

$$5a) 2\sec^2 x + \sec x - 1 = 0$$

$$\text{Factor } (2\sec x - 1)(\sec x + 1) = 0$$

$$2\sec x - 1 = 0 \quad \text{or} \quad \sec x + 1 = 0$$

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

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

$$\therefore \cos x = 2$$

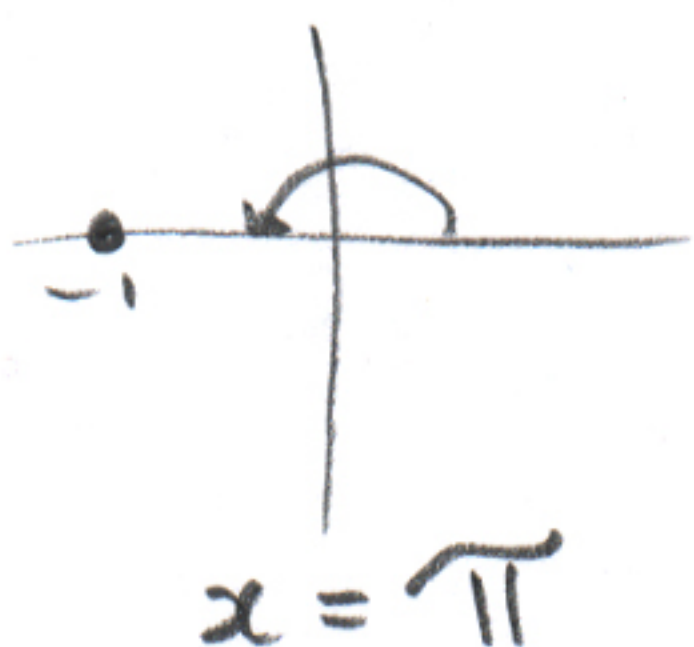
$$x = \cos^{-1}(2)$$

$$x = \text{N/A.}$$

$$\sec x = -1$$

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

$$\therefore \cos x = -1$$

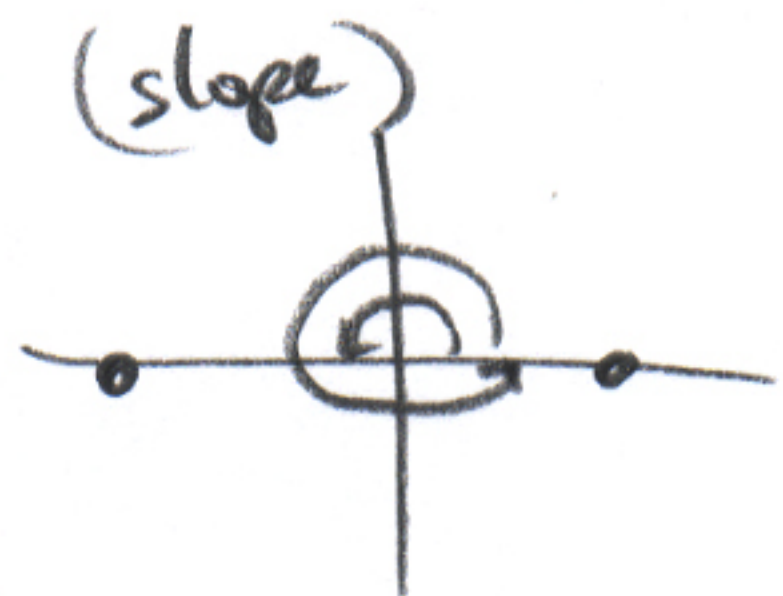


$$b) \tan x \cos^2 x - \tan x = 0$$

$$\text{Common factor } \tan x (\cos^2 x - 1) = 0$$

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

$$\tan x = 0 \quad \text{or} \quad \cos x + 1 = 0 \quad \text{or} \quad \cos x - 1 = 0$$



$$x_1 = 0$$

$$x_2 = \pi$$

$$x_3 = 2\pi$$

$$\cos x = -1$$

(x-coordinate on unit circle)



$$x_4 = \pi$$

$$\cos x = 1$$



$$x_5 = 0$$

$$x_6 = 2\pi$$

$\therefore$ the only solutions are

$0, \pi, 2\pi$ on $[0, 2\pi]$

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

pythag.

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

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

$$0 = 2\sin x - \sin x - 1$$

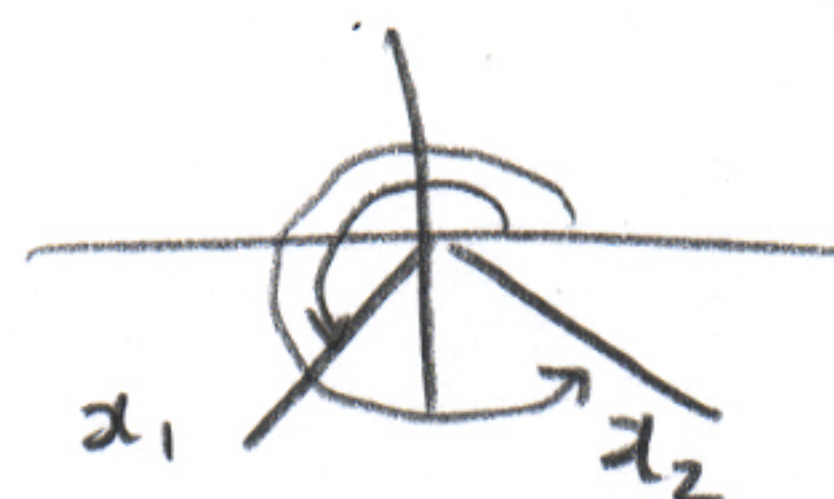
rearrange

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

Factor

$$2\sin x + 1 = 0 \quad \text{or} \quad \sin x - 1 = 0$$

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



$$x = \sin^{-1}\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$$

$$x = -0.542 \text{ in radians!}$$

$$\sin x = 1$$



$$x_3 = \frac{\pi}{2} \sim 1.571$$

$$\therefore x_1 = \pi + 0.542 \sim 3.665 = \frac{7\pi}{6}$$

$$x_2 = 2\pi - 0.542 \sim 5.760 = \frac{11\pi}{6}$$