4.2. Translations of the graphs of the sine and cosine function

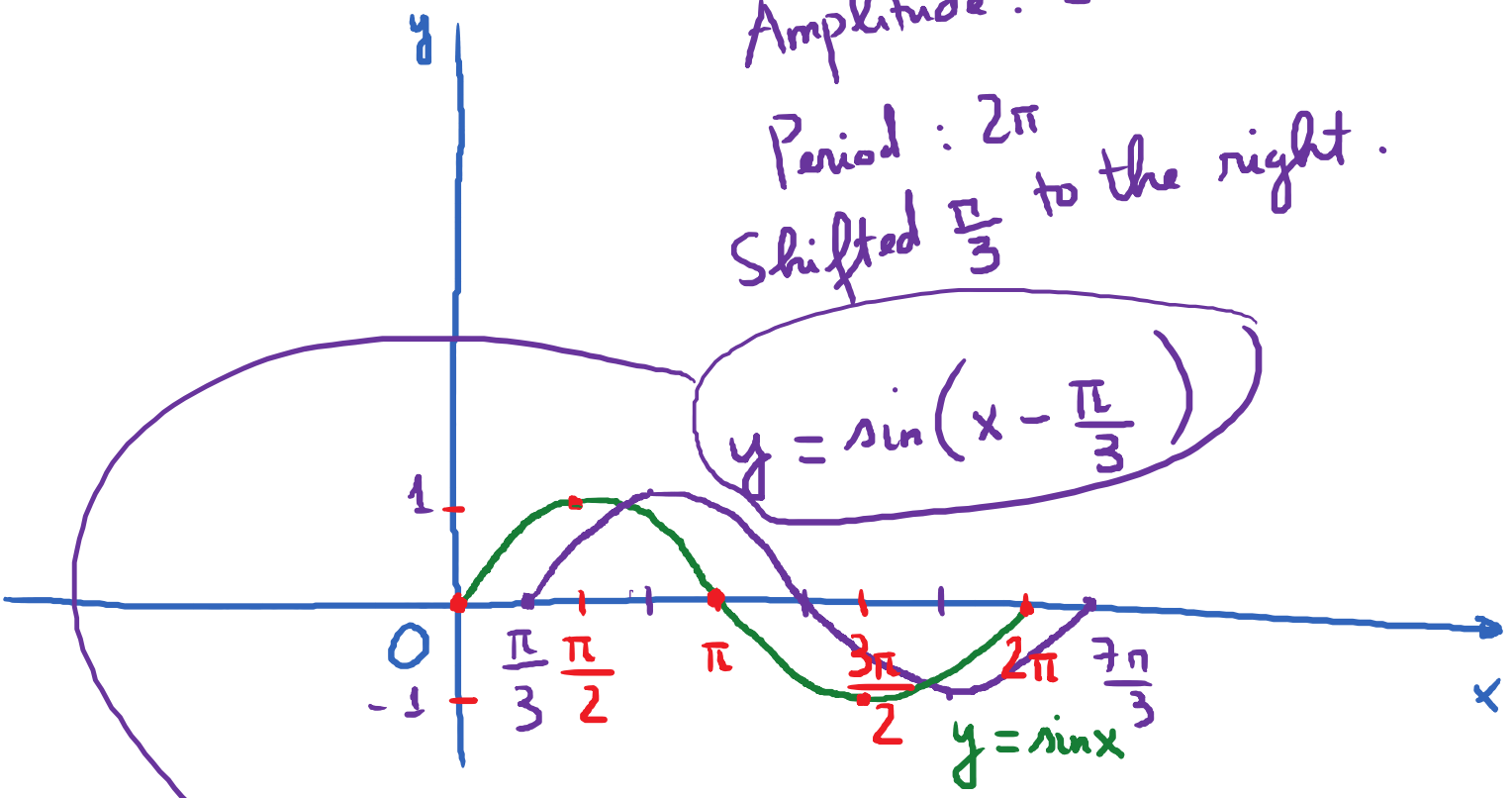
Tuesday, October 17, 2017 12:57 PM

Obj 1: Horizontal Translations

E.g. Graph the function $y = \sin\left(x - \frac{\pi}{3}\right)$ in one period.

x	$y = \sin x$
0	0
$\frac{\pi}{2}$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0

x	$y = \sin\left(x - \frac{\pi}{3}\right)$
$\frac{\pi}{3}$	0
$\frac{5\pi}{6}$	1
$\frac{4\pi}{3}$	0
$\frac{11\pi}{6}$	-1
$\frac{7\pi}{3}$	0



Phase Shift: $\frac{\pi}{3}$ to the right

E.g. Graph $y = 3\cos\left(x + \frac{\pi}{4}\right)$ in 2 periods.

Solved in class!

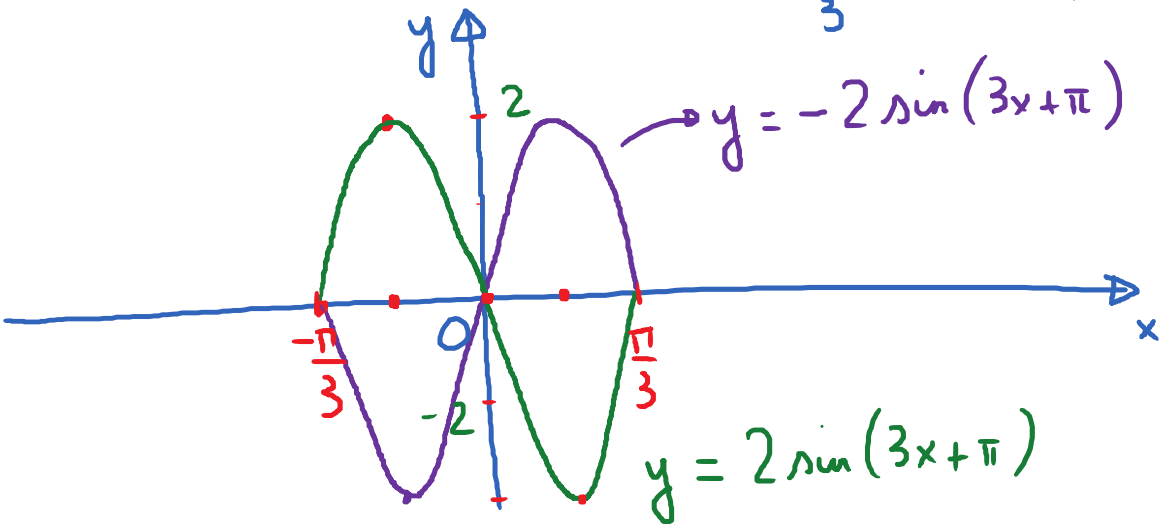
E.g. Graph $y = 2\sin(3x + \pi)$

x	$y = \sin x$
0	0
$\frac{\pi}{2}$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0

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

x	y
$-\frac{\pi}{3}$	0
$-\frac{\pi}{6}$	2
0	0
$\frac{\pi}{6}$	-2
$\frac{\pi}{3}$	0

Amplitude: 2 ; Period: $\frac{2\pi}{3}$. Phase Shift: $\frac{\pi}{3}$ to the left.



E.g. Graph $y = -\cos\left(2x + \frac{\pi}{4}\right)$ in 2 periods.

Find the amplitude, period and phase shift.

x	$y = \cos x$
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1

x	$y = -\cos\left[2\left(x + \frac{\pi}{8}\right)\right]$
$-\frac{\pi}{8}$	-1
$\frac{\pi}{8}$	0
$\frac{3\pi}{8}$	1
$\frac{5\pi}{8}$	0
$\frac{7\pi}{8}$	-1

Graphed in class!

E.g. Graph $y = -1 + 2\sin(4x + \pi)$ in one period.

x	$y = \sin x$
0	0
$\frac{\pi}{2}$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0

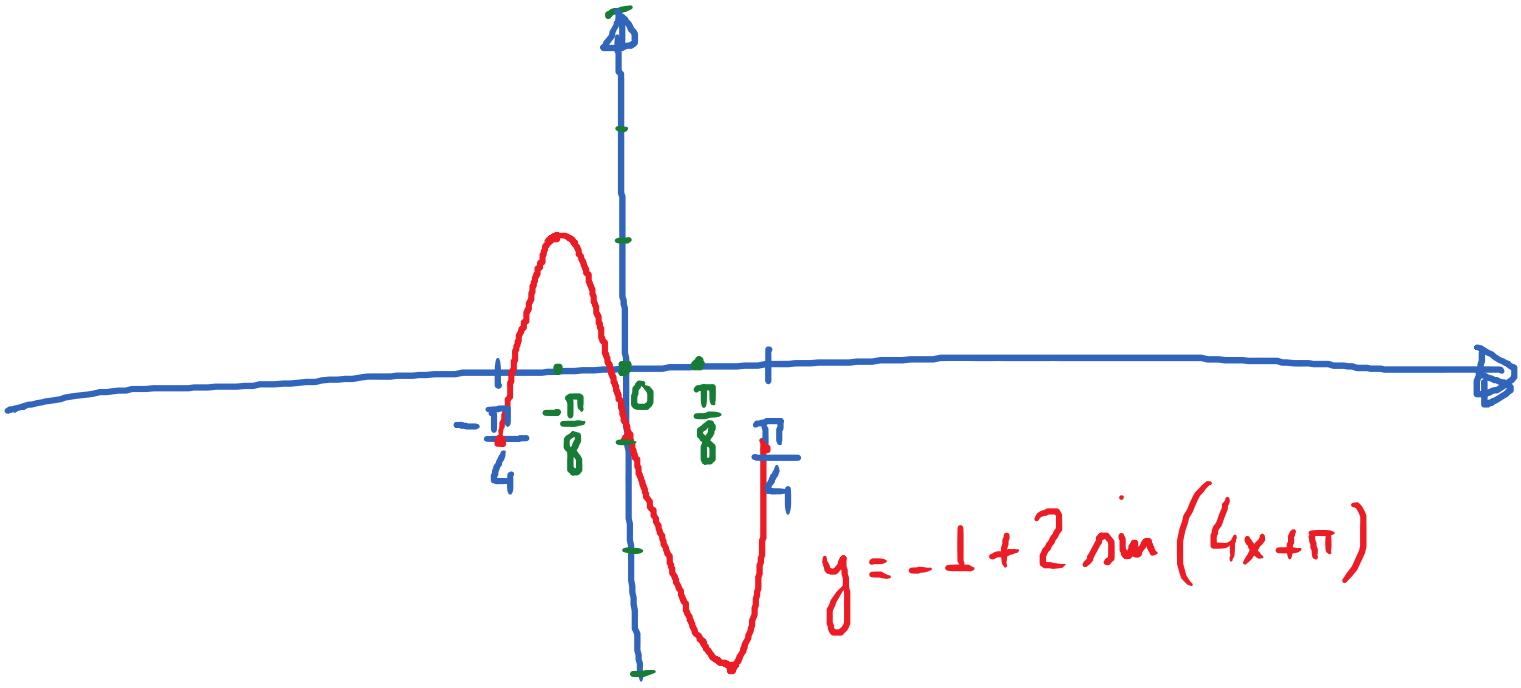
$y = -1 + 2\sin\left[4\left(x + \frac{\pi}{4}\right)\right]$

x	y
$-\frac{\pi}{4}$	-1
$-\frac{\pi}{8}$	1
0	-1
$\frac{\pi}{8}$	-3
$\frac{\pi}{4}$	-1

Phase shift: $\frac{\pi}{4}$ to the left

Period: $\frac{\pi}{2}$

Amplitude: 2



$y = -1 + 2\sin(4x + \pi)$