

Solving Trig Equations

$$\textcircled{1} \sin X = \sqrt{3} - \sin X$$
$$\frac{\sin X}{+\sin X} = \frac{\sqrt{3}}{+\sin X}$$

$$\frac{2 \sin X}{2} = \frac{\sqrt{3}}{2}$$

$$\sin X = \frac{\sqrt{3}}{2}$$

$$X = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$$

$$X = \frac{\pi}{3}, \frac{2\pi}{3}$$

Restrictions only apply when original problem is inverse trig!

$$\textcircled{3} \cos^2 X + \sin X = 1$$

$$1 - \sin^2 X + \sin X = 1$$

$$-\sin^2 X + \sin X = 0$$

$$\sin X (-\sin X + 1) = 0$$

Factor out $\sin X$

$$\sin X = 0$$

$$X = 0, \pi$$

$$-\sin X + 1 = 0$$

$$1 = \sin X$$

$$X = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\textcircled{2} \tan^2 X - 1 = 0$$
$$\frac{+1}{+1} \frac{-1}{+1}$$

$$\sqrt{\tan^2 X} = \sqrt{1}$$

$$\tan X = \pm 1$$

$$\tan X = 1 \quad \tan X = -1$$

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