Solve for x, that's the goal; .....

now you have to find it

just remember to do the opposite

"Solve for X"

- 2012

Today's learning objective:

By the end of class, I will be able to solve trigonometric equations by utilizing the unit circle.

Today's language objective:

Unit circle
Trigonometric identities (no memorization)
-(Apples to Apples)

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

Solve for x

$+1 \qquad +1$

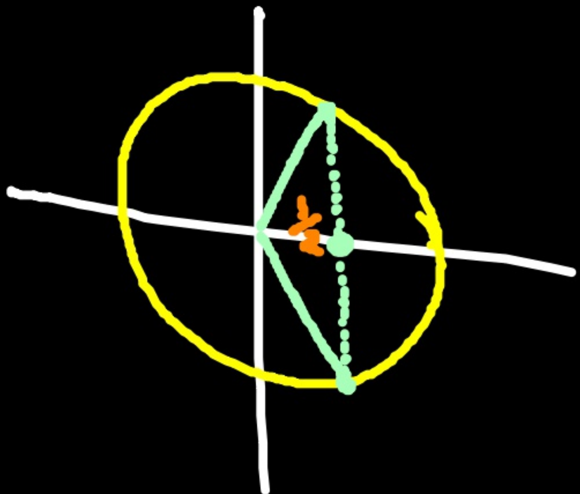
$\frac{6\cancel{0}\pi}{18\cancel{0}}$ $\frac{5\pi}{3}$ $\frac{30\cancel{0}\pi}{18\cancel{0}}$

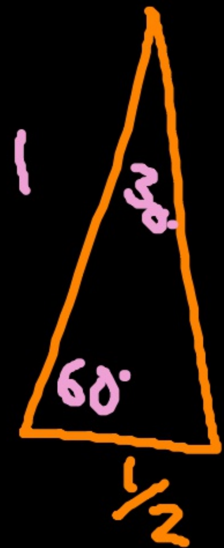
$\frac{2}{2}\cos x = \frac{1}{2}$

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

$x = 60°; \frac{\pi}{3}$

$x = 300°; \frac{5\pi}{3}$





3.1	Length of an arc Area of a sector	$l = \theta r$ $A = \frac{1}{2}\theta r^2$
3.2	Trigonometric identity	$\tan\theta = \frac{\sin\theta}{\cos\theta}$
3.3	Pythagorean identity Double angle formulae	$\cos^2\theta + \sin^2\theta = 1$ $\sin 2\theta = 2\sin\theta\cos\theta$ $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$
3.6	Cosine rule Sine rule Area of a triangle	$c^2 = a^2 + b^2 - 2ab\cos C$; $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$ $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ $A = \frac{1}{2}ab\sin C$

$2 \sin x - 1 = 0$

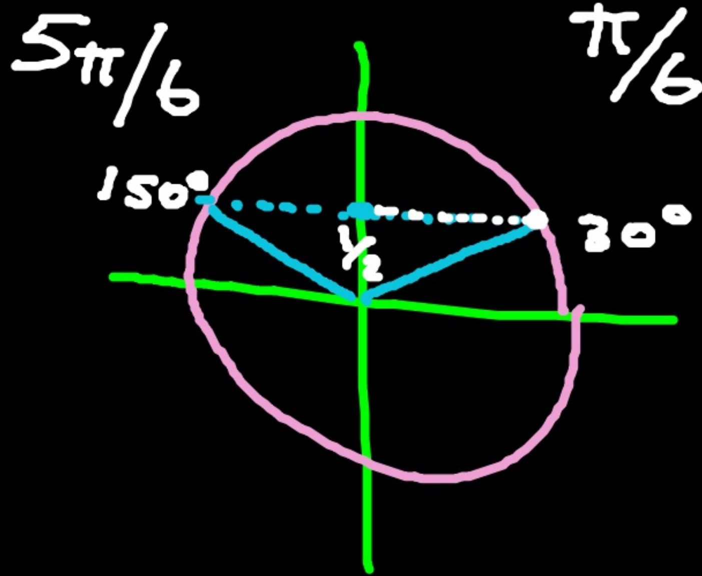
$+1 \quad +1$

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

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

~~Cos~~

$\frac{15\cancel{0}^{\circ} \pi}{18\cancel{0}^{\circ}}$



3.2	Trigonometric identity	$\tan\theta = \dfrac{\sin\theta}{\cos\theta}$
3.3	Pythagorean identity	$\cos^2\theta + \sin^2\theta = 1$
	Double angle formulae	$\sin 2\theta = 2\sin\theta\cos\theta$
		$\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = \cancel{1 - 2\sin^2\theta}$

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

$$\cos x - 1 = 0$$

$$\cos x = 1$$

$$x = 2\pi, -2\pi, 0$$

$$2 + \cos 2x = 3\cos x \qquad -2\pi < x < 2\pi$$

$$x = \cos x$$

$$(\cos x)(\cos x) = \cos^2 x$$

$$2 + 2\cos^2 x - 1 = 3\cos x$$

$$2\cos^2 x + 1 = 3\cos x$$

$$2x^2 + 1 = 3x$$

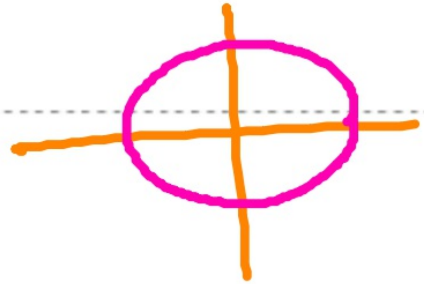
$$-3x$$

$$2x^2 - 3x + 1 = 0$$

$$\begin{matrix} (2x & -1) \\ (x & -1) \end{matrix} \quad \begin{matrix} -2x \\ -x \end{matrix}$$

$$(2x-1)(x-1)$$

3.2	Trigonometric identity	$\tan\theta = \dfrac{\sin\theta}{\cos\theta}$
3.3	Pythagorean identity Double angle formulae	$\cos^2\theta + \sin^2\theta = 1$ $\sin 2\theta = 2\sin\theta\cos\theta$ $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$



$\sin x = \tan x$

$-\pi \le x \le \pi$

$\sin x = \dfrac{\sin x}{\cos x}$

$\cos x = \dfrac{\cancel{\sin x}}{\cancel{\sin x}}$

$\cos x = 1$

$x = 0$

$\sin x \cdot \cos x = \sin x$

$\sin x \cdot \cos x - \sin x = 0$

$\sin x(\cos x - 1) = 0$

$\sin x = 0$

$x = -\pi, 0, \pi$

$\cos x - 1 = 0$

$\cos x = 1$

$x = 0$

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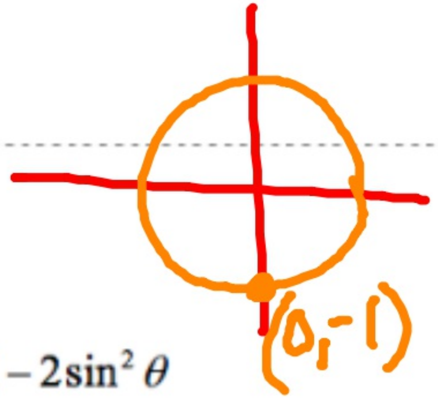
3.3	Pythagorean identity Double angle formulae	$\cos^2\theta + \sin^2\theta = 1$ $\sin 2\theta = 2\sin\theta\cos\theta$ $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$



$\sin 2x = \cos x$ $\quad -\pi \le x \le \pi$

$2\sin\theta\cos\theta = \cos\theta$

$-\cos\theta \qquad -\cos\theta$

$2\sin\theta\cos\theta - \cos\theta = 0$

$\cos\theta(2\sin\theta - 1) = 0$

$\cos\theta = 0$

$\theta = \pi/2, -\pi/2$

$2\sin\theta - 1 = 0$

$\theta = \dfrac{5\pi}{6}, \dfrac{\pi}{6}$