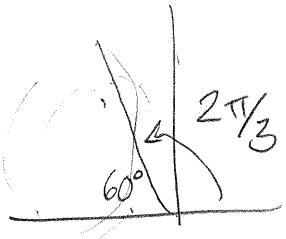
#56 b

$$x = -\frac{\sqrt{3}}{3}\sin\left(\frac{\pi}{3}t\right) - \cos\left(\frac{\pi}{3}t\right)$$

$t = 2$

$$x = -\frac{\sqrt{3}}{3}\sin\left(\frac{2\pi}{3}\right) - \cos\left(\frac{2\pi}{3}\right)$$

$$x = -\frac{\sqrt{3}}{3}\left(\frac{\sqrt{3}}{2}\right) - \left(-\frac{1}{2}\right)$$



$\sin 60 = \frac{\sqrt{3}}{2}$

$\cos 60 = \frac{1}{2}$

$\cos\left(\frac{2\pi}{3}\right) = -\frac{1}{2}$

$$= -\frac{3}{3\cdot 2} + \frac{1}{2}$$

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

$$= \boxed{0}$$

$\sqrt{n}\cdot\sqrt{m} = \sqrt{nm}$

$\sqrt{3}\sqrt{3} = \sqrt{3\cdot 3}$

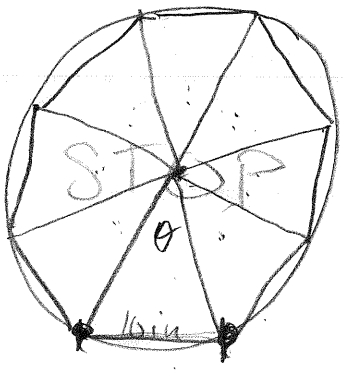
$= \sqrt{9} = 3$

#57

Radius circle ↓ central angle ↓

$$c = r\sqrt{2 - 2\cos\theta}$$

↑ chord length



$c = 10$ in

$r =$ ← I want

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

$$\frac{8\theta}{8} = \frac{2\pi}{8}$$

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

$$10 = r\sqrt{2 - 2\left(\cos\tfrac{\pi}{4}\right)}$$

$$10 = r\sqrt{2 - 2\left(\tfrac{\sqrt{2}}{2}\right)}$$

$$\frac{10}{\sqrt{2-\sqrt{2}}} = \frac{r\sqrt{2-\sqrt{2}}}{\sqrt{2-\sqrt{2}}}$$

$$\frac{10}{\sqrt{2-\sqrt{2}}} = r$$

$$r = 13.07 \text{ in}$$

Sec 2.1 cont

parabola

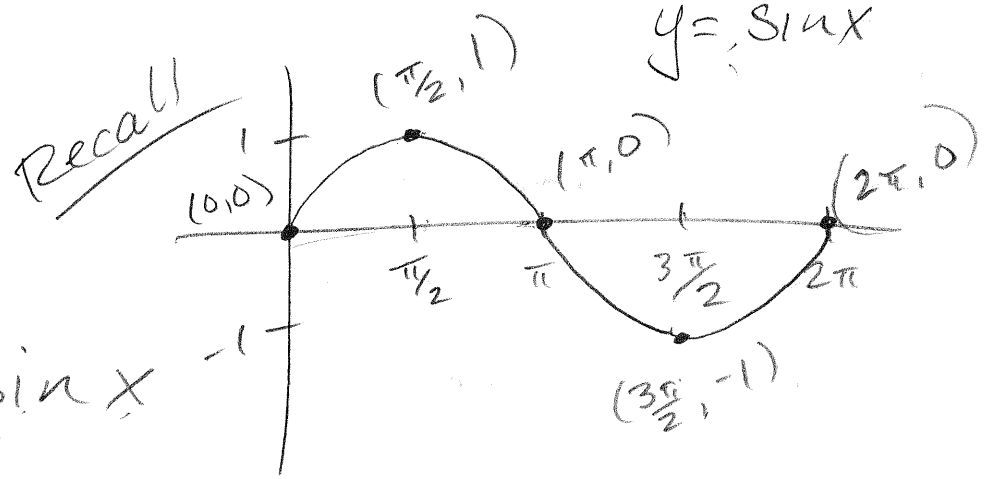
$y = 2(x+3)^2 - 5$

stretched by 2

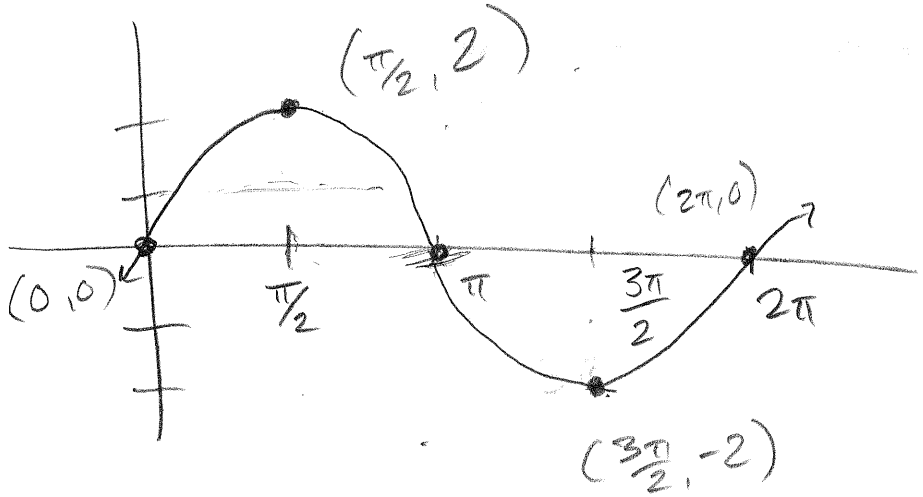
-3

Graph $y = 2\sin x$

Recall $y = \sin x$



$y = 2\sin x$ ↑ stretches by factor of 2



This stretch is called the Amplitude

Defn: the Amplitude of a sign wave is the absolute value of half the distance from the max and min y-coordinates if $y = A\sin x$, Amp $= |A|$

Our Cosine Graph

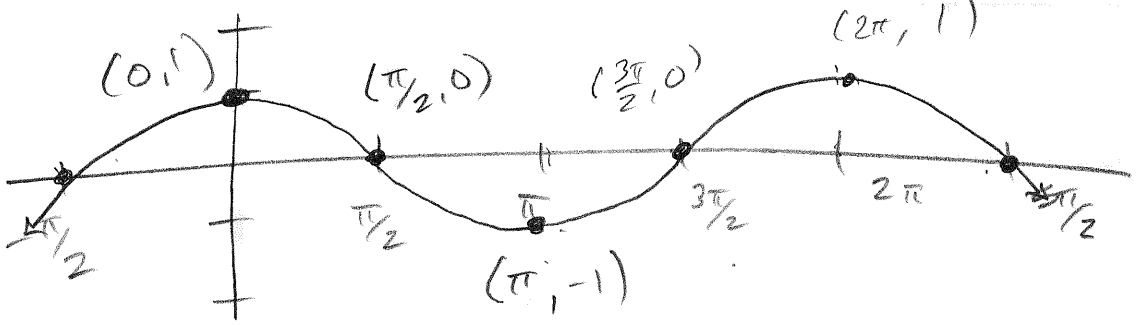
$y = \cos x$ ← input

↑ output variable

Key points:

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

basic cosine graph



Also has Amplitude of 1

$y = A\cos x$, Amp $= |A|$

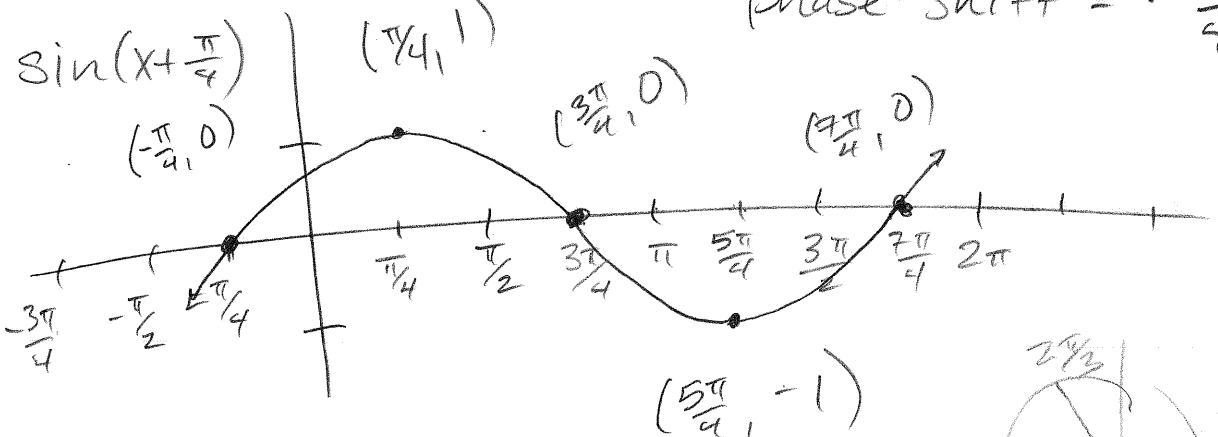
Horizontal Shift: called "phase shift"

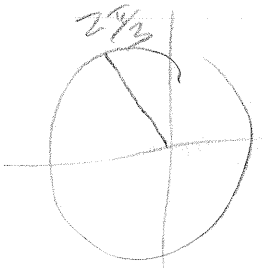
$y = \sin\left(x + \frac{\pi}{4}\right)$

Shift $\frac{\pi}{4}$ to the left

$y = \sin\left(x + \frac{\pi}{4}\right)$

Phase shift $= -\frac{\pi}{4}$

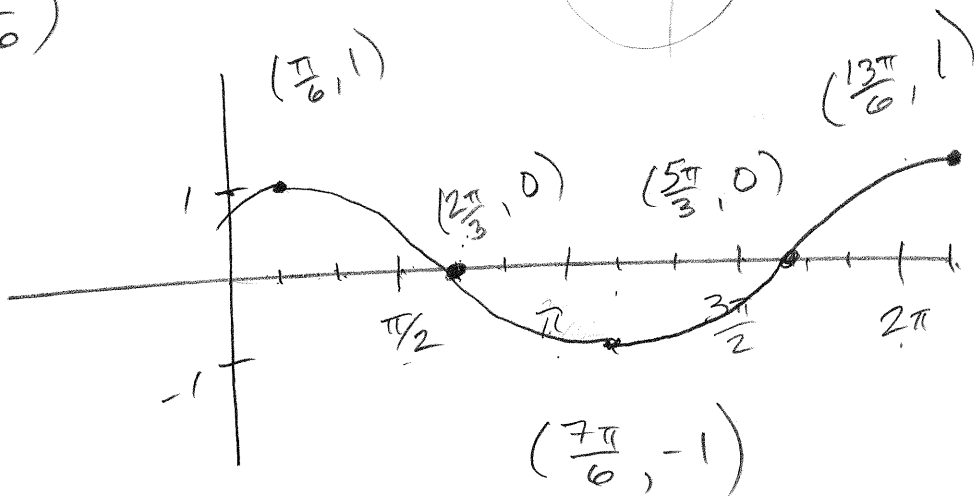


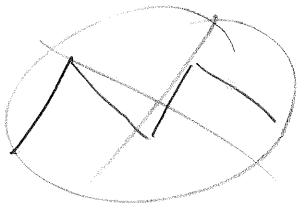


$y = \cos\left(x - \frac{\pi}{6}\right)$

Amp $= 1$

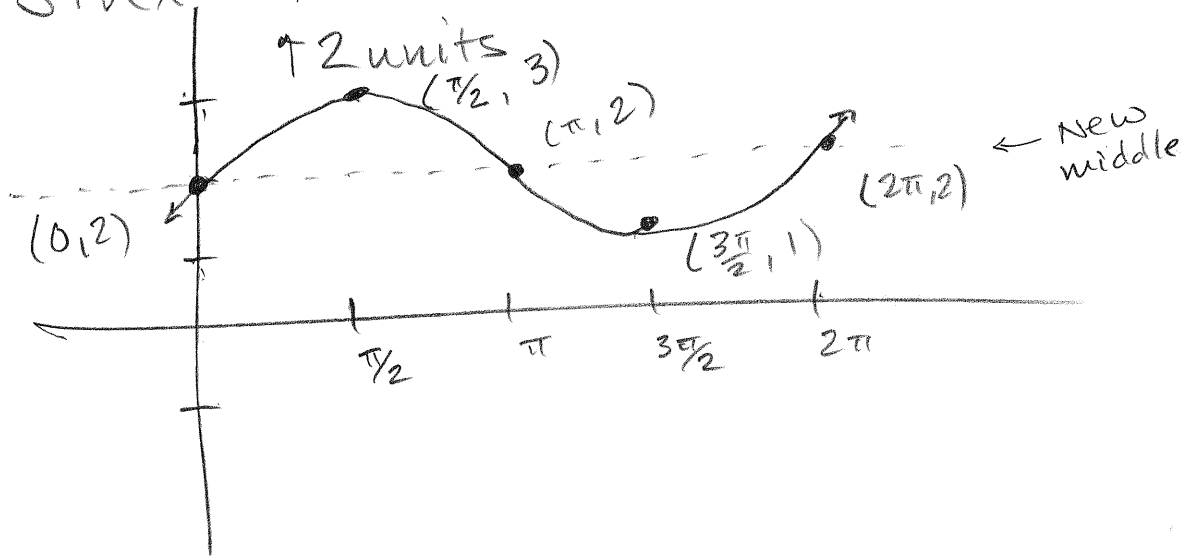
phase shift $= \frac{\pi}{6}$





Vertical Translation : Vertical Shift

$y = \sin x + 2$

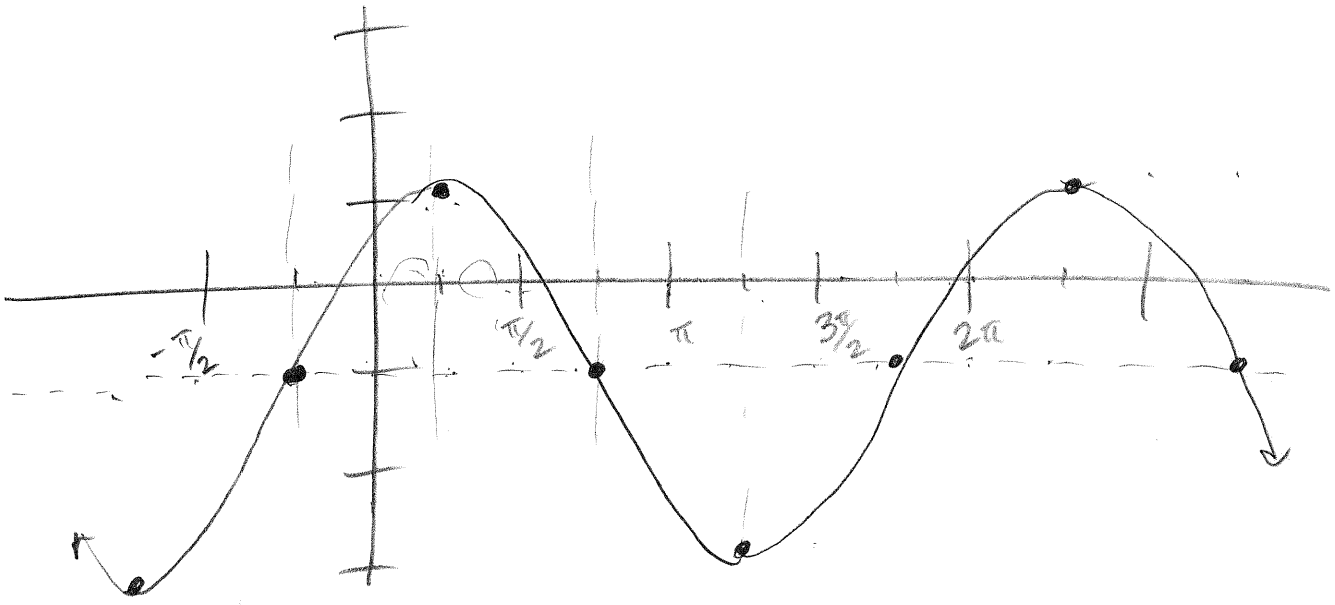


$y = 2\sin\left(x + \frac{\pi}{4}\right) - 1$

phase shift $= -\frac{\pi}{4}$

Vertical Shift $= -1$

Amp $= 2$



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