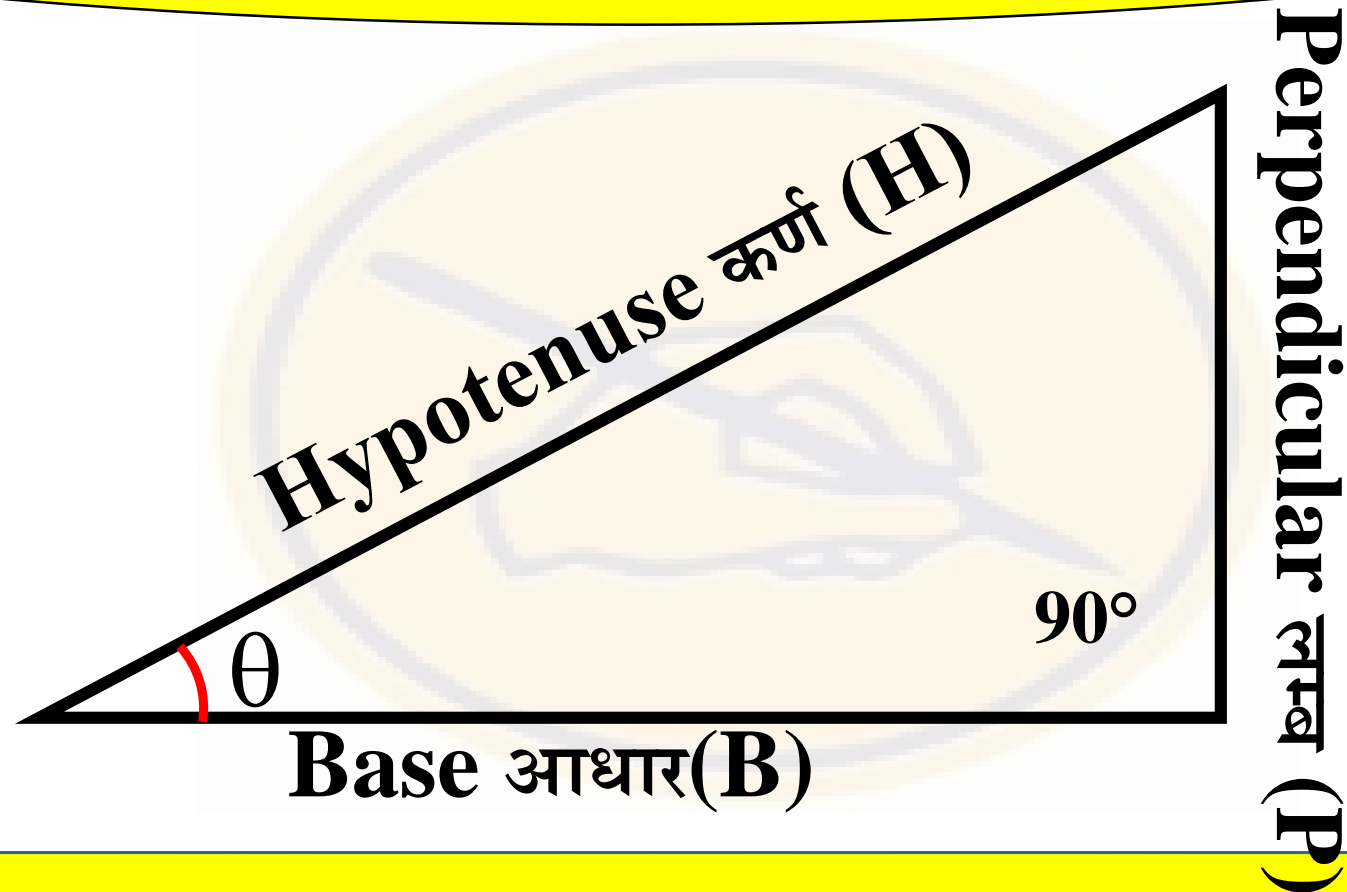
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Trigonometry

त्रिकोणमिती

RIGHT ANGLED TRIANGLE

समकोण त्रिभुज

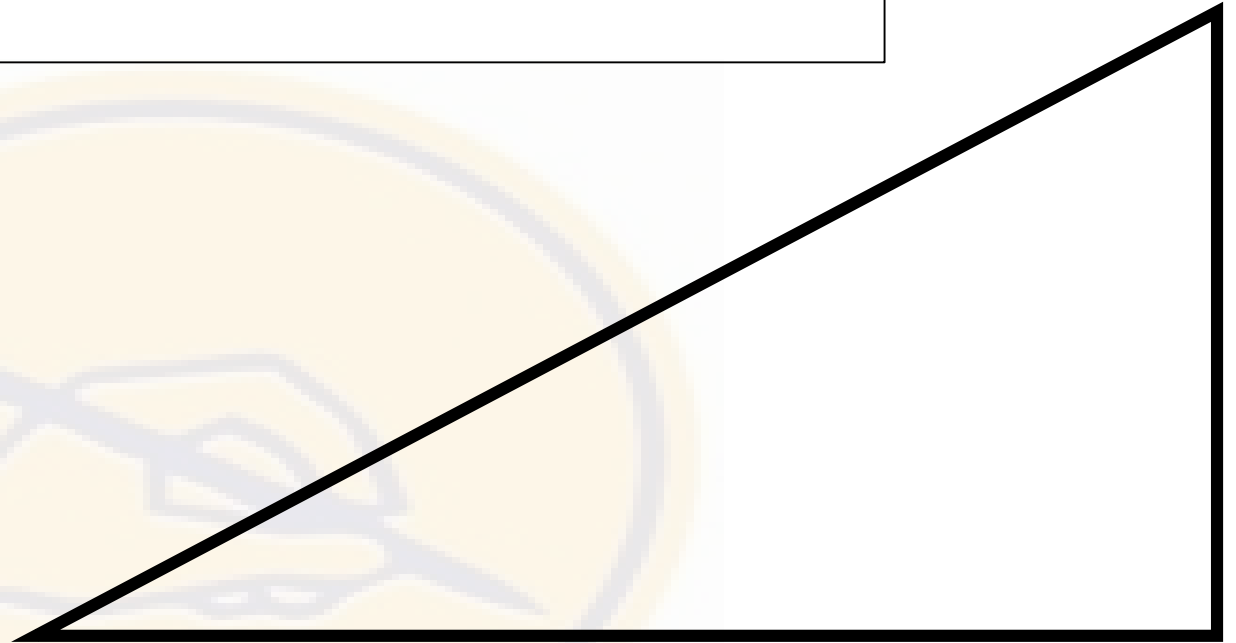


Trigonometric Ratio

त्रिकोणमितीय अनुपात

Values of Trigonometric ratio of angle θ .

त्रिकोणमितीय फलन के कोण θ के मान





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Trigonometric Table

त्रिकोणमितीय तालिका

θ	0°	30°	45°	60°	90°
Trigonometric functions	$\sqrt{0/4}$	$\sqrt{1/4}$	$\sqrt{2/4}$	$\sqrt{3/4}$	$\sqrt{4/4}$
$\sin \theta$	0	$1/2$	$1/\sqrt{2}$	$\sqrt{3}/2$	1
$\cos \theta$	1	$\sqrt{3}/2$	$1/\sqrt{2}$	$1/2$	0
$\tan \theta$	0	$1/\sqrt{3}$	1	$\sqrt{3}$	∞
$\cot \theta$	∞	$\sqrt{3}$	1	$1/\sqrt{3}$	0
$\sec \theta$	1	$2/\sqrt{3}$	$\sqrt{2}$	2	∞
$\operatorname{cosec} \theta$	∞	2	$\sqrt{2}$	$2/\sqrt{3}$	1

Basic Trigonometric Identities

मूल त्रिकोणमितीय सर्वसमिकाएँ

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

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

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

$$\sec \theta + \tan \theta = \frac{1}{\sec \theta - \tan \theta}$$

$$\operatorname{cosec} \theta + \cot \theta = \frac{1}{\operatorname{cosec} \theta - \cot \theta}$$

Trigonometric Identities

त्रिकोणमितीय सर्वसमिकाएँ

addition identities

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\sin(A + B) \sin(A - B) = \sin^2 A - \sin^2 B$$
$$\cos(A + B) \cos(A - B) = \cos^2 B - \sin^2 A$$

Product Identities

$$2 \sin A \cos B = \sin(A + B) + \sin(A - B)$$

$$2 \cos A \cos B = \cos(A + B) + \cos(A - B)$$

$$2 \sin A \sin B = \cos(A - B) - \cos(A + B)$$

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Trigonometric Identities

त्रिकोणमितीय सर्वसमिकाएँ

Double Angle Identities

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

$$\cos 2A = \cos^2 A - \sin^2 A = 1 - 2\sin^2 A = 2\cos^2 A - 1 = \frac{1 - \tan^2 A}{1 + \tan^2 A}$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

Triple Angle Identities

$$\sin 3A = 3 \sin A - 4 \sin^3 A = 4 \sin(60^\circ - A) \cdot \sin A \cdot \sin(60^\circ + A)$$

$$\cos 3A = 4 \cos^3 A - 3 \cos A = 4 \cos(60^\circ - A) \cdot \cos A \cdot \cos(60^\circ + A)$$

$$\tan 3A = \frac{3 \tan A - \tan^3 A}{1 - 3 \tan^2 A} = \tan(60^\circ - A) \cdot \tan A \cdot \tan(60^\circ + A)$$

TYPES OF ANGLES

- 1) Acute angle(न्यून कोण) - less than 90°
- 2) Obtuse angle(अधिक कोण) - more than 90°
- 3) Right angle(सम कोण) - equal to 90°

RELATION OF ANGLES

- 1) Complementary angles(कोटिपूरक कोण) - Sum of two angles is 90°
- 2) Supplementary angle(पूरक कोण) - Sum of two angles is 180°

Units of ANGLE

कोणों की इकाई



COMPLEMENTARY ANGLES

कोटिपूरक कोण

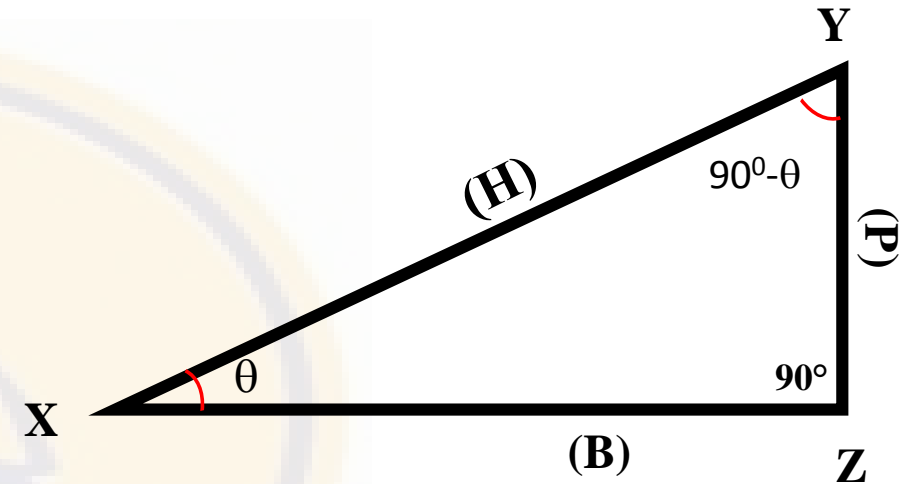
$$\begin{array}{ccc} \sin & \longleftrightarrow & \cos \\ \tan & \longleftrightarrow & \cot \\ \text{cosec} & \longleftrightarrow & \sec \\ (\theta) & & (90^\circ - \theta) \end{array}$$

EX:-

$$\sin A = \cos (90 - A)$$

$$\tan A = \cot (90 - A)$$

$$\sec(90 - A) = \text{cosec } A$$



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QUADRANT METHOD_(ASTC)

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1) Sign selection

2) Function selection



Rule – 1 : $90^0 \text{ or } 270^0$ \longleftrightarrow **Start** \longleftrightarrow **Change**

$\sin\theta \cos\theta, \tan\theta \cot\theta, \sec\theta \csc\theta$

Rule – 2 : $180^0 \text{ or } 360^0$ \longleftrightarrow **Start** \longleftrightarrow **No Change**

2) Function selection

$\sin\theta$	\longleftrightarrow	$\sin\theta$
$\cos\theta$	\longleftrightarrow	$\cos\theta$
$\tan\theta$	\longleftrightarrow	$\tan\theta$
$\cot\theta$	\longleftrightarrow	$\cot\theta$
$\sec\theta$	\longleftrightarrow	$\sec\theta$
$\csc\theta$	\longleftrightarrow	$\csc\theta$

1) Sign selection

S $\sin\theta$ & $\operatorname{cosec}\theta$ +ve

Quad II
 $90^\circ - 180^\circ$

$\sin\theta = +$
 $\cos\theta = -$
 $\tan\theta = -$
 $\cot\theta = -$
 $\sec\theta = -$
 $\operatorname{cosec}\theta = +$

Y-Axis

$\sin\theta = +$
 $\cos\theta = +$
 $\tan\theta = +$
 $\cot\theta = +$
 $\sec\theta = +$
 $\operatorname{cosec}\theta = +$

A ALL +ve

Quad I
 $0^\circ - 90^\circ$

T $\tan\theta$ & $\cot\theta$ +ve

Quad III
 $180^\circ - 270^\circ$

$\sin\theta = -$
 $\cos\theta = -$
 $\tan\theta = +$
 $\cot\theta = +$
 $\sec\theta = -$
 $\operatorname{cosec}\theta = -$

$\sin\theta = -$
 $\cos\theta = +$
 $\tan\theta = -$
 $\cot\theta = -$
 $\sec\theta = +$
 $\operatorname{cosec}\theta = -$

C $\cos\theta$ & $\sec\theta$ +ve

Quad IV
 $270^\circ - 360^\circ$

X-Axis



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