

# TEST YOUR GRIP

1. If  $\sin x + \cos x = a$ , then  $\sin^6 x + \cos^6 x =$
2. If  $\sin x - \cos x = a$  then  $\sin^4 x + \cos^4 x =$
3. If  $\sin^2 x + 3\cos x - 2 = 0$  then  $\cos^3 x + \sec^3 x =$
4. If  $y = \frac{2\sin x}{1 + \cos x + \sin x}$  then find  $\frac{1 - \cos x + \sin x}{1 + \sin x} =$
5. If  $\cos^2 \alpha - \sin^2 \alpha = \tan^2 \beta$  then show that  $\cos^2 \beta - \sin^2 \beta = \tan^2 \alpha$
6. If  $\sin x + \sin^2 x = 1$  prove  $\cos^2 x + \cos^4 x = 1$
7. If  $\frac{\cos \alpha}{\cos \beta} = n$ ,  $\frac{\sin \alpha}{\sin \beta} = m$ , show that  $(m^2 - n^2) \sin^2 \beta = 1 - n^2$
8. If  $a \cos \theta - b \sin \theta = c$  show that  $a \sin \theta + b \cos \theta = \pm \sqrt{a^2 + b^2 - c^2}$
9. If  $\tan x + \sin x = m$  and  $\tan x - \sin x = n$  prove  $(m^2 - n^2)^2 = 16mn$
10. If  $\tan^2 \theta = 1 - e^2$  prove  $\sec \theta + \tan^3 \theta \operatorname{cosec} \theta = (2 - e^2)^{\frac{3}{2}}$
11. Eliminate  $x$  from the equations  $\tan x + \sin x = m$ ,  $\tan x - \sin x = n$
12. Prove  $\frac{\sin \theta + 1 - \cos \theta}{\sin \theta - 1 + \cos \theta} = \frac{1 + \sin \theta}{\cos \theta}$
13. If  $\sec x + \tan x = p$  find the value of  $\sec x$ ,  $\tan x$ ,  $\sin x$  in term of  $p$
14. Find the value  $3(\sin x - \cos x)^4 + 6(\sin x + \cos x)^2 + 4(\sin^6 x + \cos^6 x) =$
15. If  $10\sin^4 \theta + 15\cos^4 \theta = 6$  find the value of  $27\operatorname{cosec}^6 \theta + \sec^6 \theta$

16.

if  $\frac{\cos^4 \alpha}{\cos^2 \beta} + \frac{\sin^4 \alpha}{\sin^2 \beta} = 1$  prove

(1)  $\frac{\cos^4 \beta}{\cos^2 \alpha} + \frac{\sin^4 \beta}{\sin^2 \alpha} = 1$

(2)  $\sin^4 \alpha + \sin^4 \beta = 2 \sin^2 \alpha \sin^2 \beta$

17. If  $a \sin^3 x + b \cos^3 x = \sin x \cos x$  and  $a \sin x = b \cos x$  prove that

$$a^2 + b^2 = 1$$

18. eliminate B from  $\tan A = n \tan B$  AND  $\sin A = m \sin B$  and prove that

$$\cos^2 A = \frac{m^2 - 1}{n^2 - 1}$$

19. If  $10 \sin^4 x + 15 \cos^4 x = 6$  find the value of  $27 \cos^6 x + 8 \sec^6 x$

20. prove that  $\frac{2 \sin x \cos x - \cos x}{1 - \sin x + \sin^2 x - \cos^2 x} = \cot x$

21. if  $\frac{2 \sin x}{1 + \cos x + \sin x} = y$  then prove  $\frac{1 - \cos x + \sin x}{1 + \sin x} = y$

22. if  $\cos x - \sin x = \sqrt{2} \sin x$ , show that  $\cos x + \sin x = \sqrt{2} \cos x$

23. eliminate x  $\frac{\sin^2 x}{\cos x} = a^3$  and  $\frac{\cos^2 x}{\sin x} = b^3$

24. if  $\cos^2 \alpha - \sin^2 \alpha = \tan^2 \beta$  then show that  $\cos^2 \beta - \sin^2 \beta = \tan^2 \alpha$

25. prove that  $(1 + \cot x - \operatorname{cosec} x)(1 + \tan x + \sec x) = 2$