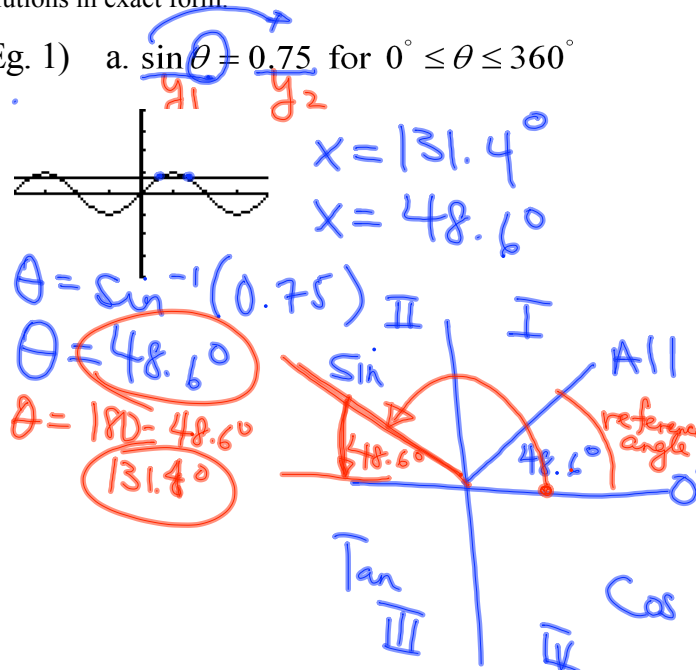


Day 1: Solving Trig Equations

Review: Solving basic equations was done in last unit using graphing and the unit circle. We can do it using inverse functions and reference angles.

**Inverse functions using your calculators generate only one answer, but we know from graphical forms of periodic functions that many answers could possibly exist. We can either find the value of the reference angle and use the domain to find the solutions. Or we could use the unit circle and the domain to find the solutions in exact form.

Eq. 1) a. $\sin \theta = 0.75$ for $0^\circ \leq \theta \leq 360^\circ$



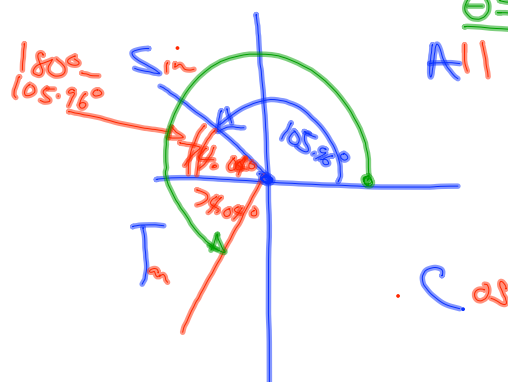
b. $\cos \theta = -0.275$ for $0^\circ \leq \theta \leq 360^\circ$

$x = 254.04^\circ$
 $x = 105.96^\circ$

$\theta = \cos^{-1}(-0.275)$

$\theta = 105.96$

$\theta = 180 + 74.04^\circ$
 $\theta = 254.04^\circ$



c. $4 \sin^2 \theta - 3 = 0$ for $0^\circ \leq \theta \leq 360^\circ$

$$4 \sin^2 \theta = 3$$

$$\sin^2 \theta = \frac{3}{4}$$

$$\sin \theta = \pm \sqrt{\frac{3}{4}}$$

$$\sin \theta = \pm \frac{\sqrt{3}}{2}$$

(x, (y))

$$\sin \theta = \frac{+\sqrt{3}}{2}$$

$$\theta = 60^\circ$$

$$\theta = 120^\circ$$

$$\sin \theta = -\frac{\sqrt{3}}{2}$$

$$\theta = 240^\circ$$

$$\theta = 300^\circ$$

$$4 \cos \theta + 3 = 2 \cos \theta + 2 \text{ for } 0 \leq \theta \leq 2\pi$$

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

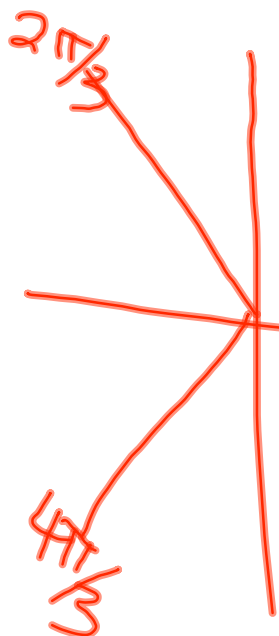
$$\cos \theta = -\frac{1}{2}$$

$$\theta = \frac{2\pi}{3}$$

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

General Solution

If our graph continued on forever
what would all of the solutions
be?

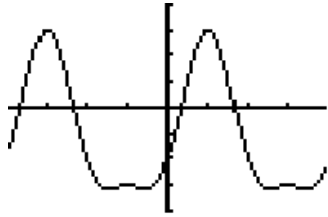


$$\frac{2\pi}{3} \pm 2\pi n$$

$$\frac{4\pi}{3} \pm 2\pi n$$

$$2 \sin^2 \theta + 3 \sin \theta - 2 = 0 \text{ for } 0 \leq x \leq 2\pi$$

Finding x-int's



2 x int's
SO I have 2 answers.

$$\begin{array}{|c} 4 \\ \hline -1 \\ \hline +2 \end{array}$$

$$x - 4$$

$$\frac{4}{2}$$

$$-\frac{1}{2}$$

$$\frac{2}{1}$$

$$-\frac{1}{2}$$

$$(1 \sin \theta + 2)$$

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

$$\sin \theta + 2 = 0$$

$$\sin \theta = -2$$

$$2 \sin \theta - 1 = 0$$

$$2 \sin \theta = 1$$

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

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

$$\theta = \frac{5\pi}{6}$$

$$|\csc^2 \theta - 3 \csc \theta - 28 = 0 \text{ for } 0^\circ \leq \theta \leq 360^\circ$$

$$\begin{array}{|c|} \hline -7 \\ \hline 4 \\ \hline \end{array} x - 28 \quad \frac{-7}{1} \quad \frac{4}{1}$$

$$(\csc \theta - 7)$$

$$(\csc \theta + 4) = 0$$

$$\csc \theta = 7$$

$$\csc \theta = -4$$

$$\sin \theta = \frac{1}{7}$$

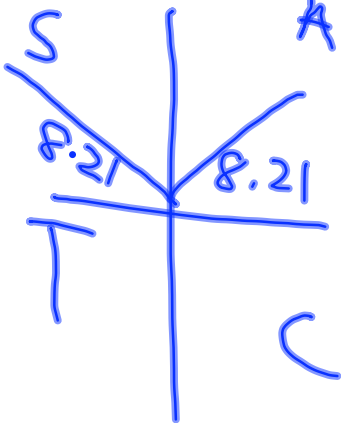
$$\sin \theta = -\frac{1}{4}$$

$$\theta = \sin^{-1} \left(-\frac{1}{4} \right)$$

$$\theta = -14.48^\circ$$

$$\theta = 360 - 14.48$$

$$345.52^\circ$$

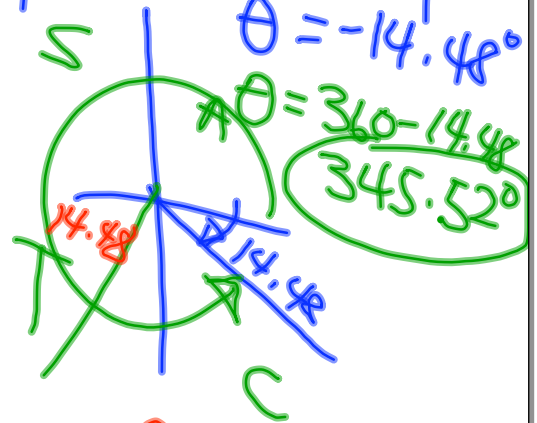


$$\theta = \sin^{-1} \left(\frac{1}{7} \right)$$

$$\theta = 8.21^\circ$$

$$\theta = 180 - 8.21$$

$$171.79^\circ$$



$$\theta = 180 + 14.48$$

$$\theta = 194.48^\circ$$

Assignment:
Pg. 313 7, 9, 12