

Notes: Solving Trig Equations that involve factoring

$$1) \quad 4 \cos^2 x - 3 = 0$$

Solve over  $[0, 2\pi)$

$$\frac{4 \cos^2 x}{4} = \frac{3}{4}$$

$$\sqrt{\cos^2 x} = \sqrt{\frac{3}{4}}$$

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

$$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$2) \quad \begin{array}{l} \cos^3 x - \cos x \\ -\cos x \quad -\cos x \end{array} \quad \text{solve over } [0, 2\pi)$$

$$\cos^3 x - \cos x = 0$$

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

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

$$\sqrt{\cos^2 x} = \sqrt{1}$$

$$\cos x = \pm 1$$

$$x = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$$

$$3) \quad \begin{array}{l} 2 \cos x \sin x - \cos x \\ +\cos x \quad +\cos x \end{array} \quad \text{solve over } [0, 2\pi)$$

$$2 \cos x \sin x + \cos x = 0$$

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

$$\cos x = 0 \quad 2 \sin x + 1 = 0$$

$$2 \sin x = -1$$

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

$$x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$4) \quad \sec^2 x - \sec x = 2 \quad \text{Solve over } [0, 2\pi)$$

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

$$\sec x - 2 = 0 \quad \sec x + 1 = 0$$

$$\sec x = 2 \quad \sec x = -1 \quad * \text{put in terms of } \cos$$

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

$$x = \frac{\pi}{3}, \frac{5\pi}{3}, \pi$$