INTERNATIONAL INDIAN SCHOOL, RIYADH

CLASS: X TOPIC: TRIGONOMETRY

1. If $\cot\theta = 15/8$, evaluate $\dfrac{(2 + 2\sin\theta)(1 - \sin\theta)}{(1 + \cos\theta)(2 - 2\cos\theta)}$ (225/64)

2. If $\tan A = 2$. Evaluate $\sec A \sin A + \tan^2 A - \operatorname{cosec} A$ $\left(\dfrac{12 - \sqrt{5}}{2}\right)$

3. In a ΔABC, right angled at A, if $\tan C = \sqrt{3}$, find the value of $\sin B \cos C + \cos B \sin C$ (1)

4. in ΔPQR, right angled at Q, QR = 6 cm, $\angle QPR = 60^\circ$. Find the length of PQ and PR

5. If $\sec\theta - \tan\theta = 4$, then prove that $\cos\theta = 8/17$

6. Evaluate: $\sqrt{2}\tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$ ($\sqrt{2}$)

7. Evaluate: $\tan^2 60^\circ - 2\cos^2 60^\circ - \frac{3}{4}\sin^2 45^\circ - 4\sin^2 30^\circ$ (9/8)

8. Evaluate: $(\sin 90^\circ + \cos 45^\circ + \cos 60^\circ)(\cos 0^\circ - \sin 45^\circ + \sin 30^\circ)$ (7/4)

9. If $\sin 2x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$, find x (15)

10. Determine the value of x such that $2\operatorname{cosec}^2 30° + x\sin^2 60° - \frac{3}{4}\tan^2 30° = 10$ (x = 3)

11. If $A = B = 30^\circ$, verify that :
    $\sin(A + B) = \sin A \cos B + \cos A \sin B$

12. If $\sec\theta(1+\sin\theta)(1-\sin\theta) = k$, find the value of k (k = 1)

13. Evaluate: $\dfrac{\sec^2 54^\circ - \cot^2 36^\circ}{\operatorname{Cosec}^2 57^\circ - \tan^2 33^\circ} + 2\sin^2 38^\circ \sec^2 52^\circ - \sin^2 45^\circ$ (5/2)

14. Evaluate: $\sec(90 - \theta)\operatorname{cosec}\theta - \tan(90 - \theta)\cot\theta + \dfrac{\cos^2 35 + \cos^2 55}{\tan 5^\circ \tan 15^\circ \tan 45^\circ \tan 75^\circ \tan 85^\circ}$ (2)

15. Find the value of:
    $\dfrac{2\sin 68^\circ}{\cos 22^\circ} - \dfrac{2\cot 15^\circ}{5\tan 75^\circ} - \dfrac{3\tan 45^\circ \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5}$ (1)

16. If $\cos(40^\circ + x) = \sin 30^\circ$, find the value of x ($20^\circ$)

17. $\sin 4A = \cos(A - 20^\circ)$, where 4A is an acute angle, find the value of A (22°)

18. Find the value of θ in $2\cos 3\theta = 1$ (20°)

19. Solve for θ: $2\sin^2\theta = \frac{1}{2}$ (30°)

20. If $\sin\theta + \cos\theta = \sqrt{2}\cos(90^\circ - \theta)$, determine $\cot\theta$ ($\sqrt{2} - 1$)

21. Find the acute angles A and B, A>B, if $\sin(A + 2B) = \sqrt{3}/2$ and $\cos(A + 4B) = 0$ (30°, 15°)

22. If $\tan(A + B) = \sqrt{3}$, $\tan(A - B) = 1$, $0^\circ < A + B \le 90^\circ$, a>b, then find A and B (52.5, 7.5)

23. If $\sin(A + B) = 1$, $\cos(A - B) = 1$, find A and B (45°, 45°)

24. If $\sin A - \cos B = 0$, prove that $A + B = 90^\circ$

25. What is the maximum value of $1/\sec\theta$

26. Express $\cos 56^\circ + \cot 56^\circ$ in terms of 0° and 45°

27. Express cosA in terms of tanA

28. Find the value of $\tan 60^\circ$ geometrically

29. If A, B and C are interior angles of triangle ABC, show that $\cos\left\{\dfrac{B+C}{2}\right\} = \sin\dfrac{A}{2}$

30. If $x = a\sin\theta$, $y = b\tan\theta$. Prove that $\dfrac{a^2}{x^2} - \dfrac{b^2}{y^2} = 1$

31. Prove that: $\dfrac{1}{1 + \sin\theta} + \dfrac{1}{1 - \sin\theta} = 2\sec^2\theta$

32. Prove that: $\dfrac{\sin\theta}{1 + \cos\theta} + \dfrac{1 + \cos\theta}{\sin\theta} = 2\operatorname{cosec}\theta$

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

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

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

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

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

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

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

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

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

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

43. Prove that

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

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

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

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

47. Prove that $\dfrac{\tan\theta + \sin\theta}{\tan\theta - \sin\theta} = \dfrac{\sec\theta + 1}{\sec\theta - 1}$

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