UDAAN 2025

TRIGONOMETRY (Level - 01)

Practice Sheet

Prove the following trigonometric identities:

1. $(1-\cos^2 A)\operatorname{cosec}^2 A = 1$
2. $\tan^2\theta\cos^2\theta = 1-\cos^2\theta$
3. $\operatorname{cosec}\theta\sqrt{1-\cos^2\theta} = 1$
4. $(\sec^2\theta - 1)(\operatorname{cosec}^2\theta - 1) = 1$
5. $\tan\theta + \dfrac{1}{\tan\theta} = \sec\theta\operatorname{cosec}\theta$
6. $\dfrac{\cos\theta}{1-\sin\theta} = \dfrac{1+\sin\theta}{\cos\theta}$
7. $\sin^2 A + \dfrac{1}{1+\tan^2 A} = 1$
8. $\sqrt{\dfrac{1-\cos\theta}{1+\cos\theta}} = \operatorname{cosec}\theta - \cot\theta$
9. $\dfrac{1-\cos\theta}{\sin\theta} = \dfrac{\sin\theta}{1+\cos\theta}$
10. $\dfrac{1-\sin\theta}{1+\sin\theta} = (\sec\theta - \tan\theta)^2$
11. $\dfrac{(1+\cot^2\theta)\tan\theta}{\sec^2\theta} = \cot\theta$
12. $\tan^2\theta - \sin^2\theta = \tan^2\theta\sin^2\theta$
13. $(\sec\theta + \cos\theta)(\sec\theta - \cos\theta) = \tan^2\theta + \sin^2\theta$
14. $\sec A(1-\sin A)(\sec A + \tan A) = 1$
15. $(\operatorname{cosec} A - \sin A)(\sec A - \cos A)(\tan A + \cot A) = 1$
16. $\sin^2 A\cot^2 A + \cos^2 A\tan^2 A = 1$
17. $\cot\theta - \tan\theta = \dfrac{2\cos^2\theta - 1}{\sin\theta\cos\theta}$
18. $\dfrac{\cos^2\theta}{\sin\theta} - \operatorname{cosec}\theta + \sin\theta = 0$
19. $\dfrac{1}{1+\sin A} + \dfrac{1}{1-\sin A} = 2\sec^2 A$
20. $\dfrac{1+\sin\theta}{\cos\theta} + \dfrac{\cos\theta}{1+\sin\theta} = 2\sec\theta$ **[NCERT]**
21. $\dfrac{(1+\sin\theta)^2 + (1-\sin\theta)^2}{2\cos^2\theta} = \dfrac{1+\sin^2\theta}{1-\sin^2\theta}$
22. $\dfrac{1+\tan^2\theta}{1+\cot^2\theta} = \left(\dfrac{1-\tan\theta}{1-\cot\theta}\right)^2 = \tan^2\theta$ **[NCERT]**
23. $\dfrac{1+\sec\theta}{\sec\theta} = \dfrac{\sin^2\theta}{1-\cos\theta}$ **[NCERT]**
24. $\dfrac{(1+\tan^2\theta)\cot\theta}{\operatorname{cosec}^2\theta} = \tan\theta$
25. $\dfrac{1+\cos A}{\sin^2 A} = \dfrac{1}{1-\cos A}$
26. $\dfrac{\sec A - \tan A}{\sec A + \tan A} = \dfrac{\cos^2 A}{(1+\sin A)^2}$
27. $\dfrac{1+\cos A}{\sin A} = \dfrac{\sin A}{1-\cos A}$
28. $\sqrt{\dfrac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

29. $\sqrt{\frac{1-\cos A}{1+\cos A}}+\sqrt{\frac{1+\cos A}{1-\cos A}}=2\operatorname{cosec} A$

30. $(\sec A-\tan A)^2=\frac{1-\sin A}{1+\sin A}$

31. $\frac{1}{\sec A-1}+\frac{1}{\sec A+1}=2\operatorname{cosec} A\cot A$

32. $\frac{\tan A+\tan B}{\cot A+\cot B}=\tan A\tan B$

33. $\tan^2 A\sec^2 B-\sec^2 A\tan^2 B=\tan^2 A-\tan^2 B$

Answer Key

1. **(Prove)**
2. **(Prove)**
3. **(Prove)**
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