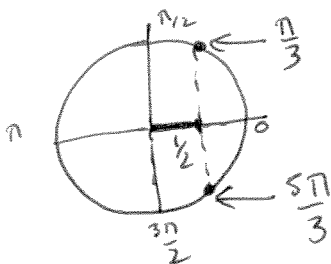


$$8) \quad 2 \cos x - 1 = 0 \quad \Rightarrow \quad 2 \cos x = 1 \rightarrow \cos x = \frac{1}{2}$$



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

$$9) \quad 2 \cos^2 x = 2 + \sin x$$

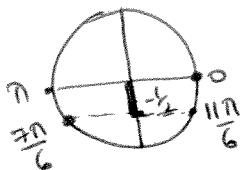
$$2(1 - \sin^2 x) = 2 + \sin x$$

$$2 - 2 \sin^2 x = 2 + \sin x \quad \Rightarrow \quad -2 \sin^2 x = \sin x \quad \Rightarrow \quad 0 = 2 \sin^2 x + \sin x$$

$$\Rightarrow \quad 2 \sin^2 x + \sin x = 0$$

$$\sin x (2 \sin x + 1) = 0$$

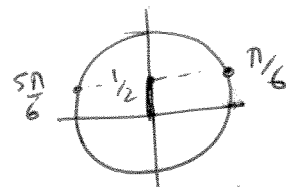
$$\begin{cases} \sin x = 0 \Rightarrow x = 0, \pi \\ \text{or} \\ 2 \sin x + 1 = 0 \Rightarrow \sin x = -\frac{1}{2} \\ x = \frac{7\pi}{6}, \frac{11\pi}{6} \end{cases}$$



$$x = \left\{ 0, \pi, \frac{7\pi}{6}, \frac{11\pi}{6} \right\}$$

10)

$$\sin 2x = \frac{1}{2} \quad \Rightarrow \quad 2x = \frac{\pi}{6} \text{ or } \frac{5\pi}{6}$$



$$2x = \frac{\pi}{6} + 2k\pi \quad \Rightarrow \quad x = \frac{\pi}{12} + k\pi$$

$$\begin{matrix} k=0 & k=1 \\ x = \frac{\pi}{12} & x = \frac{13\pi}{12} \end{matrix}$$

$$2x = \frac{5\pi}{6} + 2k\pi \quad \Rightarrow \quad x = \frac{5\pi}{12} + k\pi$$

$$\begin{matrix} x = \frac{5\pi}{12} & x = \frac{17\pi}{12} \end{matrix}$$

\Rightarrow summary:

$$x = \left\{ \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12} \right\}$$

$$11) \quad \cos^2 x - 5 \sin x + 5 = 0$$

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

$$-\sin^2 x - 5 \sin x + 6 = 0$$

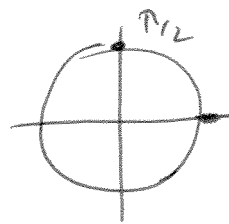
$$\text{or: } \Rightarrow \sin^2 x + 5 \sin x - 6 = 0$$

$$\text{Factor: } (\sin x - 1)(\sin x + 6) = 0 \Rightarrow \sin x = 1 \Rightarrow x = \frac{\pi}{2}$$

$$\text{or} \\ \sin x = -6 \rightarrow \text{No solution.}$$

Only solution:

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



$$12) \quad \sin 2x = \sin x$$

$$2 \sin x \cos x = \sin x$$

$$2 \sin x \cos x - \sin x = 0$$

$$\sin x (2 \cos x - 1) = 0 \Rightarrow$$

$$\left\{ \begin{array}{l} \sin x = 0 \Rightarrow x = 0, \pi \\ \text{or} \\ 2 \cos x - 1 = 0 \Rightarrow \cos x = \frac{1}{2} \end{array} \right.$$

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

$$\boxed{x = \left\{ 0, \frac{\pi}{3}, \pi, \frac{5\pi}{3} \right\}}$$

