

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

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

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

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

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

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

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

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

3. $\csc x = 2$

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

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

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

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

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

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

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

$$\sec x = -\frac{8}{4} = -2$$

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

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

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

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

$$x = \frac{\pi}{2}, \frac{3\pi}{2}, 0, 2\pi$$

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

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

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

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

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

$$\sec^2 x = 2$$

$$\sec x = \pm\sqrt{2}$$

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

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

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

$$\tan^2 x = 3$$

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

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

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

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

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

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

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

11. $\cos x = \sin x$

just think
about where
they are
the same!

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

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

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

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

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

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