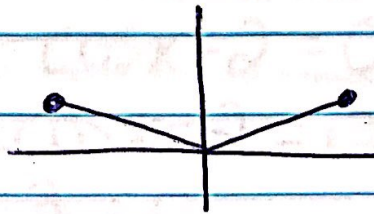


Solving Trig Equations

ex: $2\sin x - 1 = 0$ for all x

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



$$x = \frac{\pi}{6} + 2n\pi, \frac{5\pi}{6} + 2n\pi$$

ex: $\sin x = \underbrace{\cos 2x}_{\text{Double angle}}$ for $0 \leq x < 360^\circ$

$$\sin x = \underbrace{\cos^2 x - \sin^2 x}_{\text{pythagorean}}$$

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

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

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

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

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

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

$$\sin x = -1$$

$$x = 30^\circ, 150^\circ$$

$$x = 270^\circ$$

ex: $\underbrace{\cos 2x}_{\text{double}} - \cos x - 2 = 0$ for all x

$$\cos^2 x - \underbrace{\sin^2 x}_{\text{pythagorean}} - \cos x - 2 = 0$$

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

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

$$2\cos^2 x - \cos x - 3 = 0$$

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

$$2\cos x - 3 = 0$$

$$\cos x + 1 = 0$$

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

$$\cos x = -1$$

$$x = \pi + 2n\pi$$

no solution

b/c $\frac{3}{2} > 1$