

## Trigonometry Identities 2

1. Given function  $f(\theta) = \sin^4\theta + \cos^4\theta$ .

a. Express  $\cos 2\theta$  in terms of  $f(\theta)$

b. Express  $\sin 2\theta$  in terms of  $f(\theta)$

2. Given  $\tan \alpha$ ,  $\tan \beta$  are the roots for quadratic equation  $x^2 - 3x - 2 = 0$ , find value of

a.  $\cot(\alpha + \beta)$

b.  $\cos^2(\alpha + \beta)$

3. Given  $\sin(x + y) = \sin x \cos y + \cos x \sin y$ , find  $\sin 75^\circ = \frac{\sqrt{3}}{4}(1 + \sqrt{3})$

4. sketch the graph for  $y = \cos x$  and  $y = \sec x$  for  $-90^\circ \leq x \leq 90^\circ$

5. Given  $\cos x = \frac{3}{5}$  and  $\sin y = -\frac{5}{13}$ ,  $x$  and  $y$  are from the same quadrant, find  $\sin(x - 2y)$  without using calculator.

6. If  $\tan 35^\circ = k$ , simplify  $\frac{\tan 215^\circ - \tan 125^\circ}{\tan 235^\circ + \tan 325^\circ}$  and express in terms of  $k$

7. Solve  $\sin \frac{5\pi}{6} + \cos \frac{2\pi}{3} - \tan \frac{5\pi}{4}$

8.  $\sin 22\frac{1}{2}^\circ$

9. Calculate  $(\operatorname{cosec} x - \sin x)(\sec x - \cos x)(\tan x + \cot x)$

10. Given  $\cot x = \frac{3}{4}$ , calculate  $\frac{3 \cos x - 4 \sin x}{3 \cos x + 4 \sin x}$

11. Given  $\sin x + \cos x = a$ , calculate  $\sin^3 x + \cos^3 x =$

12. Given  $\cos^2\theta + \tan \theta = \frac{3}{2}$ ,  $\theta$  is an acute angle, find  $5 \sin \theta - \cos \theta$

13. Given  $\cos^2\theta + \cos \theta = 1$ , find  $\sin^2\theta + \sin^6\theta + \sin^8\theta =$

14. Given  $1 - a \tan \theta = \sec \theta$ ,  $b - \cot \theta = \operatorname{cosec} \theta$ , find  $ab$

15. If  $\sin \theta$  and  $\cos \theta$  are roots for equations  $4x^2 + 5x + k = 0$ , find  $k$

16. Given  $\sin^4\theta + \cos^4\theta = 1$ , find  $\sin \theta + \cos \theta$

17. Given  $\sin \theta + \cos \theta = \frac{\sqrt{2}}{2}$ , find  $\tan \theta + \cot \theta$

18. Given  $\frac{\cos x}{1 + \sin x} = 2$ , find  $\frac{\cos x}{1 - \sin x}$

19.  $\frac{1 - \sin^4 x - \cos^4 x}{\sin^2 2x} =$

20. Given  $\sin \theta$  and  $\cos \theta$  are roots for equations  $2x^2 + px - 1 = 0$ , find

a.  $p$

b.  $\theta$  for angle  $0^\circ < \theta < 180^\circ$

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

22. Given  $\sin \theta - \cos \theta = \frac{1}{2}$ , find

a.  $\sin \theta \cos \theta$

b.  $\sin^3 \theta - \cos^3 \theta$

23. Given  $m \sin \theta + \cos \theta = 1$ ,  $n \sin \theta - \cos \theta = 1$ , find the value of  $m$  and  $n$

24. Prove  $\frac{1}{1 + \sin^2 \theta} + \frac{1}{1 + \operatorname{cosec}^2 \theta} + \frac{1}{1 + \cos^2 \theta} + \frac{1}{1 + \sec^2 \theta} = 2$

25. Given  $\sin \theta + \cos \theta = \alpha$ ,  $\theta$  is an acute angle, express equation below in terms of  $\alpha$

a.  $\sin \theta \cos \theta$

b.  $\sin^6 \theta + \cos^6 \theta$