Introduction to Trigonometry Class 10 Important Questions

10 questions · 27 marks · no calculator · step-marked answers

Name _____ Date _____ Score / 27

- Original questions in the board paper's question types, from 1-mark MCQs to a case study. Try every question before you look at the answers.
- No calculator: as in the CBSE board exam, everything works by hand.
- Worked answers with step marks for 5 questions start after the questions. The other 5 open free on the chapter page with a free account (no card): the link is next to each one.
- Online, with more practice: cbsemathrevision.com/class-10/introduction-to-trigonometry

Section A · Multiple choice and assertion–reason (1 mark each)

1. 1 mark · Trigonometric ratios

If $\sin A = \frac{3}{5}$, where A is acute, then $\cot A$ equals

(a) $\frac{4}{3}$ (b) $\frac{3}{4}$

(c) $\frac{5}{4}$ (d) $\frac{4}{5}$

2. 1 mark · Ratios of specific angles

The value of $\sin^2 60° - \cos^2 45° + \tan^2 30°$ is

(a) $\frac{5}{12}$ (b) $\frac{1}{12}$

(c) $\frac{11}{12}$ (d) $\frac{7}{12}$

3. 1 mark · Trigonometric ratios

In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): There is an acute angle θ with $\sin\theta = \frac{4}{3}$.

Reason (R): For every acute angle θ, $0 < \sin\theta < 1$.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true.

Section B · Short answer (2 marks each)

4. 2 marks · Trigonometric ratios

Given $\tan\theta = \frac{5}{12}$, where θ is acute, find $\sin\theta$ and $\cos\theta$.

5. 2 marks · Ratios of specific angles

Evaluate $2\cos^2 45^\circ + 3\tan^2 60^\circ - 4\sin^2 30^\circ$.

Section C · Short answer (3 marks each)

6. 3 marks · Trigonometric identities

Prove that $\sec^4\theta - \sec^2\theta = \tan^4\theta + \tan^2\theta$.

7. 3 marks · Trigonometric ratios

If $4\tan\theta = 3$, find the value of $\frac{2\sin\theta + \cos\theta}{2\sin\theta - \cos\theta}$.

Section D · Long answer (5 marks each)

8. **5 marks · Trigonometric ratios**

In $\triangle ABC$, right-angled at B, $AB = 15$ cm and $BC = 8$ cm. (a) Find AC. (b) Find $\sin A$, $\cos A$ and $\tan A$. (c) Show that $\sin A \cos C + \cos A \sin C = 1$.

9. **5 marks · Trigonometric identities**

(a) Prove that $\dfrac{\cos\theta}{1-\tan\theta} + \dfrac{\sin\theta}{1-\cot\theta} = \sin\theta + \cos\theta$. (b) Hence find the value of the left-hand side when $\theta = 30°$.

Section E · Case study (4 marks)

10. **4 marks · Trigonometric ratios**

Set square. A carpenter's set square is a right triangle PQR, right-angled at Q, with $PQ = 12$ cm and $QR = 5$ cm.

i. Find the length of PR. *[1 mark]*

ii. Find $\sin P$ and $\cos R$. *[1 mark]*

iii. Find $\tan P \times \tan R$ and $\sin^2 P + \sin^2 R$. *[2 marks]*

Answers and worked solutions

Question 1 — 1 mark

$\cos A = \sqrt{1 - \frac{9}{25}} = \frac{4}{5}$, so

$\cot A = \frac{\cos A}{\sin A} = \frac{4}{3}$ **A1**

Correct option: (a) $\frac{4}{3}$

Question 2 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/introduction-to-trigonometry#iq-2

Question 3 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/introduction-to-trigonometry#iq-3

Question 4 — 2 marks

Answer: $\sin\theta = \frac{5}{13}$, $\cos\theta = \frac{12}{13}$

Take opposite $= 5k$, adjacent $= 12k$; hypotenuse $= \sqrt{25k^2 + 144k^2} = 13k$ **M1**

$\sin\theta = \frac{5}{13}$, $\cos\theta = \frac{12}{13}$ **A1**

Question 5 — 2 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/introduction-to-trigonometry#iq-5

Question 6 — 3 marks

Answer: Proved

LHS $= \sec^2\theta(\sec^2\theta - 1)$ **M1**

$= (1 + \tan^2\theta)\tan^2\theta$, using $\sec^2\theta - 1 = \tan^2\theta$ **A1**

$= \tan^2\theta + \tan^4\theta =$ RHS **A1**

Question 7 — 3 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/introduction-to-trigonometry#iq-7

Question 8 — 5 marks

Answer: $AC = 17$ cm; $\frac{8}{17}, \frac{15}{17}, \frac{8}{15}$; shown

(a) $AC = \sqrt{15^2 + 8^2} = \sqrt{289} = 17$ cm **A1**

(b) $\sin A = \frac{BC}{AC} = \frac{8}{17}$, $\cos A = \frac{15}{17}$, $\tan A = \frac{8}{15}$ **A1**

(c) For angle C: $\sin C = \frac{AB}{AC} = \frac{15}{17}$, $\cos C = \frac{BC}{AC} = \frac{8}{17}$ **M1**

$\sin A\cos C + \cos A\sin C = \frac{8}{17}\cdot\frac{8}{17} + \frac{15}{17}\cdot\frac{15}{17}$ **M1**

$= \frac{64 + 225}{289} = 1$ **A1**

Question 9 — 5 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/introduction-to-trigonometry#iq-9

Question 10 — 4 marks

i. $PR = \sqrt{144 + 25} = 13$ cm **A1**

ii. $\sin P = \frac{QR}{PR} = \frac{5}{13}$ and $\cos R = \frac{QR}{PR} = \frac{5}{13}$ **A1**

iii. $\tan P = \frac{5}{12}$, $\tan R = \frac{12}{5}$, so $\tan P \times \tan R = 1$ **M1**

$\sin^2 P + \sin^2 R = \frac{25}{169} + \frac{144}{169} = 1$ **A1**

More on this chapter, free: revision notes, a Route to 95 and practice with instant feedback at cbsemathrevision.com/class-10/introduction-to-trigonometry

Our own original questions, written and checked by CBSE Math Revision. Independent, not affiliated with CBSE or NCERT.