

$$29. \sqrt{3} \sin 2x = \cos 2x$$

$$\sqrt{3} (2 \sin x \cos x) = 2 \cos^2 x - 1$$

$$2\sqrt{3} (\sqrt{1 - \cos^2 x} \cos x) = 2 \cos^2 x - 1$$

$$\vdots$$

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

$$\tan 2x = \frac{\sqrt{3}}{3}$$

$$2x = 30^\circ + 180^\circ k$$

$$x = 15^\circ + 90^\circ k$$

$$= 15 \pmod{90}$$

$$23. \sin^2 x = 4 - 2 \cos^2 x$$

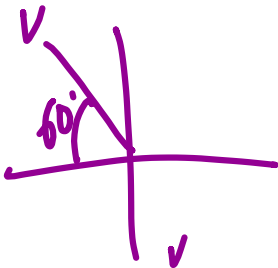
$$\underbrace{\sin^2 x + \cos^2 x}_{1} + \cos^2 x = 4$$

$$\cos^2 x = 3$$

$$x = \{ \}$$

$$33. \tan \frac{x}{4} + \sqrt{3} = 0$$

$$\tan \frac{x}{4} = -\sqrt{3}$$



$$\frac{x}{4} = 120^\circ + 180^\circ k$$

$$x = 480^\circ + 720^\circ k$$

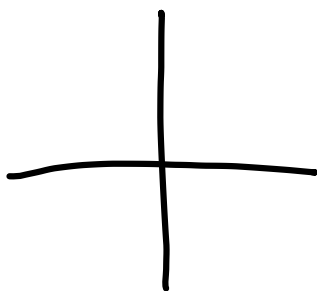
$$x = 480^\circ$$

$$35. \tan^5 x - 9 \tan x = 0$$

$$\tan x (\tan^4 x - 9) = 0$$

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

$$\tan x = 0, \pm\sqrt{3}$$



$$x = 0 \quad 60^\circ \quad 120^\circ$$

$$180^\circ \quad 240^\circ \quad 300^\circ$$

$$x = 60^\circ k$$

$$\cos \theta = -\frac{1}{2}, \quad \theta \text{ is in Q2}$$

$$\text{Find } \cos \frac{\theta}{2} = \pm \sqrt{\frac{1 + \cos \theta}{2}} = \pm \sqrt{\frac{1 - \frac{1}{2}}{2}}$$

 $\pm \frac{1}{2}$

Q2

$$= \pm \frac{1}{2} \rightarrow \begin{matrix} \textcircled{+\frac{1}{2}} \\ \textcircled{-\frac{1}{2}} \end{matrix}$$

$$90^\circ < \theta < 180^\circ \quad 45^\circ < \frac{\theta}{2} < 90^\circ \rightarrow \underline{\text{Q1}}$$

$$450^\circ < \theta < 540^\circ \quad 225^\circ < \frac{\theta}{2} < 270^\circ \rightarrow \text{Q3}$$