

Warm Up-

$$\csc x(\csc x - \sin x) + \frac{\sin x - \cos x}{\sin x} + \cot x = \csc^2 x$$

$$\csc^2 x - \sin x \cdot \frac{1}{\sin x} + \frac{\sin x}{\sin x} - \frac{\cos x}{\sin x} + \cot x$$

$$\csc^2 x - 1 + 1 - \cot x + \cot x$$

$$\csc^2 x = \csc^2 x$$

5.3 Solving Trig Equations

When solving the domain may be $[0, 2\pi)$ or $(-\infty, \infty)$.

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

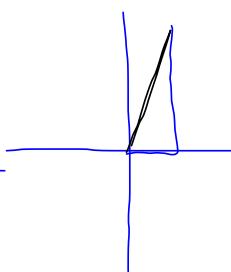
$$D: [0, 2\pi)$$

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

$$D: (-\infty, \infty)$$

$$x = \frac{\pi}{3} \pm 2k\pi$$

$$x = \frac{5\pi}{3} \pm 2k\pi$$



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

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

$$D: [0, 2\pi)$$

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

$$D: (-\infty, \infty)$$

$$x = \frac{7\pi}{6} \pm 2k\pi$$

$$x = \frac{11\pi}{6} \pm 2k\pi$$

$$3. \quad 4\sin^2 x - 1 = 0$$

$$\begin{aligned} 4\sin^2 x &= 1 \\ \sqrt{\sin^2 x} &= \sqrt{\frac{1}{4}} \end{aligned}$$

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

$$D: [0, 2\pi)$$

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

$$D: (-\infty, \infty)$$

$$x = \frac{\pi}{6} \pm k\pi$$

$$x = \frac{5\pi}{6} \pm k\pi$$

$$4. \quad \tan x \sin x - \tan x = 0$$

$$\tan x (\sin x - 1) = 0$$

$$\tan x = 0 \quad \sin x - 1 = 0$$

$$D: [0, 2\pi)$$

$$x = 0, \pi$$

$$\sin x = 1$$

$$x = \cancel{\frac{\pi}{2}}$$

$$D: (-\infty, \infty)$$

$$x = 0 \pm k\pi$$

$$5. \quad 2\cos^2 x + \cos x - 1 = 0$$

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

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

$$D: [0, 2\pi)$$

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

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

$$\cos x = -1$$

$$x = \pi$$

$$6. \quad \tan^2 x + \sec x - 1 = 0$$

$$\sec^2 x - 1 + \sec x - 1$$

$$\sec^2 x + \sec x - 2 = 0$$

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

$$D: [0, 2\pi)$$

$$\sec x = -2 \quad \sec x = 1$$

$$\cos x = -\frac{1}{2} \quad x = 0$$

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

Homework

p 376 1-5 odd, 25-41 odd, 47

$$\textcircled{41} \quad \sec^2 x - \sec x = 2$$

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

$$x^2 - x - 2 = 0$$

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

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

$$\sec x = 2 \quad \sec x = -1$$

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

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

$$\frac{\pi}{3} \pm 2k\pi$$

$$\textcircled{61} \quad 2\sin^2 2x = 1$$

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

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

$$2x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$2x = \frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$$

$$\frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{7\pi}{8}$$

$$\frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$$

$$\textcircled{W1} \quad \sec^2 x + \tan x - 3 = 0$$

$$\tan^2 x + \tan x + 1$$

$$\tan^2 x + \tan x - 2 = 0$$

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

Q2, Q4 $\tan x = -2$

$$\tan^{-1}(2) =$$

$$\textcircled{B3} \quad \sin^2 x = 3 \cos^2 x$$

$$1 - \cos^2 x = 3 \cos^2 x$$

$$4 \cos^2 x - 1 = 0$$

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

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

$$\cancel{\frac{\pi}{3}}, \frac{2\pi}{3}, \cancel{\frac{4\pi}{3}}, \frac{5\pi}{3}$$

$$\frac{\pi}{3} + k\pi$$

$$\frac{2\pi}{3} + k\pi$$

