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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 $7\sin^2\theta + 3\cos^2\theta = 4$, show that $\tan\theta = 1/\sqrt{3}$

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

4. 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)

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

6. If $\sec^2\theta(1+\sin\theta)(1-\sin\theta) = k$, find the value of k (k = 1)

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

8. 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)

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

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

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

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

13. 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)

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

15. If $\dfrac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \dfrac{5}{3}$, evaluate $\dfrac{7\tan\theta + 2}{2\tan\theta + 7}$ (2)

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

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

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

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

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