

Subjective Questions

1. If $4 \tan \theta = 3$, then the value of $\left(\frac{4 \sin \theta - \cos \theta}{4 \sin \theta + \cos \theta} \right)$.
2. Prove that $\sqrt{(1 - \cos^2 \theta) \sec^2 \theta} = \tan \theta$
3. If $\cos A + \cos^2 A = 1$, then find the value of $\sin^2 A + \sin^4 A = 1$.
4. If $\sec \theta + \tan \theta = x$, show that $\frac{x^2 - 1}{x^2 + 1} = \sin \theta$.
5. Prove that $\sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} = \tan \theta + \cot \theta$
6. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$. Prove that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$
7. If $A = 60^\circ$ and $B = 30^\circ$. Verify that $\sin(A + B) = \sin A \cos B + \cos A \sin B$.
8. Prove that $\frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta - 1} + \frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta + 1} = 2 \sec^2 \theta$
9. Prove that $\sqrt{\frac{1 - \cos A}{1 + \cos A}} = \operatorname{cosec} A - \cot A$
10. Prove that $\sec^4 \theta - \sec^2 \theta = \tan^4 \theta + \tan^2 \theta$
11. Find the value of θ of $\frac{\cos \theta}{1 - \sin \theta} + \frac{\cos \theta}{1 + \sin \theta} = 4$; $\theta \leq 90^\circ$
12. If $\sec \theta = x + \frac{1}{4x}$. Prove that $\sec \theta + \tan 2\theta = 2x$ or $\frac{1}{2x}$
13. If $\tan A + \sin A = m$ and $\tan A - \sin A = n$ show that $m^2 - n^2 = 4\sqrt{mn}$
14. If $\sec \theta + \tan \theta = P$. Show that $\sec \theta - \tan \theta = \frac{1}{P}$. Hence find the value of $\cos \theta$ and $\sin \theta$.
15. Prove that $\frac{\cos \theta - \sin \theta + 1}{\cos \theta + \sin \theta - 1} = \operatorname{cosec} \theta + \cot \theta$
16. If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$. Prove that $m^2 + n^2 = a^2 + b^2$
17. Prove that $\frac{\cos^3 \theta + \sin^3 \theta}{\cos \theta + \sin \theta} + \frac{\cos^3 \theta - \sin^3 \theta}{\cos \theta - \sin \theta} = 2$

18. If $\tan\theta + \cot\theta = 2$ then find the value of $\tan^2\theta + \cot^2\theta$.
19. If $x = 3\sin\theta + 4\cos\theta$ and $y = 3\cos\theta - 4\sin\theta$ then prove that $x^2 + y^2 = 25$
20. Find the value of k if $k + 1 = \sec^2\theta(1 + \sin\theta)(1 - \sin\theta)$
21. If $7\sin^2\theta + 3\cos^2\theta = 4$, show that $\tan\theta = \frac{1}{\sqrt{3}}$
22. If $\tan(A+B) = \sqrt{3}$ and $\tan(A-B) = \frac{1}{\sqrt{3}}$, $0^\circ < A+B < 90^\circ$, $A > B$. Find A and B.
23. Find the value of x $2\operatorname{cosec}^2 30^\circ + x\sin^2 60^\circ - \frac{3}{4}\tan^2 30^\circ = 10$.
24. If $1 + \sin^2\theta = 3\sin\theta\cos\theta$ then prove that $\tan\theta = 1$ or $\frac{1}{2}$.
25. Prove that $2\cos^2\theta + \frac{2}{1 + \cot^2\theta} = 2$
26. Prove that $\sin^6\theta + \cos^6\theta + 3\sin^2\theta\cos^2\theta = 1$
27. If $\sin\theta + \cos\theta = \sqrt{3}$ then prove that $\tan\theta + \cot\theta = 1$.
28. If $\tan\theta + \frac{1}{\tan\theta} = 2$. Find the value of $\tan^2\theta + \frac{1}{\tan^2\theta}$
29. Find x if $\tan 3x = \sin 45^\circ \cos 45^\circ + \sin 30^\circ$.
30. Prove that
- (a) $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$
- (b) $\frac{\sin\theta}{1 - \cos\theta} = \operatorname{cosec}\theta + \cot\theta$.