

Board –

Class –

Topic –

1. Prove that  $\frac{1}{\sec A} - \frac{\tan A - 1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A + \tan A}$
2. If  $\sin \theta = \frac{12}{13}$ ,  $0^\circ < \theta < 90^\circ$ , find the value of:  $\frac{\sin^2 \theta - \cos^2 \theta}{2 \sin \theta \cdot \cos \theta} \times \frac{1}{\tan^2 \theta}$
3. If  $7\sin^2 A + 3\cos^2 A = 4$ , show that  $\tan A = \frac{1}{\sqrt{3}}$
4. If  $\sin A = \cos A$ , find the value of  $2\tan^2 A + \sin^2 A - 1$
5. Show that  $\operatorname{cosec}^2 \theta - \tan^2(90^\circ - \theta) = \sin^2 \theta + \sin^2(90^\circ - \theta)$ .
6. ABC is a triangle right angled at C and  $AC = \sqrt{3} BC$ . Prove that  $\angle ABC = 60^\circ$
7. If  $\tan(A - B) = \frac{1}{\sqrt{3}}$  and  $\tan(A + B) = \sqrt{3}$ , find A and B
8. In an acute angled triangle ABC, if  $\sin(A + B - C) = \frac{1}{2}$  and  $\cos(B + C - A) = \frac{1}{\sqrt{2}}$  find  $\angle A$ ,  $\angle B$  and  $\angle C$
9. If  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$ , prove that  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$
10. Prove that:  $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$ .
11. Prove that:  $\sin \theta (1 + \tan \theta) + \cos \theta (1 + \cot \theta) = \sec \theta + \operatorname{cosec} \theta$ .
12. If  $\sec A = x + \frac{1}{4x}$ , prove that  $\sec A + \tan A = 2x$  or  $\frac{1}{2x}$
13. If  $\sec \theta - \tan \theta = x$ , show that:  $\sec \theta = \frac{1}{2(\frac{x+1}{x})}$  and  $\tan \theta = \frac{1}{2(\frac{x-1}{x})}$
14. Given that  $\cos(A - B) = \cos A \cdot \cos B + \sin A \cdot \sin B$ , find the value of  $\cos 15^\circ$  in two ways.
  - (a) Taking  $A = 60^\circ$ ,  $B = 45^\circ$  and
  - (b) Taking  $A = 45^\circ$ ,  $B = 30^\circ$
15. Prove that:  $(\sec \theta + \tan \theta)^2 = \frac{\operatorname{cosec} \theta + 1}{\operatorname{cosec} \theta - 1}$
16. Evaluate:  $\frac{4}{\cot^2 30^\circ} + \frac{1}{\sin^2 60^\circ - \cos^2 45^\circ}$
17. Evaluate:  $4(\sin 430^\circ + \cos 460^\circ) - 3(\cos^2 45^\circ - \sin^2 90^\circ)$
18. Prove that  $\frac{1}{\operatorname{cosec} A + \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\operatorname{cosec} A - \cot A}$
19. In an acute angled triangle ABC, if  $\sin(A + B - C) = \frac{1}{2}$  and  $\cos(B + C - A) = \frac{1}{\sqrt{2}}$   $\angle A$ ,  $\angle B$  and  $\angle C$
20. Determine the value of x such that  $2 \operatorname{cosec}^2 30^\circ + x \sin^2 60^\circ - \frac{3}{4 \tan^2 30^\circ} = 10$ .

# MATHEMATICS



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