7.3 Trigonometric Equations

Solve $2\sin\theta + \sqrt{3} = 0$, $0 \le \theta < 2\pi$.

$2\sin\theta = -\sqrt{3}$

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

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

Solve $\tan\left(\theta - \frac{\pi}{2}\right) = 1$, $0 \le \theta < 2\pi$

$\theta - \frac{\pi}{2} = \frac{\pi}{4}$ $\qquad$ $\theta - \frac{\pi}{2} = \frac{5\pi}{4}$

$\theta = \frac{3\pi}{4}$ $\qquad$ $\theta = \frac{7\pi}{4}$

Solve $\sin(2\theta) = \frac{1}{2}$, $0 \le \theta < 2\pi$.

$2\theta = \frac{\pi}{6} + 2\pi \quad 2\theta = \frac{5\pi}{6} + 2\pi$

$\theta = \frac{\pi}{12} + \pi \quad \theta = \frac{5\pi}{12} + \pi$

$\theta = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$

Solve $4\cos^2\theta = 1$, $0 \le \theta < 2\pi$.

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

$$\cos\theta = \sqrt{\frac{1}{4}}$$

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

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

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