

Notes Section 7.4: Basic Trig. Equations

An Identity is a Trig. Equation that's true for every angle. Most trig Equations are only true for certain values of θ .

ex: $2\cos\theta - 1 = 0$

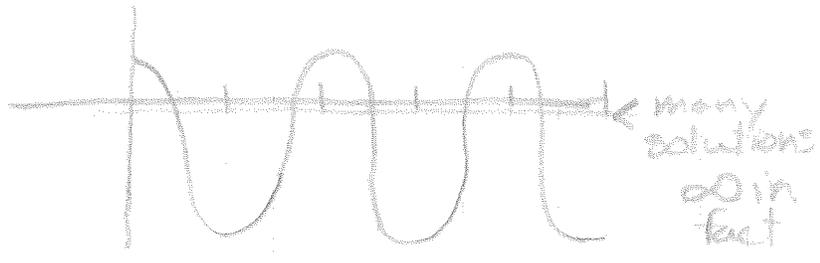
$\cos\theta = \frac{1}{2}$ *

1st per. solutions

$\theta = 60^\circ + n360^\circ$

$\theta = -60^\circ$ or $+300^\circ + n360^\circ$

degrees



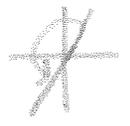
$\frac{\pi}{3} + 2k\pi$; $\frac{5\pi}{3} + 2k\pi$

radians

unknown values - use \sin^{-1} , \cos^{-1} , \tan^{-1}

ex: $\tan\theta = 1.78$ ← ok for tan, not for sin/cos.

$\tan^{-1}(1.78) = \theta = 60.67^\circ$; 240.67°



$= 1.059$ radians

unlike sin/cos, tan has same signs ^{directly} across, therefore can get both tan value w/ 1 expression

so $\theta = 60.67^\circ + n180^\circ$

$\theta = 1.059 + k\pi$ radians

• $2\cos^2\theta - 1 = 0$

$\cos\theta = \pm \frac{1}{\sqrt{2}} = \pm \frac{\sqrt{2}}{2}$



$\frac{\pi}{4} + k\pi$, $\frac{3\pi}{4} + k\pi$ or $\frac{\pi}{4} + k\frac{\pi}{2}$

Factoring to solve:

$$\cos^2 \theta - \cos \theta - 2 = 0 \rightarrow \text{like: } x^2 - x - 2$$

$$(\cos \theta - 2)(\cos \theta + 1) \quad \leftarrow (x - 2)(x + 1)$$

↑ ↑ solve each binomial for zero

$$\cos \theta - 2 = 0 \quad \cos \theta + 1 = 0$$

$$\cos \theta = 2 \quad \cos \theta = -1$$

impossible

$$\theta = \pi + 2k\pi = \pi(1 + 2k)$$

$$180^\circ + n360^\circ$$

