

# HOLIDAY ASSIGNMENT – 1

STD. – XI

SUB – MATHS

1. Prove that  $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \cdot \sin^2 \theta$ .
2. If  $\tan x = \frac{3}{4}$  and  $x$  lies in the 3<sup>rd</sup> quadrant then, find the value of  $\sec x$ .
3. Prove that  $\sec^2 \theta + \operatorname{cosec}^2 \theta \geq 4$ .
4. Find the value of  $\tan 15^\circ$ .
5. Prove that :  $\frac{\cos 17^\circ + \sin 17^\circ}{\cos 17^\circ - \sin 17^\circ} = \tan 62^\circ$ .
6. Find the value of  $\sin 135^\circ \cdot \operatorname{cosec} 225^\circ \cdot \tan 150^\circ \cdot \cot 315^\circ$ .
7. If  $\tan \alpha = \frac{m}{m+1}$ ,  $\tan \beta = \frac{1}{2m+1}$ , find the value of  $\alpha + \beta$ .
8. Prove that  $\sin^2 A = \cos^2(A - B) + \cos^2 B - 2 \cos(A - B) \cdot \cos A \cdot \cos B$ .
9. Prove that  $\sin 10^\circ \cdot \sin 30^\circ \cdot \sin 50^\circ \cdot \sin 70^\circ = \frac{1}{16}$ .
10. If  $a \sin \theta = b \sin \left( \theta + \frac{2\pi}{3} \right) = c \cdot \sin \left( \theta + \frac{4\pi}{3} \right)$ , then prove that,  
$$ab + bc + ca = 0$$
.
11. Prove that  $\cos 6\theta = 32 \cos^6 \theta - 48 \cos^4 \theta + 18 \cos^2 \theta - 1$ .
12. Prove that  $\tan 4x = \frac{4 \tan x(1 - \tan^2 x)}{1 - 6 \tan^2 x + \tan^4 x}$ .

## HOLIDAY ASSIGNMENT – 2

STD. – XI

SUB – MATHS

1. If  $\sin \theta + \operatorname{cosec} \theta = 2$ , find the value of  $\sin^n \theta + \operatorname{cosec}^n \theta$ .
2. Find the value of  $\sin 23^\circ \cdot \cos 67^\circ + \cos 23^\circ \cdot \sin 67^\circ$ .
3. Find the value of  $\tan 105^\circ$ .
4. If  $\tan A - \tan B = x$ ,  $\cot B - \cot A = y$ , prove that  $\cot(A - B) = \frac{1}{x} + \frac{1}{y}$ .
5. If  $\cos(\alpha + \beta) = \frac{4}{5}$  and  $\sin(\alpha - \beta) = \frac{5}{13}$ ,  $\alpha, \beta$  lie between 0 and  $\frac{\pi}{4}$ , then prove that  $\tan 2\alpha = \frac{56}{33}$ .
6. If  $\cos A = \frac{2}{3}$ , then find the value of  $\cos 2A$ .
7. Find in degrees, the angle between the hour hand and the minute hand of a clock at half past three.
8. Prove that:  $\frac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x} = \tan 4x$ .
9. If  $\cos(\alpha + \beta) \cdot \sin(\gamma + \delta) = \cos(\alpha - \beta) \cdot \sin(\gamma - \delta)$ , prove that,  
 $\cot \alpha \cdot \cot \beta \cdot \cot \gamma = \cot \delta$ .
10. If  $\alpha + \beta = 90^\circ$ , find maximum and minimum values of  $\sin \alpha \cdot \sin \beta$ .
11. If  $\tan x = \frac{3}{4}$ ,  $\pi < x < \frac{3\pi}{2}$ , find the values of  $\sin \frac{x}{2}$ ,  $\cos \frac{x}{2}$ ,  $\tan \frac{x}{2}$ .
12. Prove that  $\cos^3 A + \cos^3(120 + A) + \cos^3(240 + A) = \frac{3}{4} \cdot \cos 3A$ .

# HOLIDAY ASSIGNMENT - 3

STD. - XI

SUB - MATHS

1. If  $\cot x = -\frac{5}{12}$ ,  $x$  lies in the 2<sup>nd</sup> quadrant, find the value of  $\operatorname{cosec} x$ .

2. If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ , prove that,  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ .

3. If  $3 \tan A \cdot \tan B = 1$ , prove that,  $2 \cos(A + B) = \cos(A - B)$ .

4. Prove that  $\sin^2\left(\frac{\pi}{8} - \frac{A}{2}\right) = \frac{1}{\sqrt{2}} \cdot \sin A$ .

5. If  $\theta + \Phi = \alpha$  and  $\tan \theta = K \cdot \tan \Phi$ , then prove that,

$$\sin(\theta - \Phi) = \frac{K-1}{K+1} \cdot \sin \alpha.$$

6. If  $a \sin \theta = b \cos \theta$ , then find the value of  $\sin 2\theta$ .

7. Express  $48^\circ 37' 30''$  in radians.

8. Prove that:  $(\cos A - \cos B)^2 + (\sin A - \sin B)^2 = 4 \cdot \sin^2 \frac{A-B}{2}$ .

9. Prove that:  $\frac{\cos 4x + \cos 3x + \cos 2x}{\sin 4x + \sin 3x + \sin 2x} = \cot 3x$ .

10. Prove that  $\cos 20 \cdot \cos 40 \cdot \cos 60 \cdot \cos 80 = \frac{1}{16}$ .

11. Prove that  $\cot 7\frac{1}{2} = (\sqrt{3} + \sqrt{2})(\sqrt{2} + 1)$ .

12. Prove that  $\frac{\sec 8\theta - 1}{\sec 4\theta - 1} = \frac{\tan 8\theta}{\tan 2\theta}$ .

**ASSIGNMENT : 4 & 5**

**SOLVE THE QUESTIONS FROM NCERT MISC.EXERCISE (TRIGONOMETRY)**