

Practices Questions

Prove the following statements:

1. $\cos^4 A - \sin^4 A + 1 = 2\cos^2 A$.
2. $(\sin A + \cos A)(1 - \sin A \cos A) = \sin^3 A + \cos^3 A$.
3. $\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} = 2\operatorname{cosec} A$.
4. $\cos^6 A + \sin^6 A = 1 - 3\sin^2 A \cos^2 A$.
5. $\sqrt{\frac{1 - \sin A}{1 + \sin A}} = \sec A - \tan A$
6. $\frac{\operatorname{cosec} A}{\operatorname{cosec} A - 1} + \frac{\operatorname{cosec} A}{\operatorname{cosec} A + 1} = 2\sec^2 A$
7. $\frac{\operatorname{cosec} A}{\cot A + \tan A} = \cos A$
8. $(\sec A + \cos A)(\sec A - \cos A) = \tan^2 A + \sin^2 A$
9. $\frac{1}{\cot A + \tan A} = \sin A \cos A$
10. $\frac{1}{\sec A - \tan A} = \sec A + \tan A$
11. $\frac{1 - \tan A}{1 + \tan A} = \frac{\cot A - 1}{\cot A + 1}$
12. $\frac{1 + \tan^2 A}{1 + \cot^2 A} = \frac{\sin^2 A}{\cos^2 A}$
13. $\frac{\sec A - \tan A}{\sec A + \tan A} = 1 - 2\sec A \tan A + 2\tan^2 A$
14. $\frac{\tan A}{1 - \cot A} + \frac{\cot A}{1 - \tan A} = \sec A \operatorname{cosec} A + 1$.
15. $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$
16. $(\sin A + \cos A)(\cot A + \tan A) = \sec A + \operatorname{cosec} A$.
17. $\sec^4 A - \sec^2 A = \tan^4 A + \tan^2 A$
18. $\cot^4 A + \cot^2 A = \operatorname{cosec}^4 A - \operatorname{cosec}^2 A$.
19. $\sqrt{\operatorname{cosec}^2 A - 1} = \cos A \operatorname{cosec} A$
20. $\sec^2 A \operatorname{cosec}^2 A = \tan^2 A + \cot^2 A + 2$.
21. $\tan^2 A - \sin^2 A = \sin^4 A \sec^2 A$.

(MATHEMATICS)

Compound Angles

22. $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2.$

23. $\frac{1}{\operatorname{cosec} A - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\operatorname{cosec} A + \cot A}.$

24. $\frac{\cot A \cos A}{\cot A + \cos A} = \frac{\cot A - \cos A}{\cot A \cos A}$

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

26. $\left(\frac{1}{\sec^2 \alpha - \cos^2 \alpha} + \frac{1}{\operatorname{cosec}^2 \alpha - \sin^2 \alpha} \right) \cos^2 \alpha \sin^2 \alpha = \frac{1 - \cos^2 \alpha \sin^2 \alpha}{2 + \cos^2 \alpha \sin^2 \alpha}$

27. $\frac{\cos A \operatorname{cosec} A - \sin A \sec A}{\cos A + \sin A} = \operatorname{cosec} A - \sec A$

28. $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$

29. $(\tan \alpha + \operatorname{cosec} \beta)^2 - (\cot \beta - \sec \alpha)^2 = 2 \tan \alpha \cot \beta (\operatorname{cosec} \alpha + \sec \beta)$

30. $2 \sec^2 \alpha - \sec^4 \alpha - 2 \operatorname{cosec}^2 \alpha + \operatorname{cosec}^4 \alpha = \cot^4 \alpha - \tan^4 \alpha$

31. $(\sin \alpha + \operatorname{cosec} \alpha)^2 + (\cos \alpha + \sec \alpha)^2 = \tan^2 \alpha + \cot^2 \alpha + 7$

32. $(1 + \cot A + \tan A)(\sin A - \cos A) = \frac{\sec A}{\operatorname{cosec}^2 A} - \frac{\operatorname{cosec} A}{\sec^2 A}$