

ASSIGNMENT (10 CLASS)

***ALL QUESTIONS ARE MANDATORY TO SOLVE ON OWN PREMISES**

LAST DATE = 18 Feb 2023 till *4PM

CHAPTER = TRIGONOMETRIC IDENTITIES

Section A (40 Questions)

Prove the following Trigonometric Identities

1. $(1 - \cos^2 A) \operatorname{cosec}^2 A = 1$
2. $(1 + \cot^2 A) \sin^2 A = 1$
3. $\tan^2 \theta \cos^2 \theta = 1 - \cos^2 \theta$
4. $\operatorname{cosec} \theta \sqrt{1 - \cos^2 \theta} = 1$
5. $(\sec^2 \theta - 1)(\operatorname{cosec}^2 \theta - 1) = 1$
6. $\tan \theta + 1/\tan \theta = \sec \theta \operatorname{cosec} \theta$
7. $\cos \theta / (1 - \sin \theta) = (1 + \sin \theta) / \cos \theta$
8. $\cos \theta / (1 + \sin \theta) = (1 - \sin \theta) / \cos \theta$
9. $\cos^2 \theta + 1/(1 + \cot^2 \theta) = 1$
10. $\sin^2 A + 1/(1 + \tan^2 A) = 1$
- 11.

$$\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = \operatorname{cosec} \theta - \cot \theta$$

12. $1 - \cos \theta / \sin \theta = \sin \theta / 1 + \cos \theta$
13. $\sin \theta / (1 - \cos \theta) = \operatorname{cosec} \theta + \cot \theta$
14. $(1 - \sin \theta) / (1 + \sin \theta) = (\sec \theta - \tan \theta)^2$
- 15.

$$\frac{(1 + \cot^2 \theta) \tan \theta}{\sec^2 \theta} = \cot \theta$$

16. $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$
17. $(\operatorname{cosec} \theta + \sin \theta)(\operatorname{cosec} \theta - \sin \theta) = \cot^2 \theta + \cos^2 \theta$
18. $(\sec \theta + \cos \theta)(\sec \theta - \cos \theta) = \tan^2 \theta + \sin^2 \theta$
19. $\sec A(1 - \sin A)(\sec A + \tan A) = 1$
20. $(\operatorname{cosec} A - \sin A)(\sec A - \cos A)(\tan A + \cot A) = 1$

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21. $(1 + \tan^2 \theta)(1 - \sin \theta)(1 + \sin \theta) = 1$

22. $\sin^2 A \cot^2 A + \cos^2 A \tan^2 A = 1$

23.

(i) $\cot \theta - \tan \theta = \frac{2 \cos 2\theta - 1}{\sin \theta * \cos \theta}$

(ii) $\tan \theta - \cot \theta = \left(\frac{2 \sin^2 \theta - 1}{\sin \theta * \cos \theta} \right)$

24. $(\cos^2 \theta / \sin \theta) - \operatorname{cosec} \theta + \sin \theta = 0$

25.

$$\frac{1}{1 + \sin A} + \frac{1}{1 - \sin A} = 2 \sec^2 A$$

26.

$$\frac{(1 + \sin \theta)^2 + (1 - \sin \theta)^2}{2 \cos^2 \theta} = \frac{1 + \sin^2 \theta}{1 - \sin^2 \theta}$$

27.

$$\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \tan \theta + \cot \theta$$

28. $\sec^6 \theta = \tan^6 \theta + 3 \tan^2 \theta \sec^2 \theta + 1$

29. $\operatorname{cosec}^6 \theta = \cot^6 \theta + 3 \cot^2 \theta \operatorname{cosec}^2 \theta + 1$

30.

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$$\frac{(1 + \tan^2 \theta) \cot \theta}{\operatorname{cosec}^2 \theta} = \tan \theta$$

31.

$$\frac{1 + \cos A}{\sin^2 A} = \frac{1}{1 - \cos A}$$

32.

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

33.

$$1 + \frac{\cos A}{\sin A} = \frac{\sin A}{1 - \cos A}$$

34.

$$\frac{(\operatorname{cosec} A)}{(\operatorname{cosec} A - 1)} + \frac{(\operatorname{cosec} A)}{(\operatorname{cosec} A + 1)} = 2 \sec^2 A$$

35.

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$$\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A} = \sin A + \cos A$$

36.

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

37.

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

38.

$$\frac{\sec \theta - 1}{\sec \theta + 1} = \left(\frac{\sin \theta}{1 + \cos \theta} \right)^2$$

39.

$$\sqrt{\frac{(1 + \cos \theta)}{(1 - \cos \theta)}} + \sqrt{\frac{(1 - \cos \theta)}{(1 + \cos \theta)}} = 2 \operatorname{cosec} \theta$$

40.

$$\sqrt{\frac{(\sec \theta - 1)}{(\sec \theta + 1)}} + \sqrt{\frac{(\sec \theta + 1)}{(\sec \theta - 1)}} = 2 \operatorname{cosec} \theta$$

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Section –B(5 Questions)

41. If $\cos \theta = 4/5$, find all other trigonometric ratios of angle θ .

42. If $\sin \theta = 1/\sqrt{2}$, find all other trigonometric ratios of angle θ .

43.

If $\tan \theta = \frac{1}{\sqrt{2}}$, find the value of $\frac{\operatorname{cosec}^2 \theta - \sec^2 \theta}{\operatorname{cosec}^2 \theta + \cot^2 \theta}$.

44.

If $\tan \theta = \frac{3}{4}$, find the value of $\frac{1 - \cos \theta}{1 + \cos \theta}$

45.

If $\operatorname{cosec} A = \sqrt{2}$, find the value of $\frac{2 \sin^2 A + 3 \cot^2 A}{4(\tan^2 A - \cos^2 A)}$.

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Section –C (5 Questions)

46. Evaluate $\cos 60^\circ \sin 30^\circ + \sin 60^\circ \cos 30^\circ$.
47. If $3x = \sec \theta$ then find $9(x^2 - 1/x^2) = \tan \theta$
48. Evaluate $\operatorname{cosec} (65^\circ + \theta) - \sec (25^\circ - \theta) - \tan (55^\circ - \theta) + \cot (35^\circ + \theta)$.
49. If $\sin \theta + \cos \theta = \sqrt{2}$, then evaluate $\tan \theta + \cot \theta$ [CBSE Sample Paper-2017]
50. If $7 \sin^2 A + 3 \cos^2 A = 4$, show that $\tan A = 1/3$. [CBSE Delhi 2016]