

# Practice Exercises

$$2) \sec \theta \tan \theta \csc \theta$$

$$\frac{1}{\cancel{\cos \theta}} \frac{\sin \theta}{\cancel{\cos \theta}} \frac{1}{\sin \theta}$$

$$\sec^2 \theta$$

$$6) \frac{1}{\cancel{\cos \theta}} - \cos \theta$$

$$\frac{1 - \cos^2 \theta}{\cancel{\cos \theta}}$$

$$\frac{\sin^2 \theta}{\cancel{\cos \theta}}$$

$$\tan \theta \sin \theta$$

$$10) \sec \theta (\sin \theta + \cos \theta) = \tan \theta + 1$$

$$\sec \theta \sin \theta + 1$$

$$\frac{\sin \theta}{\cancel{\cos \theta}} + 1$$

$$\tan \theta + 1 \quad \checkmark$$

$$4) \sin x \cos x \tan x = 1 - \cos^2 x$$

$$\sin x \cos x \frac{\sin x}{\cancel{\cos x}}$$

$$\sin^2 x$$

$$1 - \cos^2 x \quad \checkmark$$

$$12) \frac{1}{\sin x \cos x} - \tan x = \cot x$$

$$\frac{1}{\sin x \cos x} - \frac{\sin x}{\cancel{\cos x}}$$

$$\frac{1 - \sin^2 x}{\sin x \cancel{\cos x}}$$

$$\frac{\cos^2 x}{\sin x \cancel{\cos x}}$$

$$\frac{\cos x}{\sin x}$$

$$\cot x = \cot x$$

$$15) \frac{\sin x}{1 - \cos x} + \frac{1 - \cos x}{\sin x} = \frac{2}{\sin x}$$

$$\frac{\sin^2 x + 1 - 2 \cos x + \cos^2 x}{(1 - \cos x) \sin x}$$

$$\frac{2 - 2 \cos x}{(1 - \cos x) \sin x}$$

$$\frac{2(1 - \cos x)}{(1 - \cos x) \sin x}$$

$$\frac{2}{\sin x}$$

$$17) \frac{\sec x}{\cos x} + \frac{\csc x}{\sin x} = \sec^2 x \csc^2 x$$

$$\frac{1}{\cos^2 x} + \frac{1}{\sin^2 x}$$

$$\frac{\sin^2 x + \cos^2 x}{\cos^2 x \sin^2 x}$$

$$\frac{1}{\cos^2 x \sin^2 x}$$

$$\sec^2 x \csc^2 x$$

$$k) 5 \sin x = 5$$

$$\sin x = 1$$

$$x = \frac{\pi}{2}$$

$$2a) \cos \theta = -0.1724$$

$$\theta = 1.744, 4.539$$

$$3d) 2 \sin x + \sqrt{3} = 0$$

$$\sin x = -\frac{\sqrt{3}}{2}$$

$$x = \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$e) 3 \sin x = -1$$

$$\sin x = -\frac{1}{3}$$

$$x = 3.481, 5.943$$

$$5) 5 \sin x = 8$$

$$\sin x = \frac{8}{5}$$

No solution

$$10) 4 \cos^2 x - 1 = 0$$

$$\cos^2 x = \frac{1}{4}$$

$$\cos x = \pm \frac{1}{2}$$

$$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$13) 2 \cos^2 x - \cos x - 1 = 0$$

$$(2 \cos x + 1)(\cos x - 1) = 0$$

$$\cos x = -\frac{1}{2} \quad \cos x = 1$$

$$x = \frac{2\pi}{3}, \frac{4\pi}{3}, 0$$

$$14) 6 \sin^2 x - \sin x - 1 = 0$$

$$(3 \sin x + 1)(2 \sin x - 1) = 0$$

$$\sin x = -\frac{1}{3} \quad \sin x = \frac{1}{2}$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$15) \cos 2x = \frac{1}{2}$$

$$2x = \frac{\pi}{3}, \frac{5\pi}{3}, \frac{7\pi}{3}, \frac{11\pi}{3}$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$17) \cos 4x = -1$$

$$4x = \pi, 3\pi, 5\pi, 7\pi$$

$$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$18) 4\cos^2(x - \frac{\pi}{4}) - 2 = 0$$

$$\cos^2(x - \frac{\pi}{4}) = \frac{1}{2}$$

$$\cos(x - \frac{\pi}{4}) = \pm \frac{1}{\sqrt{2}}$$

$$x - \frac{\pi}{4} = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$x = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$$

$$19) 5 \sin 2(x-1) + 3 = 0$$

$$\sin 2(x-1) = -\frac{3}{5}$$

$$2(x-1) = \sin^{-1}(-\frac{3}{5}), \sin^{-1}(-\frac{3}{5}) + 2\pi$$

$$x = 0.428, 2.893, 3.820, 6.034$$

$$21) 2\sin^2 3x + \sin 3x = 0$$

$$\sin 3x(2\sin 3x + 1) = 0$$

$$\sin 3x = 0 \quad \sin 3x = -\frac{1}{2}$$

$$3x = 0, \pi, 2\pi, 3\pi, 4\pi, 5\pi$$

$$x = 0, \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$\rightarrow 3x = \frac{7\pi}{6}, \frac{11\pi}{6}, \frac{19\pi}{6}, \frac{23\pi}{6}, \frac{31\pi}{6}, \frac{35\pi}{6}$$

$$x = \frac{7\pi}{18}, \frac{11\pi}{18}, \frac{19\pi}{18}, \frac{23\pi}{18}, \frac{31\pi}{18}, \frac{35\pi}{18}$$