

CLASS 10

MATHS

NCERT SOLUTIONS

NCERT Solutions for Class 10 Maths Chapter 8: Introduction to Trigonometry (2026-27) – Free PDF Download

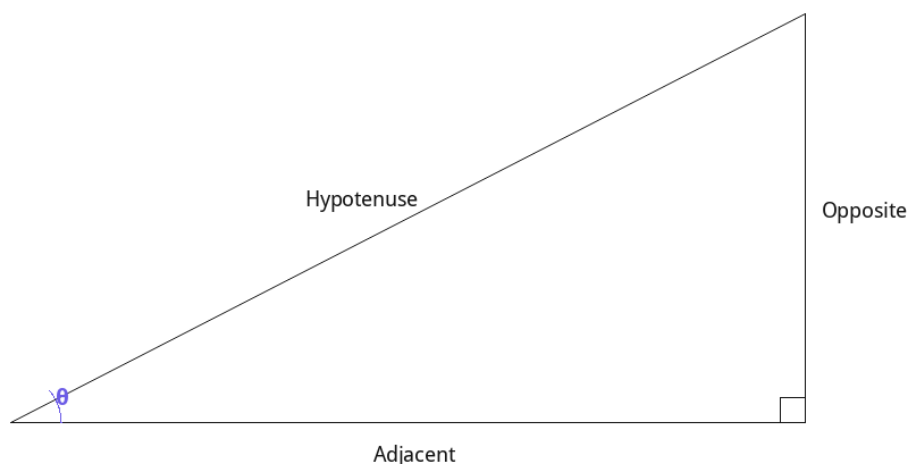
Chapter 8, Introduction to Trigonometry, is one of the highest-weightage chapters in the Class 10 Maths board exam — it introduces the six trigonometric ratios, their values for standard angles, and the identities that Chapter 9 (Applications of Trigonometry) builds on directly.

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Chapter 8, Introduction to Trigonometry, is one of the highest-weightage chapters in the Class 10 Maths board exam — it introduces the six trigonometric ratios, their values for standard angles, and the identities that Chapter 9 (Applications of Trigonometry) builds on directly.

This post covers the current 2026-27 rationalised exercise set: Exercise 8.1 (11 questions), Exercise 8.2 (4 questions) and Exercise 8.3 (complementary-angle identities). Every answer below is derived step by step from the ratio definitions, not copied from any answer key.



$\sin \theta = \text{Opposite/Hypotenuse}$, $\cos \theta = \text{Adjacent/Hypotenuse}$, $\tan \theta = \text{Opposite/Adjacent}$.

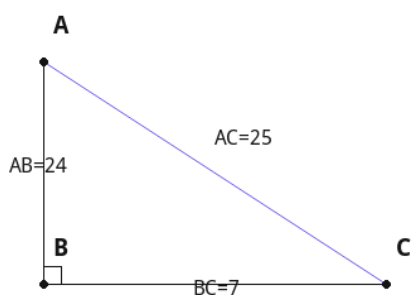
Reference figure — trigonometric ratios of a right triangle

Exercise 8.1

Q1. In $\triangle ABC$, right-angled at B, $AB = 24$ cm, $BC = 7$ cm. Determine (i) $\sin A$, $\cos A$ (ii) $\sin C$, $\cos C$.

Solution: By Pythagoras, $AC^2 = 24^2 + 7^2 = 625$, so $AC = 25$ cm.

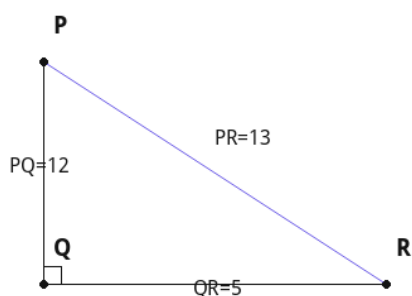
$\sin A = 7/25$, $\cos A = 24/25$. $\sin C = 24/25$, $\cos C = 7/25$.



Right angle at B $\rightarrow AC = 25$ (Pythagoras).

Q2. In $\triangle PQR$, right-angled at Q, $PR = 13$ cm, $PQ = 12$ cm. Find $\tan P - \cot R$.

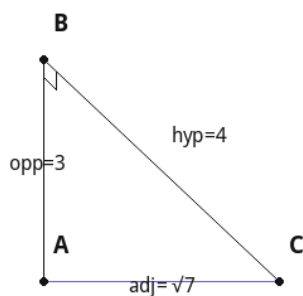
Solution: $QR^2 = 169 - 144 = 25$, $QR = 5$ cm. $\tan P = 5/12$, $\cot R = 5/12$. $\tan P - \cot R = 0$.



$$\tan P = \cot R = \frac{5}{12} \Rightarrow \frac{5}{12} = 0.$$

Q3. If $\sin A = \frac{3}{4}$, calculate $\cos A$ and $\tan A$.

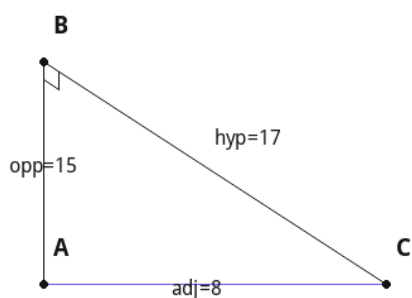
Solution: adjacent = $\sqrt{(16-9)} = \sqrt{7}$. $\cos A = \frac{\sqrt{7}}{4}$, $\tan A = \frac{3}{\sqrt{7}}$.



$$\sin A = \frac{3}{4} \rightarrow \cos A = \frac{\sqrt{7}}{4}, \tan A = \frac{3}{\sqrt{7}}.$$

Q4. Given $15 \cot A = 8$, find $\sin A$ and $\sec A$.

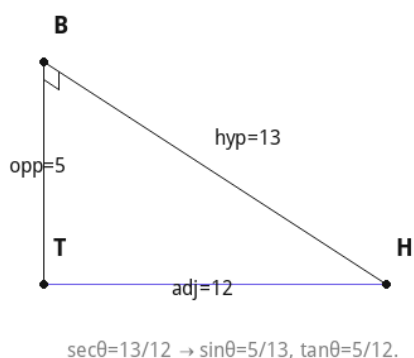
Solution: $\cot A = \frac{8}{15}$, hypotenuse = $\sqrt{(64+225)} = 17$. $\sin A = \frac{15}{17}$, $\sec A = \frac{17}{8}$.



$$\cot A = \frac{8}{15} \rightarrow \sin A = \frac{15}{17}, \sec A = \frac{17}{8}.$$

Q5. Given $\sec \theta = \frac{13}{12}$, calculate all other trigonometric ratios.

Solution: opposite = $\sqrt{(169-144)} = 5$. $\sin \theta = \frac{5}{13}$, $\cos \theta = \frac{12}{13}$, $\tan \theta = \frac{5}{12}$, $\operatorname{cosec} \theta = \frac{13}{5}$, $\cot \theta = \frac{12}{5}$.



Q6. If $\angle A$ and $\angle B$ are acute angles with $\cos A = \cos B$, show $\angle A = \angle B$.

Solution: Cosine is one-to-one and strictly decreasing on $0^\circ - 90^\circ$, so equal cosine values force equal angles.

Q7. If $\cot \theta = 7/8$, evaluate (i) $[(1+\sin\theta)(1-\sin\theta)]/[(1+\cos\theta)(1-\cos\theta)]$ (ii) $\cot^2\theta$.

Solution: $(1-\sin^2\theta)/(1-\cos^2\theta) = \cos^2\theta/\sin^2\theta = \cot^2\theta = 49/64$ for both parts.

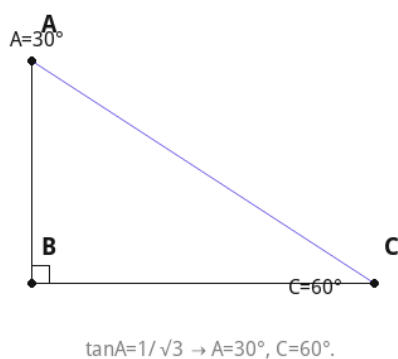
Q8. If $3 \cot A = 4$, check $(1-\tan^2 A)/(1+\tan^2 A) = \cos^2 A - \sin^2 A$.

Solution: $\tan A = 3/4$, $\sin A = 3/5$, $\cos A = 4/5$. LHS = $(7/16)/(25/16) = 7/25$. RHS = $16/25 - 9/25 = 7/25$.

Verified equal.

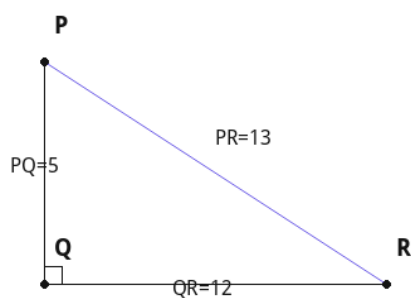
Q9. In $\triangle ABC$, right-angled at B, $\tan A = 1/\sqrt{3}$. Find (i) $\sin A \cos C + \cos A \sin C$ (ii) $\cos A \cos C - \sin A \sin C$.

Solution: $A = 30^\circ$, $C = 60^\circ$. (i) $\sin(A+C) = \sin 90^\circ = 1$. (ii) $\cos(A+C) = \cos 90^\circ = 0$.



Q10. In $\triangle PQR$, right-angled at Q, $PR+QR=25$ cm, $PQ=5$ cm. Find $\sin P$, $\cos P$, $\tan P$.

Solution: $(PR-QR)(PR+QR) = PQ^2 = 25 \Rightarrow PR-QR = 1$, so $PR = 13$, $QR = 12$. $\sin P = 12/13$, $\cos P = 5/13$,



$$PR+QR=25, PQ=5 \rightarrow QR=12, PR=13.$$

$$\tan P = 12/5.$$

Q11. True/False: (i) $\tan A$ always < 1 — **False**. (ii) $\sec A = 12/5$ possible — **True**. (iii) $\cos A$ abbreviates cosecant — **False**. (iv) $\cot A$ is a product of $\cot$ and A — **False**. (v) $\sin \theta = 4/3$ possible — **False** ($\sin \theta \leq 1$ always).

Exercise 8.2

Q1. Evaluate: (i) $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ = 1$. (ii) $2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ = 2$. (iii) $\cos 45^\circ / (\sec 30^\circ + \operatorname{cosec} 30^\circ) = (3\sqrt{2} - \sqrt{6})/8$. (iv) $(\sin 30^\circ + \tan 45^\circ - \operatorname{cosec} 60^\circ) / (\sec 30^\circ + \cos 60^\circ + \cot 45^\circ) = (43 - 24\sqrt{3})/11$. (v) $(5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ) / (\sin^2 30^\circ + \cos^2 30^\circ) = 67/12$.

Q2. Choose the correct option: (i) $(2 \tan 30^\circ) / (1 + \tan^2 30^\circ) = \sin 60^\circ$. (ii) $(1 - \tan^2 45^\circ) / (1 + \tan^2 45^\circ) = 0$. (iii) $\sin 2A = 2 \sin A$ true when $A = 0^\circ$. (iv) $(2 \tan 30^\circ) / (1 - \tan^2 30^\circ) = \tan 60^\circ$.

Q3. If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = 1/\sqrt{3}$, find A and B .

Solution: $A+B=60^\circ$, $A-B=30^\circ$. **$A=45^\circ$, $B=15^\circ$.**

Q4. True/False: (i) $\sin(A+B) = \sin A + \sin B$ — **False**. (ii) $\sin \theta$ increases as θ increases — **True**. (iii) $\cos \theta$ increases as θ increases — **False**. (iv) $\sin \theta = \cos \theta$ for all θ — **False**. (v) $\cot A$ undefined at $A=0^\circ$ — **True**.

Exercise 8.3 — complementary angles

Q1. Evaluate (i) $\sin 18^\circ / \cos 72^\circ$ (ii) $\tan 26^\circ / \cot 64^\circ$ (iii) $\cos 48^\circ - \sin 42^\circ$ (iv) $\operatorname{cosec} 31^\circ - \sec 59^\circ$.

Solution: Each pair is complementary, so each expression collapses to a ratio over itself or a difference of equals: answers are **1, 1, 0, 0**.

Q2. Show (i) $\tan 48^\circ \tan 23^\circ \tan 42^\circ \tan 67^\circ = 1$ (ii) $\cos 38^\circ \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$.

Solution: (i) $\tan 48^\circ \cdot \tan 42^\circ = 1$ and $\tan 23^\circ \cdot \tan 67^\circ = 1$ by complementary pairing, product = 1. (ii) equals $\cos(38^\circ + 52^\circ) = \cos 90^\circ = 0$.

Q3. $\tan 2A = \cot(A - 18^\circ)$, find A . **Solution:** $90^\circ - 2A = A - 18^\circ \Rightarrow A = 36^\circ$.

Q4. If $\tan A = \cot B$, prove $A+B=90^\circ$. **Solution:** $\cot B = \tan(90^\circ - B) \Rightarrow A = 90^\circ - B$.

Q5. $\sec 4A = \operatorname{cosec}(A - 20^\circ)$, find A . **Solution:** $90^\circ - 4A = A - 20^\circ \Rightarrow A = 22^\circ$.

Q6. Show $\sin((B+C)/2) = \cos(A/2)$ for $\triangle ABC$. **Solution:** $B+C=180^\circ - A \Rightarrow (B+C)/2 = 90^\circ - A/2$.

Q7. Express $\sin 67^\circ + \cos 75^\circ$ in terms of angles below 45° . **Solution:** = $\cos 23^\circ + \sin 15^\circ$.

Why this chapter matters for boards

These ratios and complementary-angle identities reappear directly in Chapter 9's heights-and-distances problems and show up as standalone 2-mark questions across the paper — spotting $A + (90^\circ - A)$ pairs quickly is worth practising until automatic.

CBSE Exam Weightage

This chapter falls under **Unit V: Trigonometry** in the CBSE Class 10 Maths board exam syllabus. This unit typically carries around **12 marks (15%)** of the 80-mark theory paper, based on CBSE's published unit-wise weightage (Question Paper Design). CBSE sets weightage at the unit level rather than chapter-by-chapter, so the exact share from this specific chapter can vary a little between years and sample papers.

Class 10 Mathematics Chapter 8 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the [Class 10 Mathematics Chapter 8 Extra Questions](#) and [Class 10 Mathematics Chapter 8 Revision Notes](#) for quick revision and extra practice.