

INTERNATIONAL INDIAN SCHOOL, RIYADH

CLASS: X

TOPIC: TRIGONOMETRY

1. If $\cot \theta = 15/8$, evaluate $\frac{(2 + 2\sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(2 - 2\cos \theta)}$ (225/64)
2. If $\tan A = 2$. Evaluate $\sec A \sin A + \tan^2 A - \operatorname{cosec} A$
3. In a $\triangle ABC$, right angled at A, if $\tan C = \sqrt{3}$, find the value of $\sin B \cos C + \cos B \sin C$ (1)
4. In $\triangle PQR$, right angled at Q, $QR = 6$ cm, $\angle QPR = 60^\circ$. Find the length of PQ and PR
5. If $7 \sin^2 \theta + 3 \cos^2 \theta = 4$, show that $\tan \theta = 1/\sqrt{3}$
6. If $\sec \theta - \tan \theta = 4$, then prove that $\csc \theta = 8/17$
7. If $\csc \theta - \sin \theta = \sqrt{2} \sin \theta$, prove that $\csc \theta + \sin \theta = \sqrt{2} \csc \theta$
8. If $\sqrt{3} \tan \theta = 3 \sin \theta$, find the value of $\sin^2 \theta - \cos^2 \theta$
9. Evaluate: $\sqrt{2} \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$ ($\sqrt{2}$)
10. Evaluate: $\tan^2 60^\circ - 2 \cos^2 60^\circ - \frac{3}{4} \sin^2 45^\circ - 4 \sin^2 30^\circ$ (9/8)
11. Evaluate: $(\sin 90^\circ + \cos 45^\circ + \cos 60^\circ)(\cos 0^\circ - \sin 45^\circ + \sin 30^\circ)$ (7/4)
12. If $\sin 2x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$, find x (15)
13. If $A = B = 30^\circ$, verify that :
 $\sin(A + B) = \sin A \cos B + \cos A \sin B$
14. If $\sec^2 \theta (1 + \sin \theta) (1 - \sin \theta) = k$, find the value of k (k = 1)
15. Evaluate: $\frac{\sec^2 54^\circ - \cot^2 36^\circ}{\operatorname{Cosec}^2 57^\circ - \tan^2 33^\circ} + 2 \sin^2 38^\circ \sec^2 52^\circ - \sin^2 45^\circ$ (5/2)
16. Evaluate: $\sec(90 - \theta) \operatorname{cosec} \theta - \tan(90 - \theta) \cot \theta + \frac{\cos^2 35^\circ + \cos^2 55^\circ}{\tan 5^\circ \tan 15^\circ \tan 45^\circ \tan 75^\circ \tan 85^\circ}$ (2)
17. Find the value of:
 $\frac{2 \sin 68^\circ}{\cos 22^\circ} - \frac{2 \cot 15^\circ}{5 \tan 75^\circ} - \frac{3 \tan 45^\circ \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5}$ (1)
18. If $\cos(40^\circ + x) = \sin 30^\circ$, find the value of x (20)
19. $\sin 4A = \cos(A - 20^\circ)$, where 4A is an acute angle, find the value of A (22)
20. Find the value of θ in $2 \cos 3\theta = 1$ (20)
21. Solve for θ : $2 \sin^2 \theta = \frac{1}{2}$ (30)
22. If $\sin \theta + \cos \theta = \sqrt{2} \cos(90^\circ - \theta)$, determine $\cot \theta$ ($\sqrt{2} - 1$)
23. Find the acute angles A and B, $A > B$, if $\sin(A + 2B) = \sqrt{3}/2$ and $\cos(A + 4B) = 0$ (30, 15)
24. If $\tan(A + B) = \sqrt{3}$, $\tan(A - B) = 1$, $0^\circ < A + B \leq 90^\circ$, $a > b$, then find A and B (52.5, 7.5)
25. If $\sin(A + B) = 1$, $\cos(A - B) = 1$, find A and B (45, 45)
26. If $\sin A - \cos B = 0$, prove that $A + B = 90^\circ$
27. What is the maximum value of $1/\sec \theta$
28. Express $\cos 56^\circ + \cot 56^\circ$ in terms of 0° and 45°
29. Express $\cos A$ in terms of $\tan A$
30. Find the value of $\tan 60^\circ$ geometrically
31. If A, B and C are interior angles of triangle ABC, show that $\cos \left\{ \frac{B+C}{2} \right\} = \sin \frac{A}{2}$
32. If $x = a \sin \theta$, $y = b \tan \theta$. Prove that $\frac{a^2}{x^2} - \frac{b^2}{y^2} = 1$
33. Prove that: $\frac{1}{1 + \sin \theta} + \frac{1}{1 - \sin \theta} = 2 \sec^2 \theta$
34. Prove that: $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$
35. Prove: $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \frac{\cos A}{1 - \sin A}$

36. Prove that $\sin(90 - \theta) \cos(90 - \theta) = \frac{\tan \theta}{1 + \tan^2 \theta}$

37. If $x = a \sec \theta + b \tan \theta$ and $y = a \tan \theta + b \sec \theta$ prove that $x^2 - y^2 = a^2 - b^2$

38. Show that $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$

39. Prove that $\sec^2 \theta + \operatorname{cosec}^2 \theta = \sec^2 \theta \cdot \operatorname{cosec}^2 \theta$

40. Prove that $\frac{\cot \theta}{1 + \tan \theta} = \frac{\cot \theta - 1}{2 - \sec^2 \theta}$

41. Prove that $\frac{1 - \sin \theta}{1 + \sin \theta} = (\sec \theta - \tan \theta)^2$

42. Prove that: $\frac{\tan^2 A - \tan^2 B}{\cos^2 A \cdot \cos^2 B} = \frac{\sin^2 A - \sin^2 B}{\cos^2 A \cdot \cos^2 B}$

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

44. Prove that $(\operatorname{cosec} \theta - \cot \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$

45. Prove that $\frac{1}{(\sec \theta - \tan \theta)} - \frac{1}{\cos \theta} = \frac{1}{\cos \theta} - \frac{1}{(\sec \theta + \tan \theta)}$

46. Prove that

$$\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$$

47. Prove that $\sec^4 \theta - \tan^4 \theta = 1 + 2 \tan^2 \theta$

48. Show that $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$

49. If $\sec \theta + \tan \theta = p$, prove that $\sin \theta = \frac{p^2 - 1}{p^2 + 1}$

50. Prove that $\frac{\tan \theta + \sin \theta}{\tan \theta - \sin \theta} = \frac{\sec \theta + 1}{\sec \theta - 1}$

PREPARED BY: MAHABOOB PASHA IX – X BOYS