

Solving Trig Equations

Day 3

Ex

$$5 \cos^2 \left(\theta - \frac{\pi}{4} \right) = 5$$

$$\cos^2 \left(\theta - \frac{\pi}{4} \right) = 1$$

Solve $\cos^2 \theta = 1$

$$\cos \theta = \pm 1$$

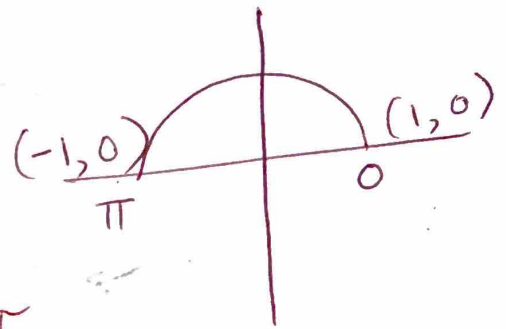
$$\theta = 0, \theta = \pi$$

$$\theta - \frac{\pi}{4} = 0$$

$$\theta - \frac{\pi}{4} = \pi \quad \frac{4\pi}{4}$$

$$\theta = \frac{\pi}{4}$$

$$\theta = \frac{5\pi}{4}$$



Ex

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

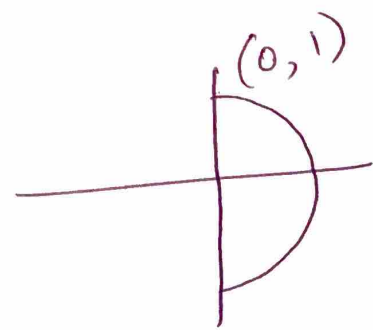
$$\sin x = 1$$

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

$$\frac{x}{2} - \frac{\pi}{6} = \frac{\pi}{2}$$

$$\cancel{2} \cdot \frac{x}{2} = \frac{2\pi}{3} \cdot 2$$

$$x = \frac{4\pi}{3}$$



Ex $4 \sin(\theta + 60^\circ) = -2\sqrt{3}$

$$\sin(\theta + 60^\circ) = \frac{-2\sqrt{3}}{4}$$

$$\sin(\theta + 60^\circ) = -\frac{\sqrt{3}}{2}$$

$$\sin\theta = -60^\circ$$

$$\theta + 60^\circ = -60^\circ$$

$$\theta = -120^\circ$$

Ex

$$1 + \tan\theta = \frac{3 + \sqrt{3}}{3}$$

$$\tan\theta = \frac{3 + \sqrt{3}}{3} - 1$$

$$\tan\theta = \frac{3}{3} + \frac{\sqrt{3}}{3} - \frac{3}{3}$$

$$\tan\theta = \frac{\sqrt{3}}{3}$$

$$\theta = \frac{\pi}{6}$$

$$\sqrt{3} = \tan\left(\frac{\theta}{3} + \frac{7\pi}{4}\right)$$

$$\tan\left(\frac{\theta}{3} + \frac{7\pi}{4}\right) = \sqrt{3}$$

$$\tan^{-1}(\tan) = \tan^{-1}(\sqrt{3})$$

$$\theta = \frac{\pi}{3}$$

$$\frac{\theta}{3} + \frac{7\pi}{4} = \frac{\pi}{3}$$

$$\frac{\theta}{3} = \frac{\pi}{3} - \frac{7\pi}{4}$$

$$3 \cdot \frac{\theta}{3} = \frac{-17\pi \cdot 3}{12}$$

$$\theta = -\frac{51\pi}{12}$$

$$\theta = -\frac{17\pi}{4}$$