

Solve the following equations over  $[0, 2\pi)$ .

1.  $4\sin x + 2 = 0$

$$4\sin x = -2$$

$$\sin x = -\frac{2}{4}$$

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

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

3.  $\csc x = 2$

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

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

5.  $4\sec x - 8 = 0$

$$4\sec x = 8$$

$$\sec x = 2$$

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

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

7.  $\cot x - \sqrt{3} = 0$

$$\cot x = \sqrt{3}$$

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

9.  $2\tan^2 x - 6 = 0$

$$2\tan^2 x = 6$$

$$\tan^2 x = 3$$

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

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

11.  $\cos x = \sin x$

Where on the unit circle does  $\cos x = \sin x$ ?

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

2.  $2\cos x + \sqrt{3} = 0$

$$2\cos x = -\sqrt{3}$$

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

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

4.  $4\sin^2 x - 1 = 0$

$$4\sin^2 x = 1$$

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

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

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

6.  $\cos x(\cos x - 1) = 0$

$$\cos x = 0 \quad \cos x - 1 = 0$$

$$\cos x = 1$$

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

$$x = 0$$

$$\left\{0, \frac{\pi}{2}, \frac{3\pi}{2}\right\}$$

8.  $\sec^2 x - 2 = 0$

$$\sec^2 x = 2$$

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

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

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

10.  $3\cot^2 x - 1 = 0$

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

$$\cot^2 x = \frac{1}{3}$$

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

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

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

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

12.  $4\sin^2 x + 9 = 12$

$$4\sin^2 x = 3$$

$$\sin^2 x = \frac{3}{4}$$

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

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