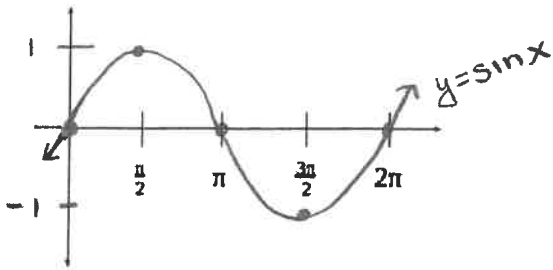
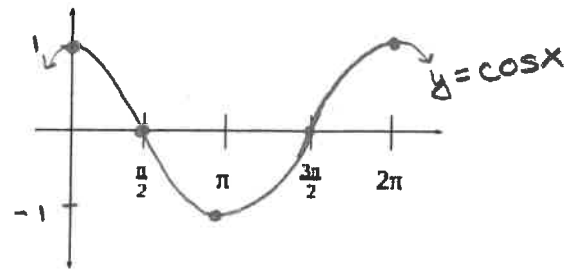


6.3 Graphs of the Sine and Cosine Functions  
 6.4 Translations of the Graphs of the Sine and Cosine Functions

$$y = A \sin(Bx - C) + D$$



$$y = A \cos(Bx - C) + D$$



Amplitude:  $|A|$  half the distance between the max & min y values  
 \* height

Period:  $\frac{2\pi}{B}$  distance to complete one full cycle

Phase Shift  $\frac{C}{B}$  horizontal shift

Example:  $y = \frac{1}{2} \cos(2x - 3) = \frac{1}{2} \cos[2(x - \frac{3}{2})]$

amplitude =  $\frac{1}{2}$       period =  $\frac{2\pi}{2} = \pi$       phase shift =  $\frac{3}{2}$

right

Graph the following

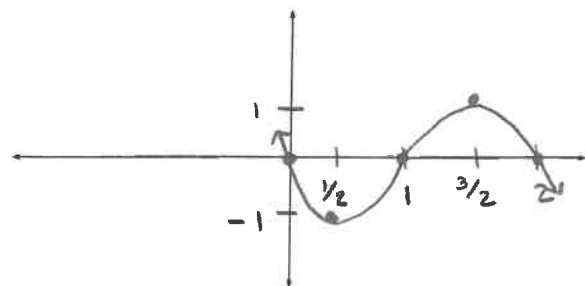
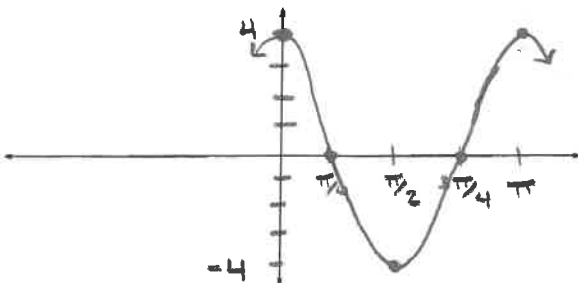
1.  $y = 4 \cos 2x$

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

2.  $y = -\sin \pi x$

↑  
reflects  
over x-axis

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



\* To make x-values can

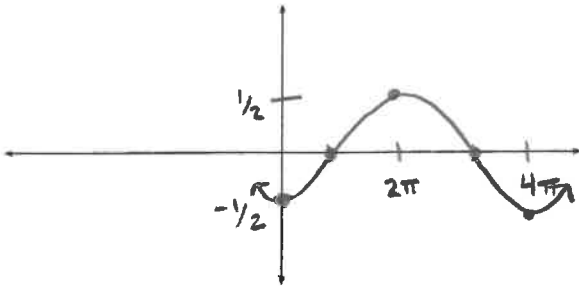
$\frac{b-a}{4}$  where  $b = \text{end of period}$   
 $a = \text{start of period}$

### 6.3 Graphs of the Sine and Cosine Functions

#### 6.4 Translations of the Graphs of the Sine and Cosine Functions

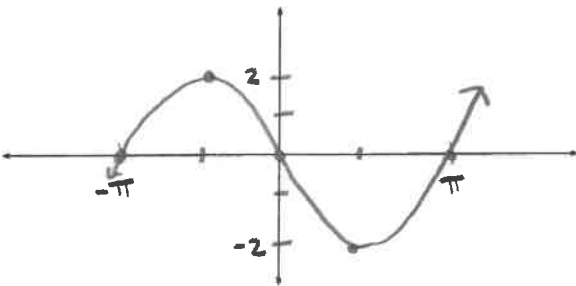
3.  $y = -\frac{1}{2} \cos \frac{1}{2}x$

$A = 1/2$  period =  $4\pi$   
reflect



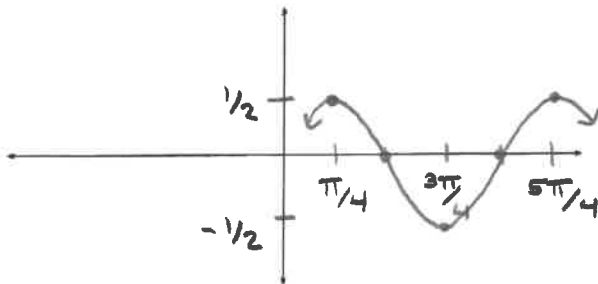
4.  $y = 2 \sin(x + \pi)$

left  $\pi$   
period =  $2\pi$



5.  $y = \frac{1}{2} \cos(2x - \frac{\pi}{2}) = \frac{1}{2} \cos(2(x - \frac{\pi}{4}))$

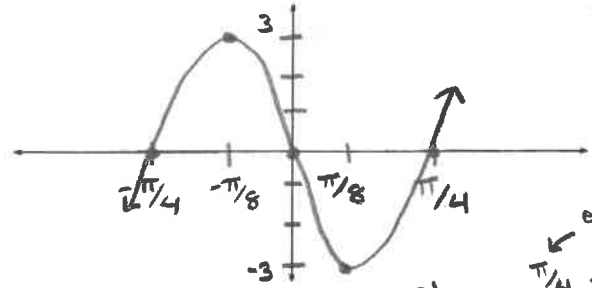
$A = 1/2$  period =  $\pi$  p.s. =  $\pi/4$  right



6.  $y = 3 \sin(4x + \pi) = 3 \sin(4(x + \pi/4))$

amp = 3 period =  $\frac{2\pi}{4} = \frac{\pi}{2}$

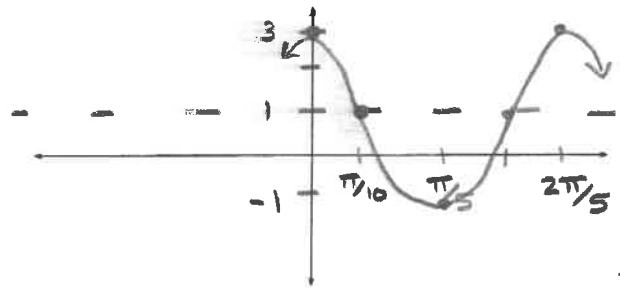
phase shift =  $\pi/4$  left



7.  $y = 1 + 2 \cos 5x$

up 1  
 $A = 2$  period =  $\frac{2\pi}{5}$

steps =  $\frac{\pi/4 - (-\pi/4)}{4}$   
end =  $-\pi/4 + \pi/2$   
 $= \pi/8$



8.  $y = 3 \sin \frac{1}{2}x - 3$

$A = 3$  period =  $4\pi$  down 3

