

## Trig Proofs - Review

Prove the following identities.

1.  $\sec x - \sin x \tan x = \cos x$
2.  $\frac{1 + \cos x}{\sin x} = \csc x + \cot x$
3.  $\frac{\sec x \sin x}{\tan x + \cot x} = \sin^2 x$
4.  $\frac{\sec x}{\cos x} - \frac{\tan x}{\cot x} = 1$
5.  $\cos^2 x - \sin^2 x = 1 - 2\sin^2 x$
6.  $\csc^2 x \tan^2 x - 1 = \tan^2 x$
7.  $\frac{\sec^2 x}{\sec^2 x - 1} = \csc^2 x$
8.  $2 \cos x \tan x \csc x = 2$
9.  $6 \cos x \left( \frac{1}{\cos x} - \frac{\cot x}{\csc x} \right) = 6 \sin^2 x$
10.  $\frac{\cot^2 x}{\csc x} \sec^2 x = \csc x$
11.  $\frac{1 - \tan^2 x}{1 + \tan^2 x} = \cos 2x$
12.  $\frac{1 + \cos x}{\sin^3 x} = \frac{\csc x}{1 - \cos x}$
13.  $\frac{\tan x}{\sec x} + \frac{\cot x}{\csc x} = \sin x + \cos x$
14.  $\frac{\sin x + \tan x}{1 + \sec x} = \sin x$
15.  $1 + \tan^2 x + \tan x \sec x = \frac{1 + \sin x}{\cos^2 x}$

Solve:

16.  $\cos 165^\circ$
17.  $\sin 345^\circ$
18.  $\tan 255^\circ$
19.  $\sec 105^\circ$

Given  $\cos A = \frac{-2}{3}$ ,  $\sin A < 0$ ,  $\cos B < 0$ , and  $\sin B = \frac{3}{5}$ , find:

20.  $\cos(A - B)$
21.  $\cos 2B$
22.  $\sin(A + B)$
23.  $\sin 2A$
24.  $\tan(A - B)$
25.  $\tan 2B$

Solve for the given domain.

26.  $\sec(\theta + 81) = 2$   $\theta = [0, 360)$
27.  $4 \cos^2 \theta = 1$   $\theta = [-180, 180]$
28.  $\tan^2 \theta + \tan \theta = 0$   $\theta = [-90, 90]$
29.  $2 \cos^2 x - 5 \cos x + 2 = 0$   $x = [0, 2\pi)$
30.  $2 \sec^2 x - 3 \sec x - 2 = 0$   $x = [0, 2\pi)$
31.  $3 - 3 \sin x - 2 \cos^2 x = 0$   $x = [-\pi, \pi)$
32.  $4 \sin x \cos x = \sqrt{3}$   $x = [0, 2\pi)$
33.  $\sin x = \sin 2x$   $x = [0, 2\pi)$
34.  $\frac{\tan 10\theta + \tan 50}{1 - \tan 10\theta \tan 50} = \frac{\sqrt{3}}{3}$   $\theta = [0, 90)$
35.  $\cos x \cos \frac{\pi}{5} - \sin x \sin \frac{\pi}{5} = \frac{\sqrt{3}}{2}$   $x = [0, 2\pi)$
36.  $\sin \theta \cos 35 + \cos \theta \sin 35 = \frac{1}{2}$   $\theta = [0, 360)$
37.  $\frac{\tan \theta + \tan 27}{1 - \tan \theta \tan 27} = 1$   $\theta = [0, 360)$
38.  $4 \sin x \cos x = -\sqrt{2}$   $x = [0, 2\pi)$
39.  $\cos^2 \theta - \sin^2 \theta = -1$   $\theta = [0, 360)$

Answers:

$$16. \frac{-\sqrt{2}-\sqrt{6}}{4}$$

$$17. \frac{\sqrt{6}-\sqrt{2}}{4}$$

$$18. 2+\sqrt{3}$$

$$19. -\sqrt{2}-\sqrt{6}$$

$$20. \frac{8-3\sqrt{5}}{15}$$

$$21. \frac{7}{25}$$

$$22. \frac{4\sqrt{5}-6}{15}$$

$$23. \frac{4\sqrt{5}}{9}$$

$$24. \frac{108+50\sqrt{5}}{19}$$

$$25. \frac{-24}{7}$$

$$26. 219, 339$$

$$27. -60, 60, -120, 120$$

$$28. 0, -45$$

$$29. \frac{\pi}{3}, \frac{5\pi}{3}$$

$$30. \frac{\pi}{3}, \frac{5\pi}{3}$$

$$31. \frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}$$

$$32. \frac{\pi}{6}, \frac{7\pi}{6}, \frac{\pi}{3}, \frac{4\pi}{3}$$

$$33. 0, \pi, \frac{\pi}{3}, \frac{5\pi}{3}$$

$$34. 16, 34, 52, 70, 88$$

$$35. \frac{49\pi}{30}, \frac{59\pi}{30}$$

$$36. 115, 355$$

$$37. 18, 198$$

$$38. \frac{5\pi}{8}, \frac{7\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$$

$$39. 90, 270$$