

SELF ASSESSMENT TEST -4**CLASS 10+1****TRIGONOMETRY**

1. Prove that $\frac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = \frac{-\sin 2x}{\cos 10x}$
2. Prove that $(\sin 3A + \sin A) \sin A + (\cos 3A - \cos A) \cos A = 0$
3. Prove that $\cot 4x (\sin 5x + \sin 3x) = \cot x (\sin 5x - \sin 3x)$
4. Prove that $\sin x + \sin \left(x + \frac{2\pi}{3}\right) + \sin \left(x + \frac{4\pi}{3}\right) = 0$
5. Prove that $\cos \left(\frac{\pi}{4} + x\right) + \cos \left(\frac{\pi}{4} - x\right) = \sqrt{2} \cos x$
6. Prove that $\sin 47^\circ + \cos 77^\circ = \cos 17^\circ$
7. Prove that $\sin A + \sin 2A + \sin 4A + \sin 5A = 4 \cos \frac{A}{2} \cos \frac{3A}{2} \sin 3A$
8. Prove that $\sin 3A + \sin 2A - \sin A = 4 \sin A \cos \frac{A}{2} \cos \frac{3A}{2}$
9. Prove that $\frac{\cos 4A + \cos 3A + \cos 2A}{\sin 4A + \sin 3A + \sin 2A} = \cot 3A$
10. If $\sin A = n \sin (A + 2B)$, prove that $\tan (A+B) = \frac{1+n}{1-n} \tan B$.
11. If $\cos A + \cos B = \frac{1}{2}$ and $\sin A + \sin B = \frac{1}{4}$, prove $\tan \left(\frac{A+B}{2}\right) = \frac{1}{2}$.
12. Prove $\sin \alpha + \sin \beta + \sin \gamma - \sin(\alpha + \beta + \gamma) = 4 \sin \left(\frac{\alpha + \beta}{2}\right) \sin \left(\frac{\beta + \gamma}{2}\right) \sin \left(\frac{\gamma + \alpha}{2}\right)$.
13. Prove that $\cos A + \cos \left(A + \frac{2\pi}{3}\right) + \cos \left(A + \frac{4\pi}{3}\right) = 0$
14. prove $(\cos \alpha - \cos \beta)^2 + (\sin \alpha - \sin \beta)^2 = 4 \sin^2 \left(\frac{\alpha - \beta}{2}\right)$.
15. If $\sin A + \sin B = \sqrt{3} (\cos A - \cos B)$ prove $\sin 3A + \sin 3B = 0$.

16. If $\cos(A+B) \sin(C-D) = \cos(A-B) \sin(C+D)$, prove that

$$\tan A \tan B \tan C + \tan D = 0$$

17. $\operatorname{cosec} A + \sec A = \operatorname{cosec} B + \sec B$, prove $\tan A \tan B = \cot \frac{A+B}{2}$.

18. Prove that $\frac{\cos 6A + 6 \cos 4A + 15 \cos 2A + 10}{\cos 5A + 5 \cos 3A + 10 \cos A} = 2 \cos A$

19. Prove $2 \cos \frac{\pi}{13} \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$

20. Prove $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$

21. Prove that $\sin A \sin(60^\circ - A) \sin(60^\circ + A) = \frac{1}{4} \sin 3A$

22. Prove $4 \cos 12^\circ \cos 48^\circ \cos 72^\circ = \cos 36^\circ$.

23. Prove $\tan(60^\circ + A) \tan(60^\circ - A) = \frac{2 \cos 2A + 1}{2 \cos 2A - 1}$

24. Prove $\sin A \sin(B-C) + \sin B \sin(C-A) + \sin C \sin(A-B) = 0$

25. If $A+B = 90^\circ$, find the maximum and minimum values of

$$\sin A \sin B$$

