

$$\sin^2 x - \sin x - 2 = 0$$

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

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

Unit Circle Calculator

$$x = \frac{\pi}{2} + 2\pi k \quad x = 3.87 + 2\pi k$$

$$x = 0 + \pi k \quad x = 5.85 + 2\pi k$$

$$2) \tan x \cos^2 x - \tan x = 0$$

$$\tan x (\cos^2 x - 1) = 0$$

$$\tan x = 0 \quad \cos x = \pm 1$$

$$x = \pi + \pi k \quad x = 0 + 2\pi k$$

$$x = 0 + \pi k \quad x = \pi + 2\pi k$$

$$3.) \cos \theta (\tan \theta - \sqrt{3}) = 0$$

$$\cos \theta = 0 \quad \tan \theta = \sqrt{3}$$

$$\frac{\pi}{2}, \frac{3\pi}{2} \quad \frac{\pi}{3}, \frac{4\pi}{3}$$

$$4) \cot^2 \theta + \cot \theta = 1$$

$$\cot \theta (\cot \theta + 1) = 0$$

$$\cot \theta = 0 \quad \cot \theta = -1$$

$$\tan \theta = \text{undef} \quad \tan \theta = 1$$

$$\frac{\pi}{2}, \frac{3\pi}{2} \quad \frac{3\pi}{4}, \frac{7\pi}{4}$$

$$90^\circ, 270^\circ \quad 135^\circ, 315^\circ$$

$$5) \cos 3x = \frac{\sqrt{3}}{2}$$

$$3x = \frac{\pi}{6} + 2\pi k \quad 3x = \frac{11\pi}{6} + 2\pi k$$

$$x = \frac{\pi}{18} + \frac{2}{3}\pi k \quad x = \frac{11\pi}{18} + \frac{2}{3}\pi k$$

$$\frac{\pi}{18}, \frac{13\pi}{18}, \frac{25\pi}{18}, \frac{11\pi}{18}, \frac{23\pi}{18}, \frac{35\pi}{18}$$

$$6) 2 \cos^2 x - \sqrt{3} \cos x = 0$$

$$\cos x (2 \cos x - \sqrt{3}) = 0$$

$$\cos x = 0 \quad \cos x = \frac{\sqrt{3}}{2}$$

$$\frac{\pi}{2}, \frac{3\pi}{2} \quad \frac{\pi}{6}, \frac{11\pi}{6}$$

$$7) 4 \sin^2 (2\theta - \frac{\pi}{6}) = 4$$

$$\sin^2 (2\theta - \frac{\pi}{6}) = 1$$

$$\sin (2\theta - \frac{\pi}{6}) = \pm 1$$

$$2\theta - \frac{\pi}{6} = \frac{\pi}{2} + 2\pi k \quad 2\theta - \frac{\pi}{6} = \frac{3\pi}{2} + 2\pi k$$

$$2\theta = \frac{2\pi}{3} + \frac{2\pi k}{2}$$

$$2\theta = \frac{5\pi}{3} + \frac{2\pi k}{2}$$

$$\theta = \frac{\pi}{3} + \pi k$$

$$\theta = \frac{5\pi}{6} + \pi k$$

$$8) \tan(x + \frac{\pi}{5}) = 1$$

$$x + \frac{\pi}{5} = \frac{\pi}{4} + \pi k \quad x + \frac{\pi}{5} = \frac{5\pi}{4} + \pi k$$

$$\frac{\pi}{20}, \frac{21\pi}{20}$$

$$\frac{\pi}{3}, \frac{4\pi}{3}$$

$$\frac{5\pi}{6}, \frac{11\pi}{6}$$

$$9) 7 \tan x = 2\sqrt{3} + \tan x$$

$$6 \tan x = 2\sqrt{3}$$

$$\tan x = \frac{\sqrt{3}}{3}$$

$$\frac{\pi}{6}, \frac{7\pi}{6} \text{ or } 30^\circ, 210^\circ$$

$$10) 3 \sin x + 6 = 3 - \sin x$$

$$4 \sin x = -3$$

$$\sin x = -\frac{3}{4} \text{ on cal } \sin^{-1}(\frac{3}{4}) = .848$$

QIII

QIV

$$\pi + .848 \quad 2\pi - .848$$

$$3.9897 + 2\pi k \quad 5.4351 + 2\pi k$$

$$11) \csc x \tan x$$

$$\frac{1}{\sin} \cdot \frac{\sin}{\cos} = \frac{1}{\cos}$$

$$= \sec x$$

$$12) \frac{\tan x}{\sec x} = \frac{\sin}{\cos} \cdot \frac{1}{\frac{1}{\cos}}$$

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

$$13) \frac{\sin^2 x + \tan^2 x + 2 \tan x - 4 + \cos^2 x}{3 \tan x (\tan x - 1)}$$

$$\frac{1 + \tan^2 x + 2 \tan x - 4 + \cos^2 x}{3 \tan x (\tan x - 1)} = \frac{\tan^2 x + 2 \tan x - 3}{3 \tan x (\tan x - 1)}$$

$$\frac{(\tan x + 3)(\tan x - 1)}{3 \tan x (\tan x - 1)} = \frac{\tan x + 3}{3 \tan x} = \frac{1}{3} + \frac{1}{\tan x}$$

$$= \frac{1}{3} + \cot x$$

$$14) \frac{(\sin^2 x - \cos^2 x) + 1}{\sin^2 x} = \frac{1 - \cos^2 x - \cos^2 x + 1}{\sin^2 x}$$

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

$$15) \frac{\frac{1}{\cos^2 x} \cdot \frac{1}{\sin}}{\frac{1}{\sin^2} \cdot \frac{1}{\cos}} = \frac{\frac{\sin^2 x \cos x}{\cos^2 x \sin x}}{\frac{1}{\cos x}} = \frac{\sin x}{\cos x} = \tan x$$

$$16) \frac{\frac{\sin^2}{\cos^2} - \sin^2}{\frac{1}{\cos^2}} = \frac{\frac{\sin^2 - \sin^2 \cos^2}{\cos^2}}{\frac{1}{\cos^2}} = \frac{\sin^2 (1 - \cos^2)}{\cos^2} \cdot \frac{\cos^2}{1} = \sin^2 (1 - \cos^2) \cos^2$$

$$= \sin^2 \cdot \sin^2 = \sin^4 x$$

$$17) \frac{\sec x + 1}{\tan x (\sec x - 1)} = \frac{\tan}{\sec x - 1}$$

$$\frac{\sec^2 x - 1}{\tan x (\sec x - 1)} = \frac{\tan^2 x}{\tan x (\sec x - 1)} = \frac{\tan x}{\sec x - 1}$$