

CLASS 10 — MATHEMATICS

Chapter: Introduction to Trigonometry

Practice Worksheet | CBSE Pattern

Maximum Marks: 40

Time Allowed: 1 hour 30 minutes

Name: _____

Class/Section: _____ Date: _____

General Instructions:

1. All questions are compulsory.
2. Read each question carefully before answering.
3. Show complete working for questions requiring calculations or proofs.
4. Select only one option for each MCQ.
5. Marks for each question are indicated alongside the question.
6. Write mathematical steps clearly and use appropriate notation.

This paper has 21 questions in five sections: A (Q1–Q10, 1 mark each), B (Q11–Q15, 2 marks each), C (Q16–Q19, 3 marks each), D (Q20, 4 marks) and E (Q21, case study, 4 marks). All angles are acute unless stated otherwise.

SECTION A

Multiple Choice Questions — Q1 to Q10 carry 1 mark each.

- Q1.** If $\sin A = \frac{3}{5}$, where A is an acute angle, then $\cos A$ is **[1 mark]**
- (A) $\frac{4}{5}$ (B) $\frac{3}{4}$
(C) $\frac{5}{4}$ (D) $\frac{5}{3}$
- Q2.** The value of $\sin 30^\circ + \cos 60^\circ$ is **[1 mark]**
- (A) $\frac{1}{2}$ (B) $\sqrt{3}$
(C) 1 (D) 0
- Q3.** If $\tan A = \sqrt{3}$, where A is an acute angle, then A is **[1 mark]**
- (A) 45° (B) 60°
(C) 30° (D) 90°
- Q4.** The value of $5 \operatorname{cosec}^2 \theta - 5 \cot^2 \theta$ is **[1 mark]**
- (A) 1 (B) 0
(C) 10 (D) 5
- Q5.** $\cos^2 30^\circ - \sin^2 30^\circ$ is equal to **[1 mark]**
- (A) $\sin 60^\circ$ (B) $\cos 60^\circ$
(C) $\tan 30^\circ$ (D) 1

- Q6.** For an acute angle A , $\sec A \cdot \sqrt{1 - \sin^2 A}$ is equal to **[1 mark]**
 (A) 0 (B) $\sec A$
 (C) 1 (D) $\cos^2 A$
- Q7.** In $\triangle ABC$, right-angled at B , $AB = 5$ cm and $AC = 13$ cm. The value of $\tan C$ is **[1 mark]**
 (A) $\frac{12}{5}$ (B) $\frac{5}{13}$
 (C) $\frac{12}{13}$ (D) $\frac{5}{12}$
- Q8.** If $\sin \theta + \cos \theta = \sqrt{2} \cos \theta$, where θ is an acute angle, then $\tan \theta$ is **[1 mark]**
 (A) $\sqrt{2} - 1$ (B) $\sqrt{2} + 1$
 (C) $\frac{1}{\sqrt{2}}$ (D) $\sqrt{2}$

In Q9 and Q10, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- Q9.** **Assertion (A):** $\sin A = \frac{4}{3}$ for some acute angle A . **[1 mark]**
Reason (R): In a right triangle the hypotenuse is the longest side, so for an acute angle A , $\sin A < 1$.
 (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.
- Q10.** **Assertion (A):** $(\sec \theta + \tan \theta)(\sec \theta - \tan \theta) = 1$ for every acute angle θ . **[1 mark]**
Reason (R): $\sec^2 \theta - \tan^2 \theta = 1$ for every acute angle θ .
 (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

Very Short Answer Questions — Q11 to Q15 carry 2 marks each.

Q11. If $8 \tan A = 15$, where A is an acute angle, find $\sin A$ and $\cos A$. **[2 marks]**

Q12. Evaluate: $4 \cos^2 60^\circ + 4 \sin^2 45^\circ - \sin^2 30^\circ$ **[2 marks]**

Q13. If $\sqrt{3} \tan 2\theta - 3 = 0$, where $0^\circ < \theta < 45^\circ$, find the value of θ . **[2 marks]**

Q14. Prove that $\sin A \tan A + \cos A = \sec A$, where A is an acute angle. **[2 marks]**

Q15. In $\triangle PQR$, right-angled at Q , $PQ = 3$ cm and $PR = 6$ cm. Find $\angle QPR$ and $\angle PRQ$. **[2 marks]**

SECTION C

Short Answer Questions — Q16 to Q19 carry 3 marks each.

- Q16.** If $5 \cot \theta = 12$, where θ is acute, find the value of $\frac{\sin \theta + \cos \theta}{\sin \theta - \cos \theta}$. **[3 marks]**

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- Q17.** If $\sin (A + B) = 1$ and $\cos (A - B) = \frac{\sqrt{3}}{2}$, where $0^\circ < A + B \leq 90^\circ$ and $A > B$, find A and B . **[3 marks]**

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- Q18.** Prove that: $\frac{1}{\sec A - \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A + \tan A}$ **[3 marks]**

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- Q19.** If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, where θ is acute, show that $m^2 - n^2 = 4\sqrt{mn}$. **[3 marks]**
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SECTION D

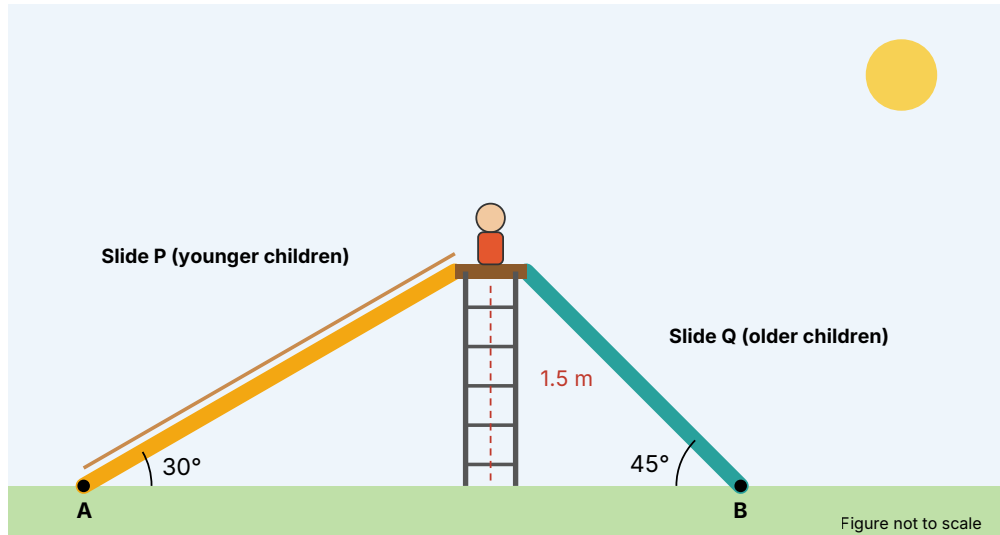
Long Answer Question — Q20 carries 4 marks.

- Q20.** (a) Prove that $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$, where θ is an acute angle. **[4 marks]**
- (b) Hence find the value of $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1}$ when $\theta = 30^\circ$.

SECTION E

Case Study Based Question — Q21 carries 4 marks.

- Q21.** A park has a platform 1.5 m above the ground, reached by a vertical ladder. Two straight slides start from the top of the platform. Slide P, for younger children, makes an angle of 30° with the ground and ends at A. Slide Q, for older children, makes an angle of 45° with the ground and ends at B. The two slides are on opposite sides of the platform, as shown. **[4 marks]**



Ignore the width of the platform. Based on the above information, answer the following questions:

- (i) Find the length of slide P. **[1 mark]**

- (ii) Find the length of slide Q. **[1 mark]**

- (iii) Find the horizontal distance from the foot of the platform to A and to B. Hence find the distance AB between the ends of the two slides. (Take $\sqrt{3} = 1.73$) **[2 marks]**

— End of Question Paper —