CBSE NCERT Based Chapter wise Questions (2025-2026)

Class-X

Subject: MATHEMATICS

Chapter Name : Introduction to Trigonometry (Chap : 8)

[MCQ(2+1AR)-1 Mark, SA-1(1)-2 Marks, SA-II(1)-3 Marks

Level - 2 (Higher Order)

MCQ Type :

1. If $x = r \sin A \cos C$ and $y = r \sin A \sin C$ and $z = r \cos A$, then the value of $x^2 + y^2 + z^2$ is :

Ⓐ $\frac{1}{r^2}$ Ⓑ r^2 Ⓒ $\frac{r^2}{2}$ Ⓓ $\frac{r}{2}$

(Hints : Squaring and adding)

2. If triangles ABC and PTR are similar such that $\angle C = \angle R = 90°$ and $\frac{AC}{AB} = \frac{3}{5}$ then, sin T is :

Ⓐ $\frac{3}{5}$ Ⓑ $\frac{5}{3}$ Ⓒ $\frac{4}{5}$ Ⓓ $\frac{5}{4}$

(Hints : Applying similarity find angle T)

3. $\tan x + \sin x = m$ and $\tan x - \sin x = n$, then $(m^2 - n^2)$ is equal to :

Ⓐ $4\sqrt{mn}$ Ⓑ $\sqrt{mn}$ Ⓒ $2\sqrt{mn}$ Ⓓ None of these

(Hints : Put the value of m and n and simplify)

4. $\frac{\cos 60° + \sin 60°}{\cos 60° - \sin 60°}$ = ... :

Ⓐ $-\sqrt{3}+2$ Ⓑ $-2-\sqrt{3}$ Ⓒ $\sqrt{3}-2$ Ⓓ None of these

(Hints : Put standard angle value)

5. If $\sin A = \frac{12}{13}$, then the value of $\frac{13\sin A + 5\sec A}{5\tan A + 12\operatorname{cosec} A}$ will be :

Ⓐ 9 Ⓑ 8 Ⓒ 4 Ⓓ None of these

(Hints : Find secA, tanA and cosecA value)

6. If θ increases from θ to 90° then, $\sin\theta$ changes according to :

Ⓐ from $-\infty$ to 0 Ⓑ from 0 to 1 Ⓒ from $-\infty$ to 1 Ⓓ None of these

7. Evaluate $\sqrt{\frac{1-\sin A}{1+\sin A}}$

Ⓐ cos A + tan A Ⓑ cos A – tan A Ⓒ tan A – cot A Ⓓ sec A + tan A

(Hints : Multiply both Nu. and Dn. by (1-sinA)

8. In a triangle PQR, right-angled at Q, PR + QR = 25 cm and PQ = 5 cm, then the value of sin P is

Ⓐ $\frac{7}{25}$ Ⓑ $\frac{24}{25}$ Ⓒ 1 Ⓓ None of these

(Hints : let PR = x cm, QR = (25–x) cm. Ue Pythagoras theorem)

9. The value of $2\cos^2 60° + 3\sin^2 45° - 3\sin^2 30° + 2\cos^2 90°$ is

Ⓐ 1 Ⓑ 5 Ⓒ 5/4 Ⓓ None of these

(Hints : Put standard angle value)

10. $(1 + \tan A + \sec A)(1 + \cot A - \operatorname{cosec} A) =$

Ⓐ 0 Ⓑ 1 Ⓒ 2 Ⓓ –1

(Hints : Multiply and simplify)

ASSERTION & REASON BASED QUESTIONS (Q. 11 – 14)

Directions : In each of the questions given below, there are two statements marked as Assertion (A) and Reason (R). Mark your answer as per the codes provided below :

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.

11. **Assertion (A) :** If $x \sin^3\theta + y \cos^3\theta = \sin\theta \cos\theta$ and $x \sin\theta = y \cos\theta$, then $x^2 + y^2 = 1$

Reason (R) : For any value of θ, $\sin^2\theta + \cos^2\theta = 1$

Ⓐ a Ⓑ b Ⓒ c Ⓓ d

12. **Assertion (A) :** $\sin(A + B) = \sin A + \sin B$.

Reason (R) : For any value of θ, $1 + \tan^2\theta = \sec^2\theta$

Ⓐ a Ⓑ b Ⓒ c Ⓓ d

13. **Assertion (A) :** The value of $\sin 60° \cos 30° + \sin 30° \cos 60°$ is 1.

Reason (R) : $\sin 90° = 1$ and $\cos 90° = 0$

Ⓐ a Ⓑ b Ⓒ c Ⓓ d

14. **Assertion (A) :** The value of $\frac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} + \sin\theta\cos\theta$ is 1

Reason (R) : $\sin^2 A + \cos^2 A = 1$, for any value of A.

Ⓐ a Ⓑ b Ⓒ c Ⓓ d

SA-1 Type :

15. Simplify : $\cos^4 A - \sin^4 A$

(Hints : Apply $a^2 - b^2 = (a+b)(a-b)$)

16. If θ is an acute angle and $\tan\theta + \cot\theta = 2$, then find the value of $\sin^3\theta + \cos^3\theta$.

(Hints : Break tanθ and cotθ in terms sinθ and cosθ and simplify)

17. ΔABC right angled at B, $\sin A = \frac{7}{25}$, then find the value of cos C.

(Hints : sin A = cos C)

18. If $2\sin^2\beta - \cos^2\beta = 2$, then find β.

(Hints : Use the identity $\sin^2\theta + \cos^2\theta = 1$)

19. Find an acute angle θ when $\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$

(Hints : Use componendo-dividendo to find tanθ)

20. Prove that $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

(Hints : $(a+b)^2$ formula and three basic identities.)

SA-II Type :

21. Evaluate : $4(\sin^4 30^\circ + \cos^4 60^\circ) - 3(\cos^2 45^\circ - \sin^2 90^\circ) + 5\cos^2 90^\circ$

(Hints : Put standard angle values and simplify)

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22. Using the formula, $\tan 2A = \frac{2\tan A}{1-\tan^2 A}$, find the value of tan60°, it being given that $\tan 30° = \frac{1}{\sqrt{3}}$

(Hints : Put A = 30°)

23. If A and B are acute angles such that $\tan A = \frac{1}{3}$, $\tan B = \frac{1}{2}$ and $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$, Show that A + B = 45°.

(Hints : Put the value of tanA and tanB and simplify)

24. Prove that : $\frac{1+\sin A - \cos A}{1+\sin A + \cos A} = \sqrt{\frac{1-\cos A}{1+\cos A}}$

(Hints : L.H.S divide both Nu. and Dn. by sinA and simplify. R.H.S both Nu. and Dn. multiply by (1-cosA))

25. Prove that : $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2\operatorname{cosec} A$

(Hints : Simplify L.H.S by addition concept and use identity $\sec^2 A - 1 = \tan^2 A$)

ANSWER

Section - A

1. Ⓑ
2. Ⓐ
3. Ⓐ
4. Ⓑ
5. Ⓓ
6. Ⓑ
7. Ⓓ
8. Ⓓ
9. Ⓒ
10. Ⓒ
11. Ⓐ
12. Ⓓ
13. Ⓑ
14. Ⓐ
15. $1-2\sin^2 A$
16. $\frac{1}{\sqrt{2}}$
17. $\frac{7}{25}$
18. 90°
19. 60°
21. 2
22. $\sqrt{3}$

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