Class 10 Trigonometry

Trigonometric Ratios, Standard Values & Identities

Trigonometry is a branch of mathematics that deals with the **relationship between the angles and sides of a right-angled triangle**.

The main trigonometric ratios are **Sine (sin), Cosine (cos), Tangent (tan), Cotangent (cot), Secant (sec), and Cosecant (cosec)**.

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1 Trigonometric Ratios (Definitions)

For a right-angled triangle:

Ratio	Formula
sin θ	Perpendicular / Hypotenuse

Ratio	Formula
cos θ	Base / Hypotenuse
tan θ	Perpendicular / Base
cosec θ	1 / sin θ
sec θ	1 / cos θ
cot θ	1 / tan θ

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2 Trigonometric Values Table

(Standard Angles: 0°, 30°, 45°, 60°, 90°)

◆ Step 1: sin and cos values

Angle (θ)	0°	30°	45°	60°	90°
sin θ	0	1/2	1/√2	√3/2	1
cos θ	1	√3/2	1/√2	1/2	0

◆ Step 2: tan, cot, sec, cosec values

Angle (θ)	0°	30°	45°	60°	90°
tan θ	0	1/√3	1	√3	Not defined
cot θ	Not defined	√3	1	1/√3	0
sec θ	1	2/√3	√2	2	Not defined
cosec θ	Not defined	2	√2	2/√3	1

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3 Important Trigonometric Identities

◆ Reciprocal Identities

- $\sin \theta = 1 / \operatorname{cosec} \theta$
- $\cos \theta = 1 / \sec \theta$
- $\tan \theta = 1 / \cot \theta$

◆ Quotient Identities

- $\tan \theta = \sin \theta / \cos \theta$
- $\cot \theta = \cos \theta / \sin \theta$

◆ Pythagorean Identities

- $\sin^2\theta + \cos^2\theta = 1$
- $1 + \tan^2\theta = \sec^2\theta$
- $1 + \cot^2\theta = \text{cosec}^2\theta$

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4 Relationship Between Angles

- $\sin (90° - \theta) = \cos \theta$
- $\cos (90° - \theta) = \sin \theta$
- $\tan (90° - \theta) = \cot \theta$
- $\sec (90° - \theta) = \text{cosec } \theta$

- cosec (90° − θ) = sec θ

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5 Important Exam Points

- **sin 0° = 0 and cos 90° = 0**
- tan 90° and sec 90° are **not defined**
- cot 0° and cosec 0° are **not defined**
- Always **rationalize the denominator** (Class 10 rule)

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6 Common Mistakes to Avoid

- Writing wrong values of **tan 30° and cot 60°**
- Forgetting to rationalize √ in denominator
- Mixing up **sin and cos values**
- Using identities incorrectly

7️⃣ Quick Memory Trick (Sin Values)

For angles **0°, 30°, 45°, 60°, 90°**

- sin θ = √(0/4), √(1/4), √(2/4), √(3/4), √(4/4)
- cos θ = reverse of sin values

✅ Conclusion

Trigonometric tables and identities form the **foundation of Class 10 Trigonometry**.

By memorizing **standard values**, understanding **identities**, and practicing problems, you can easily score **full marks** in this chapter.