

Solving Trig Equations

Ex: Solve for $0 \leq \theta \leq 2\pi$

$$1. \quad 2\cos\theta + \sqrt{3} = 0$$

$$\frac{-\sqrt{3} \quad -\sqrt{3}}{\quad \quad \quad}$$

$$\frac{2\cos\theta}{2} = \frac{-\sqrt{3}}{2}$$

$$\cos\theta = -\frac{\sqrt{3}}{2}$$

$$\boxed{\frac{5\pi}{6}, \frac{7\pi}{6}}$$

$$2. \quad 3\sin\theta + 1 = \sin\theta$$

$$\frac{-\sin\theta \quad -\sin\theta}{\quad \quad \quad}$$

$$\frac{2\sin\theta + 1}{-1 \quad -1} = 0$$

$$2\sin\theta = -1$$

$$\sin\theta = -\frac{1}{2}$$

$$\boxed{\frac{7\pi}{6}, \frac{11\pi}{6}}$$

$$3. \quad 2\sin^2 x + \sin x - 1 = 0$$

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

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

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

$$\sin x + 1 = 0 \quad 2\sin x - 1 = 0$$

$$\sin x = -1$$

$$2\sin x = 1$$

$$\sin x = \frac{1}{2}$$

$$\boxed{\frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}}$$

$$4. \quad 2\sin\theta\cos\theta - \cos\theta = 0$$

$$\cos\theta(2\sin\theta - 1) = 0$$

$$\cos\theta = 0 \quad 2\sin\theta - 1 = 0$$

$$\boxed{\frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}}$$

$$2\sin\theta = 1$$

$$\sin\theta = \frac{1}{2}$$

$$5. \quad 2\sin\theta + 2 = 0$$

$$2\sin\theta = -2$$

$$\sin\theta = -1$$

$$\boxed{\frac{3\pi}{2}}$$

$$6. \quad 3\tan^2 x - 4 = -3$$

$$\frac{+4 \quad +4}{\quad \quad \quad}$$

$$3\tan^2 x = 1$$

$$\sqrt{\tan^2 x} = \sqrt{\frac{1}{3}}$$

$$\tan x = \pm \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$$

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

$$\boxed{\frac{\pi}{6}, \frac{11\pi}{6}, \frac{7\pi}{6}, \frac{5\pi}{6}}$$

$$7. \quad \sqrt{3} + 5\sin\theta = 3\sin\theta$$

$$8. \quad 3\cot^2 x + 4 = 7$$

$$3\cot^2 x = 3$$

$$\cot^2 x = 1$$

$$\sqrt{\tan^2 x} = \sqrt{1}$$

$$\tan x = \pm 1$$

$$\boxed{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}}$$