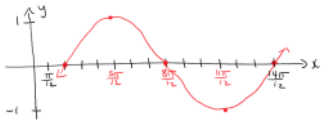
Week 12 Wednesday

March 27, 2019 7:46 AM

7.8 Cont'd

Recall $y = \sin\left[2\left(x - \frac{\pi}{6}\right)\right]$



Recall Standard Form

$y = A\sin\left[\omega\left(x - \frac{\phi}{\omega}\right)\right] + C$ $\omega > 0$

Ex: Graph $y = 3\sin\left(\frac{\pi}{3} - 2x\right)$

$y = 3\sin\left[-\left(2x - \frac{\pi}{3}\right)\right]$

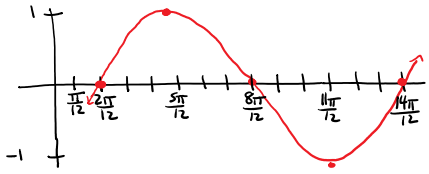
$\sin\theta$ is odd

$y = -3\sin\left(2x - \frac{\pi}{3}\right)$ $\omega > 0$ ✓

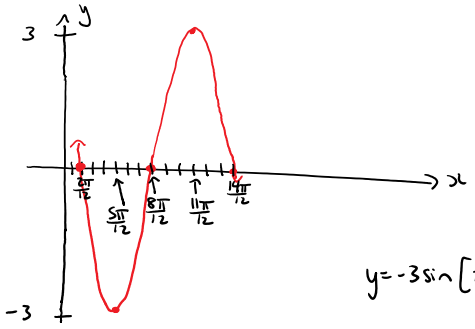
$y = -3\sin\left[2\left(x - \frac{\pi}{6}\right)\right]$

Standard Form ✓

Previous graph with y-values multiplied by -3



$y = \sin\left[2\left(x - \frac{\pi}{6}\right)\right]$



$y = -3\sin\left[2\left(x - \frac{\pi}{6}\right)\right]$

Ex: Graph $y = 4\cos(2x - \pi) + 1$

Standard Form

$y = 4\cos\left[2\left(x - \frac{\pi}{2}\right)\right] + 1$

Intuition:

period: $\frac{2\pi}{\omega} = \frac{2\pi}{2} = \pi$

phase shift: $\frac{\pi}{2}$ to the right

amplitude: $|4| = 4$

x	$y = \cos x$
0	1
$\pi/2$	0
π	-1
$3\pi/2$	0
2π	1

New x-values
Divide x by 2
Then add $\frac{\pi}{2}$

Gunter-intuitive

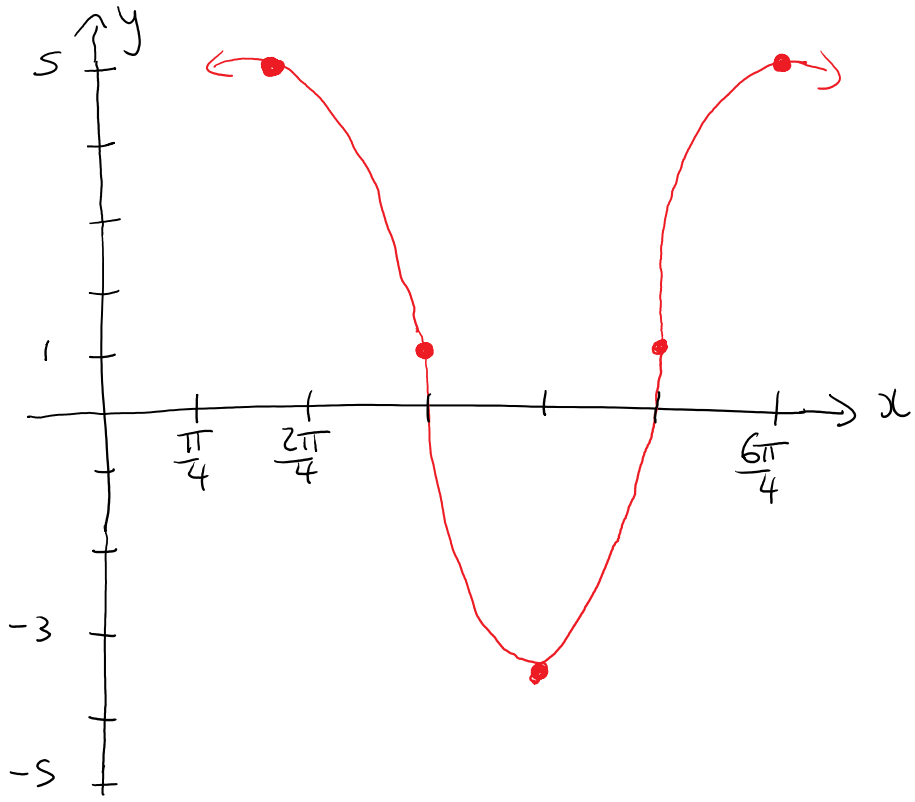
x	y
$\frac{0}{2} + \frac{\pi}{2} = \frac{\pi}{2} = \frac{2\pi}{4}$	1
$\frac{\pi}{4} + \frac{\pi}{2} = \frac{3\pi}{4}$	0
$\frac{\pi}{2} + \frac{\pi}{2} = \pi = \frac{4\pi}{4}$	-1
$\frac{3\pi}{4} + \frac{\pi}{2} = \frac{5\pi}{4}$	0
$\pi + \frac{\pi}{2} = \frac{3\pi}{2} = \frac{6\pi}{4}$	1

New y-values

Multiply y by 4
then add 1

Intuitive

x	y
$2\pi/4$	5
$3\pi/4$	1
$4\pi/4$	$4(-1)+1 = -3$
$5\pi/4$	1
$6\pi/4$	5



Ch 8 Trig II

More algebra, less graphing

8.1 Inverse Trig Functions

Recall $y = x^3$ and $y = \sqrt[3]{x}$ are inverse functions (undo each other)

NOTATION

$\sin^{-1} x$ or $\arcsin x$ is the inverse sine function

NOT TO BE CONFUSED WITH $(\sin x)^{-1} = \frac{1}{\sin x} = \csc x$

Ex: $\sin \frac{\pi}{6} = \frac{1}{2}$

$\sin^{-1} \frac{1}{2} = \frac{\pi}{6}$

$\sin(\text{angle}) = \#$

$\sin^{-1}(\#) = \text{angle}$

FACT

$$\sin^{-1}(-a) = -\sin^{-1} a$$

Ex: $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$= -\frac{\pi}{3}$ or -60°

FACT

Domain of $\sin^{-1} x$: $-1 \leq x \leq 1$

Range of $\sin^{-1} x$: $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$

S	A
T	C

$\sin^{-1} x$ can only return angles in QI or QIV