

WS #1

WS 1 A Level Trig EQS

1). $\csc^2 x - 2\cot x = 0$

↓

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

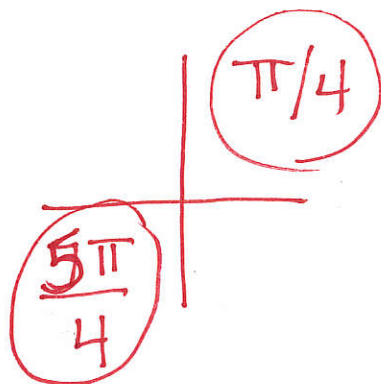
$$\cot^2 x - 2\cot x + 1 = 0$$

$$(\cot x - 1)(\cot x - 1) = 0$$

$$\cot x - 1 = 0$$

$$\cot x = 1$$

$\frac{\pi}{4}$ family



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

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

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

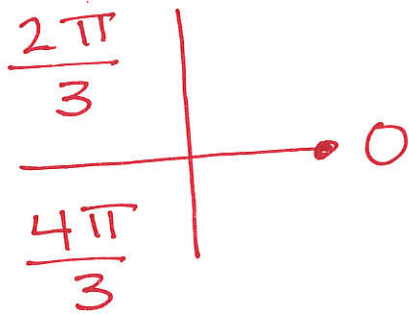
$$\sec x = \frac{1}{1}$$

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

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

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

$$\cos x = 1$$



$$3. \quad \sqrt{2} \csc^2 x + \csc x - \sqrt{2} = 0$$

$$(\sqrt{2} \csc x - 1)(\csc x + \sqrt{2}) = 0$$

$$\csc x = \frac{1}{\sqrt{2}}$$

$$\csc x = -\frac{\sqrt{2}}{1}$$

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

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

$$\sin x = \sqrt{2}$$

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

$$\sin x \approx 1.41 \dots$$

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

($\hat{=}$)

$$\frac{5\pi}{4}, \frac{7\pi}{4}$$

$$6. \quad 4 \cos^4 x - 5 \cos^2 x + 1 = 0$$

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

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

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

$$\cos x = \pm \sqrt{\frac{1}{4}}$$

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

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

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

$$\cos^2 x = 1$$

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

$$\cos x = \pm 1$$

$$0, \pi$$

$$7. \quad \underline{\underline{2 \tan^2 x - 3 \sec x + 3 = 0}}$$

$$2(\sec^2 x - 1) - 3 \sec x + 3 = 0$$

$$2 \sec^2 x - 3 \sec x + 1 = 0$$

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

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

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

$$\cos x = 2$$

☹

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

$$\cos x = 1$$

0

☺

$$9. \tan^4 x - 2 = \tan^2 x + \sec^2 x$$

$$\tan^4 x - \tan^2 x - \underbrace{\sec^2 x}_{=1} - 2 = 0$$

$$\cancel{\tan^2 x} (\cancel{\tan^2 x} - 1) \downarrow$$

$$\tan^4 x - \tan^2 x - (1 + \tan^2 x) - 2 = 0$$

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

$$\tan^4 x - 2\tan^2 x - 3 = 0$$

$$(\tan^2 x + 1)(\tan^2 x - 3) = 0$$

$$\tan^2 x = -1$$

$$\tan^2 x = 3$$

$$\tan x = \pm \sqrt{-1}$$

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

x

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

$$10. \cos x - \cot x = 0$$

$$\cos x - \frac{\cos x}{\sin x} = 0$$

$$\frac{\cos x \sin x - \cos x}{\sin x} = 0$$

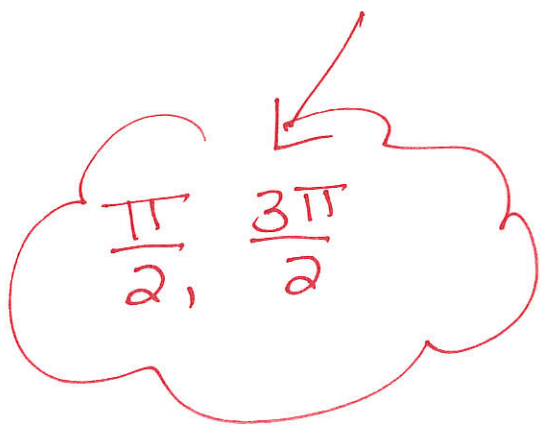
$$\frac{\cos x (\sin x - 1)}{\sin x} = 0$$

$$\cos x = 0 \quad \sin x - 1 = 0 \quad \begin{array}{l} \text{so} \\ x \neq 0, \pi \end{array}$$

$$\sin x = 1$$

$$\sin x \neq 0$$

$$\therefore x \neq 0, \pi$$



$$12. \quad \sin^2 x - \tan x \cos^2 x = 0$$

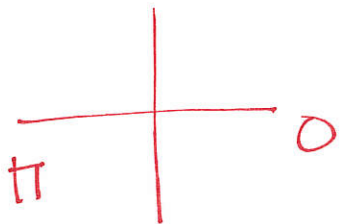
$$\sin^2 x - \frac{\sin x \cos^2 x}{\cos x} = 0$$

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

$$\sin x (\sin x - \cos x) = 0$$

$$\sin x = 0$$

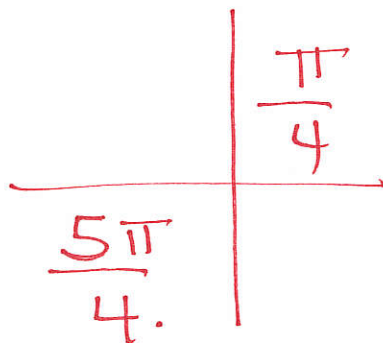
$$\sin x - \cos x = 0$$



$$\sin x = \cos x$$

$x = \frac{\pi}{4}$ family
in Q1

and Q3



$$13. \sqrt{3} \tan x \sec x + 2 \tan x = 0$$

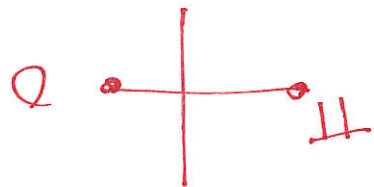
$$\tan x (\sqrt{3} \sec x + 2) = 0$$

$$\tan x = 0 \quad \sqrt{3} \sec x + 2 = 0$$

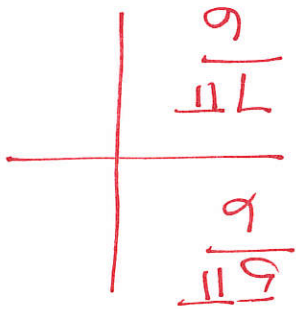
$$\sec x = -\frac{2}{\sqrt{3}}$$

$$\frac{1}{\cos x} = -\frac{2}{\sqrt{3}}$$

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



$$\frac{y}{x} = 0$$



$$0, \pi, \frac{5\pi}{6}, \frac{7\pi}{6}$$