

Maxprap. Chapter wise Series Class 10th – Mathematics

Class : 10th

Topic : Introduction to Trigonometry

Max. Marks : 50

Duration : 2 Hrs

Sections: A (MCQs), B (Short Answer-I), C (Short Answer-II), D (Long Answer), E (Case-Based).

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 23 questions divided into five Sections A, B, C, D and E. (iii). Section A comprises of 10 MCQs of 1 mark each. Section B comprises of 5 questions of 2 marks each. Section C comprises of 4 questions of 3 marks each. Section D comprises of 2 question of 5 marks each and Section E comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted.
- (vi). Draw neat figures wherever required. Take $\pi = 22/7$, wherever required if not stated.

Section A

Questions 1 to 10 carry 1 mark each

1. If $\cos\theta = \frac{1}{\sqrt{2}}$ then $\tan\theta$ is equal to

- a) 0 b) $\sqrt{2} + 1$ c) 1 d) $\frac{1}{\sqrt{2}}$

2. $\sec^4 A - \sec^2 A$ is equal to

- a) $\tan^2 A - \tan^4 A$ b) $\tan^2 A + \tan^4 A$
c) $\tan^4 A + \tan^2 A$ d) $\tan^4 A - \tan^2 A$

3. If $\sec\theta - \tan\theta = m$, then the value of $\sec\theta + \tan\theta$ is:

- a) $1 - \frac{1}{m}$ b) $-m$ c) $\frac{1}{m}$ d) $m^2 - 1$

4. If $7 \tan\theta = 4$ then $\frac{(7\sin\theta - 3\cos\theta)}{(7\sin\theta + 3\cos\theta)} = ?$

- a) $\frac{5}{7}$ b) $\frac{5}{14}$ c) $\frac{3}{7}$ d) $\frac{1}{7}$

5. $(\sec A + \tan A)(1 - \sin A)$

- a) $\operatorname{cosec} A$ b) $\sin A$ c) $\sec A$ d) $\cos A$

6. The value of $2 \cos 45^\circ \cot 30^\circ$ is

- a) $\sqrt{6}$ b) $2\sqrt{3}$ c) $\frac{\sqrt{6}}{2}$ d) $\frac{\sqrt{3}}{2\sqrt{2}}$

7. If $\cos\theta = \frac{\sqrt{3}}{2}$ and $\sin\phi = \frac{1}{2}$, then $\tan(\theta + \phi)$ is:

- a) $\frac{1}{\sqrt{3}}$ b) 1 c) not defined d) $\sqrt{3}$

8. If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A =$
 a) 0 b) -1 c) 2 d) 1

Assertion(A)/Reason(R) Based (9-10): In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- a) Both A and R are true and R is the correct explanation of A.
 b) Both A and R are true but R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.

9. Assertion (A): The value of $\sin \theta = \frac{4}{3}$ is not possible.

Reason (R): Hypotenuse is the largest side in any right - angled triangle.

10. Assertion (A): $\sin^2 \theta = 1 - \cos^2 \theta$ for any value of θ .

Reason (R): Value of $\sin \theta$ is always more than 1.

SECTION – B

Questions 11 to 15 carry 2 marks each

11. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$; $0^\circ < A + B \leq 90^\circ$; $A > B$, then find A and B.

12. Evaluate: $\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$.

13. Evaluate: $4(\sin^4 30^\circ + \cos^4 60^\circ) - \frac{2}{3}(\sin^2 60^\circ - \cos^2 45^\circ) + \frac{1}{2}\tan^2 60^\circ$

14. Prove that: $\frac{1}{\sec A + \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A - \tan A}$

15. Prove that: $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

SECTION – C

Questions 16 to 19 carry 3 marks each

16. If $\operatorname{cosec} A + \cot A = m$. show that $\frac{m^2 - 1}{m^2 + 1} = \cos A$.

17. Write all the other trigonometric ratios of $\angle A$ in terms of $\sec A$.

18. If $\sin \theta + \cos \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$, show that $q(p^2 - 1) = 2p$.

19. Find the value of the trigonometric ratios if $\tan \theta = \frac{8}{15}$

SECTION – D

Questions 20 to 21 carry 5 marks each

20. Prove that: $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = 1 + \tan A + \cot A = 1 + \sec A \operatorname{cosec} A$

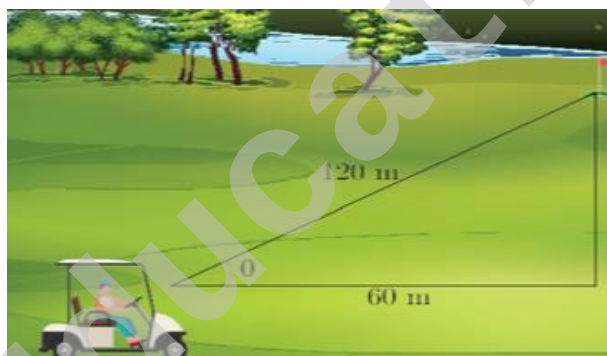
21. $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$

SECTION – E (Case Study Based Questions)

Questions 22 & 23 carry 4 marks each

22. Read the following text carefully and answer the questions that follow:

Golf is a game played in an open field where the golfer plays his golf ball into a hole by using different types of clubs (golf instruments). In golf, a golfer plays a number of holes in a given order. 18 holes played in an order controlled by the golf course design, normally make up a game.



On your approach shot to the ninth green, the Global Positioning System (GPS) your cart is equipped with tells you the pin is 120 meter away.

- The distance plate states the straight line distance to the hole is 60 meter. Relative to a straight line between the plate and the hole, at what acute angle should you hit the shot? (1)
- What is the value of the tangent of the above angle? (1)
- What is the length of the side opposite to the angle θ in the given picture? (2)

OR

What is the value of tangent of angle A? (2)

23. Read the following text carefully and answer the questions that follow:

Akshat studies in DAV Public school, Vasant Kunj, Delhi. During summer vacation he went to his native place in a village. His grandfather took him to the bank of a nearby river. Akshat was very happy to see the pollution free environment near the river.

He was standing on the bank of the river He thought to measure the width of the river. He found that the angle of elevation of the top of a tree standing on the opposite bank was 60° When he moved 30 m away from the river the angle of elevation reduced to 30°



- d) What is the height of the tree? (1)
 e) What is the width of the river? (1)
 f) After moving how much distance away from the river the angle of elevation becomes 45° . (2)

OR

If the width of the river were 40 m then what would be the height of the tree selected? (2)

Introduction to Trigonometry Paper Details – Analysis		
Objective Questions		
MCQ	1 marks x 8 question = 8	
Assertion Reason	1 marks x 2 question = 2	
Subjective		
Short type I	2 marks x 5 question = 10	
Short type II	3 marks x 4 question = 12	
Long Type	5 marks x 2 question = 10	
Case Studies Based		
Case 1	4 marks	
Case 2	4 marks	

Total = 50 marks Your Score =