

St. Mary's School, Dwarka
Holiday Homework
Class – XI
Subject: Mathematics
Week 1
Worksheet-1

(TRIGONOMETRIC FUNCTIONS)

Q1 to Q20 carry 2 marks each

- 1.** If $2 \sin (3x - 15^\circ) = \sqrt{3}$.

Find the value of $\sin^2 (2x + 10^\circ) + \tan^2 (x + 5^\circ)$

- 2.** If $\sec \theta + \tan \theta = 4$. Prove that $\cos \theta = 8/17$.

- 3.** If $\tan (A + B) = \sqrt{3}$ and $\tan (A - B) = 1/\sqrt{3}$

$0^\circ \leq (A + B) \leq 90^\circ$; $A > B$

Find the value of $\cos (2A - 3B)$.

- 4.** If $\sin A + \sin^2 A = 1$ prove that $\cos^2 A + \cos^4 A = 1$

- 5.** If $\operatorname{cosec} A + \cot A = m$ and $\operatorname{cosec} A - \cot A = n$ prove that $mn = 1$.

- 6.** If $\sec \theta + \tan \theta = p$

Show that $\frac{p^2 - 1}{p^2 + 1} = \sin \theta$

If $\operatorname{cosec} \theta + \cot \theta = p$

Show that

$$\frac{p^2 - 1}{p^2 + 1} = \cos \theta$$

- 7.** Evaluate-

$$\frac{\operatorname{Sec} 39^\circ}{\operatorname{Cosec} 51^\circ} + 2 [\tan 17^\circ \tan 38^\circ \tan 60^\circ \tan 52^\circ \tan 73^\circ] - 3 (\sin^2 31^\circ + \sin^2 59^\circ)$$

- 8.** Prove that

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

- 9.** Prove that

$$(1 + \cot \theta)^2 + (1 - \cot \theta)^2 = 2 \operatorname{cosec}^2 \theta.$$

10. Prove that

$$\text{Cosec } \theta (1 + \cos \theta) (\csc \theta - \cot \theta) = 1$$

11. Prove that

$$(1 + \cos A) (1 - \cos A) (1 + \cot^2 A) = 1$$

12. Prove that

$$\frac{\cos \theta}{1 + \sin \theta} + \frac{1 + \sin \theta}{\cos \theta} = 2 \sec \theta$$

13. Prove that

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

14. Prove that

$$(\csc \theta - \sin \theta) (\sec \theta - \cos \theta) (\tan \theta + \cot \theta).$$

15. Prove that

$$\frac{\cos^3 \theta - \sin^3 \theta}{\cos \theta - \sin \theta} + \frac{\cos^3 \theta + \sin^3 \theta}{\cos \theta + \sin \theta} = 2$$

16. Prove that

$$\frac{\cot \theta + \csc \theta - 1}{\cot \theta - \csc \theta + 1} = \frac{1 + \cos \theta}{\sin \theta}$$

17. Prove that

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

18. Prove that

$$\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta}$$

19. Prove that

$$\frac{\cos \theta - \sin \theta + 1}{\cos \theta + \sin \theta - 1} = \csc \theta + \cot \theta$$

20. Prove that

$$\frac{1}{(\cos \theta + \sin \theta - 1)} = \frac{1}{(\cos \theta + \sin \theta + 1)} = \text{Cosec } \theta + \sec \theta$$