

7. Solve the equation for $0 \leq x < 2\pi$.

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

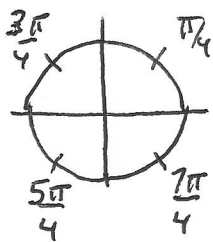
$$\cos^2 x = \frac{1}{2}$$

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

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

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

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



8. Solve the equation for $0^\circ \leq \theta < 360^\circ$.

change $\cos^2 \theta$ to $1 - \sin^2 \theta$:

$$2 \cos^2 \theta + 5 \sin \theta + 1 = 0$$

$$2(1 - \sin^2 \theta) + 5 \sin \theta + 1 = 0$$

$$2 - 2 \sin^2 \theta + 5 \sin \theta + 1 = 0$$

$$-2 \sin^2 \theta + 5 \sin \theta + 3 = 0$$

multiply each side by -1

$$2w^2 - 5w - 3 \leftarrow 2 \sin^2 \theta - 5 \sin \theta - 3 = 0$$

Product # = -6

Sum # = -5

$$(2w + 1)(w - 3)$$

-6w + 1w -6 + 1w

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

$$2 \sin \theta + 1 = 0 \text{ or } \sin \theta - 3 = 0$$

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

$\sin \theta = 3$
No solutions here.

$$\theta = 210^\circ, 330^\circ$$

Section 6.3

9. Solve the equation for $0 \leq x < 2\pi$.

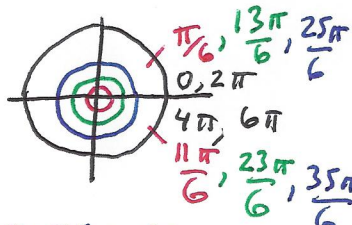
arg = 3x:

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

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

$$\cos(\text{arg}) = \frac{\sqrt{3}}{2}$$

$0 \leq 3x < 6\pi$
Three turns around the unit circle.



$$\text{arg} = \frac{\pi}{6}, \frac{11\pi}{6}, \frac{13\pi}{6}, \frac{23\pi}{6}, \frac{25\pi}{6}, \frac{35\pi}{6}$$

$$3x = \frac{\pi}{6}, \frac{11\pi}{6}, \frac{13\pi}{6}, \frac{23\pi}{6}, \frac{25\pi}{6}, \frac{35\pi}{6}$$

multiply each side and each value by $\frac{1}{3}$:

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

10. Solve the equation for $0^\circ \leq \theta < 360^\circ$.

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

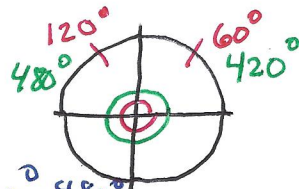
First write the left side as $\sin(2\theta)$:

$$\sin(2\theta) = \frac{\sqrt{3}}{2}$$

$$\text{arg} = 2\theta \rightarrow 0^\circ \leq 2\theta < 720^\circ$$

Two turns around the unit circle.

$$\sin(\text{arg}) = \frac{\sqrt{3}}{2}$$



$$\text{arg} = 60^\circ, 120^\circ, 420^\circ, 480^\circ$$

$$2\theta = 60^\circ, 120^\circ, 420^\circ, 480^\circ$$

Divide each side and each value by 2:

$$\theta = 30^\circ, 60^\circ, 210^\circ, 240^\circ$$