MATHS WITHOUT GUESSWORK · BOARD BOOSTER

Introduction to Trigonometry

LOCK THE SURE MARKS.
STRETCH FOR THE TOP.
PRACTISE THE BOARD WAY.

A board-exam practice companion for **CBSE Class 10 Mathematics**
Syllabus session 2026–27 · Standard (041)

🛡️ Secure Track | 🚀 Stretch Track | ~130 questions + 3 mini-mocks

Built around what the board actually tests

6 Ratios	0–90°	Identities
sin cos tan · cosec sec cot	the standard-angle table	$\sin^2 A + \cos^2 A = 1$

Original questions and solutions. Answers kept separate. Not a substitute for the NCERT textbook or your teacher.

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Trigonometry in the board paper

Know exactly how many marks are really at stake here — so you spend your effort where the paper pays.

◆ UNDERSTAND THE OFFICIAL NUMBER This chapter sits inside **Unit V — Trigonometry, worth 12 marks**, shared with "Some Applications of Trigonometry". Introduction to Trigonometry alone usually brings **4–6 marks**: an MCQ or two on ratios/values, a short "evaluate this expression" or "find the other ratios", and often a **3- or 5-mark identity proof**. CBSE publishes weightage per unit, not per chapter.

Where those marks usually fall (PYQ trend — based on past papers, not official)

Form it takes	Typical marks	What it tests
1–2 MCQ / Assertion-Reason	1–2	A standard-angle value, a reciprocal pair, "is this identity true?"
A VSA or SA	2–3	Evaluate an expression; given one ratio find the others
A 3- or 5-mark identity	3–5	Prove a trigonometric identity (the near-fixture)
A case study	4	Ramps, slopes, ratios read off a right triangle

★ SPOT THE CLUE WHAT'S IN THE 2026–27 SCOPE The current syllabus keeps the **six ratios**, the **standard-angle values**, and the **identities** ($\sin^2 A + \cos^2 A = 1$, and the simple ones that follow). It has **dropped** the trigonometric ratios of complementary angles. If an old guide shows $\sin(90° - A) = \cos A$ style questions, skip them.

Q6 sin 30° = A. 1/2 B. √3/2 C. 1/√2 D. 1

1 GUIDED ★

Q7 cos 60° = A. 1/2 B. √3/2 C. 0 D. 1

1 GUIDED ★

Q8 tan 45° = A. 0 B. 1 C. √3 D. 1/√3

1 GUIDED ★

Q9 sin 90° = A. 0 B. 1 C. 1/2 D. ∞

1 GUIDED

Q10 cos 0° = A. 0 B. 1 C. 1/2 D. √3/2

1 GUIDED

Q11 tan 60° = A. 1 B. √3 C. 1/√3 D. 2

1 GUIDED ★

Q12 sin 45° = A. 1/2 B. 1 C. 1/√2 D. √3/2

1 GUIDED

Q13 cot 45° = A. 0 B. 1 C. √3 D. ∞

1 GUIDED

Q14 $\sin^2 A + \cos^2 A$ = A. 0 B. 1 C. 2 D. sin A cos A

1 GUIDED ★

Q15 $1 + \tan^2 A$ = A. $\sec^2 A$ B. $\operatorname{cosec}^2 A$ C. $\cot^2 A$ D. $\sin^2 A$

1 GUIDED ★

Q16 $\sec^2 A - \tan^2 A$ = A. 0 B. 1 C. 2 D. $\tan^2 A$

1 PART-GUIDED ★

Q17 If sin A = 3/5, then cos A = A. 4/5 B. 5/4 C. 3/4 D. 5/3

1 PART-GUIDED ★

Q18 If tan A = 1, then A = A. 0° B. 30° C. 45° D. 60°

1 GUIDED ★

Q19 sin 30° + cos 60° = A. 1 B. 1/2 C. √3 D. 0

1 PART-GUIDED ★

Q20 2 tan 45° = A. 1 B. 2 C. √3 D. 0

1 GUIDED

Q21 cosec 90° = A. 0 B. 1 C. ∞ D. 2

1 PART-GUIDED

Q22 If cos A = 12/13, then sin A = A. 5/13 B. 13/12 C. 12/5 D. 5/12

1 PART-GUIDED ★

Q23 $\sin^2 30° + \cos^2 30°$ = A. 0 B. 1/2 C. 1 D. 3/4

1 GUIDED

Q24 tan 0° = A. 0 B. 1 C. ∞ D. √3

1 GUIDED

Q25 If sec A = 2, then cos A = A. 1/2 B. 2 C. √3/2 D. 1

1 PART-GUIDED ★

Q26 $\cos^2 45°$ = A. 1 B. 1/2 C. 1/√2 D. √3/2

1 PART-GUIDED

Q27 $1 + \cot^2 A$ = A. $\sec^2 A$ B. $\operatorname{cosec}^2 A$ C. $\tan^2 A$ D. 1

1 GUIDED ★

Very Short Answer (2-mark) set

22 two-mark questions. Substitute the standard values, show the step, simplify. Worked solutions in the Answer Key.

Q1 Evaluate sin 30° + cos 60°.

2 GUIDED ★

Q2 Evaluate 2 tan²45° + cos²30° − sin²30°.

2 PART-GUIDED ★

Q3 If sin A = 3/5, find cos A and tan A.

2 PART-GUIDED ★

Q4 Evaluate sin 60° cos 30° + cos 60° sin 30°.

2 PART-GUIDED ★

Q5 Using the identity sin²A + cos²A = 1, show that sec²A − tan²A = 1.

2 INDEPENDENT ★

Q6 If tan A = 1, find A and sin A.

2 GUIDED

Q7 Evaluate (1 − tan²45°) / (1 + tan²45°).

2 PART-GUIDED

Q8 Evaluate cos 60° cos 30° − sin 60° sin 30°.

2 INDEPENDENT ★

Q9 If cos A = 12/13, find sin A and tan A.

2 PART-GUIDED ★

Case studies (4-mark)

12 source-based cases, each 1 + 1 + 2 marks. Draw the right triangle, label the known angle/sides, then read off the ratio. Solutions in the Answer Key.

Case 1 — A surveyor's triangle

4 marks

A right triangle has legs 8 m and 15 m with the right angle between them; the hypotenuse is 17 m. Angle A is opposite the 8 m side.

(i) Which side is the hypotenuse?

1

(ii) Find sin A.

1

(iii) Find cos A and tan A.

2

Answer Key

Kept at the back on purpose — so a parent needn't teach. The recurring proof techniques are written out in full once; the drills get the key step, the answer and the likely slip.

Model proof techniques (learn these once)

Deriving the other two identities. Start from $\sin^2A + \cos^2A = 1$. Divide every term by $\cos^2A$: $\sin^2A/\cos^2A + 1 = 1/\cos^2A$, i.e. $\tan^2A + 1 = \sec^2A$. Divide the original instead by $\sin^2A$: $1 + \cot^2A = \operatorname{cosec}^2A$. That is where both come from — you only ever memorise one identity.

The conjugate move. To prove $(1 - \cos A)/\sin A = \sin A/(1 + \cos A)$: cross-check by multiplying LHS top and bottom by $(1 + \cos A)$: $(1 - \cos A)(1 + \cos A) / [\sin A(1 + \cos A)] = (1 - \cos^2A)/[\sin A(1 + \cos A)] = \sin^2A/[\sin A(1 + \cos A)] = \sin A/(1 + \cos A)$ = RHS. The key step is $1 - \cos^2A = \sin^2A$.

tan A + cot A = sec A · cosec A. LHS $= \sin A/\cos A + \cos A/\sin A = (\sin^2A + \cos^2A)/(\sin A \cos A) = 1/(\sin A \cos A) = (1/\cos A)(1/\sin A) = \sec A \cdot \operatorname{cosec} A$.

$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2$. Expand: $\sin^2A + 2 + \operatorname{cosec}^2A + \cos^2A + 2 + \sec^2A = (\sin^2A + \cos^2A) + 4 + \operatorname{cosec}^2A + \sec^2A = 1 + 4 + (1 + \cot^2A) + (1 + \tan^2A) = 7 + \tan^2A + \cot^2A$.

Conjugate-product shortcut. Since $\operatorname{cosec}^2A - \cot^2A = 1$, we have $(\operatorname{cosec} A - \cot A)(\operatorname{cosec} A + \cot A) = 1$. So if $\operatorname{cosec} A - \cot A$ is given, $\operatorname{cosec} A + \cot A$ is just its reciprocal. The same trick works with $\sec A \pm \tan A$.

MATHS WITHOUT GUESSWORK

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- **Very Short Answer.** 22 two-mark questions
- **Short Answer.** 20 three-mark questions
- **Long Answer.** 16 five-mark questions
- **Case studies.** 12 four-mark source-based cases
- **HOTS and trickiest variations.** 15 questions
- **Timed mini-mocks and Answer Key.** 3 single-chapter mini-mocks; every question has its answer, kept at the back

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