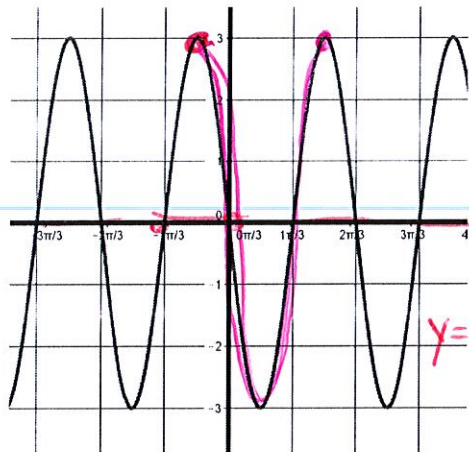


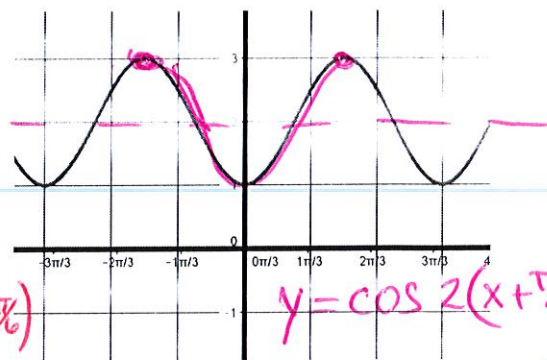
## 6.2 Day 3 Notes Writing Cosine and Sine Equations From a Graph

1. Find the amplitude by taking half of the vertical distance between the minimum and the maximum.
2. Find the period by finding how long the graph takes to complete one cycle.
3. Find the vertical shift by finding the middle horizontal line between the minimum and the maximum.
4. Find the phase shift for cosine by finding the distance between the y-axis and a maximum. Or a minimum but then you are multiplying equation by a negative.
5. Find the phase shift for sine by finding the distance between the y-axis and a point on the x-axis (or shifted x-axis) that leads to a maximum right afterward.
6. Pay ATTENTION to the **SCALE** used on the graphs!!
7. Write equations in terms of cosine for the given graphs.
  - a.
  - b.

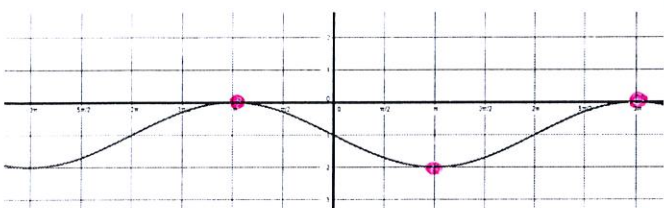


$$y = 3 \cos 3(x + \pi/6)$$

amp = 3  
 Vertical Shift = 0  
 Phase = left  $\pi/6$   
 Period =  $2\pi/3$

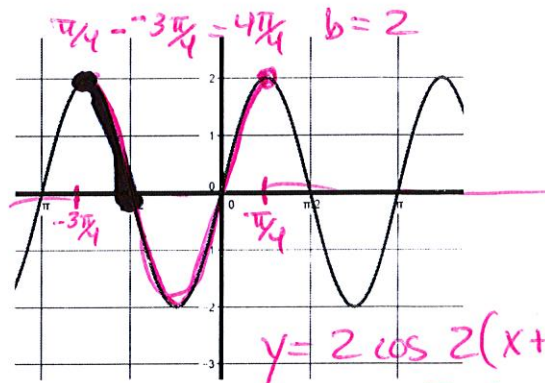


amp = 1  
 V.S. = up 2  
 Phase left  $\pi/2$   
 Period  $\pi$



amp = 1  
 Vertical Shift = down 1  
 Phase = left  $\pi$   
 Period =  $4\pi$   
 $b = 1/2$

$$y = \cos \frac{1}{2}(x + \pi) - 1$$

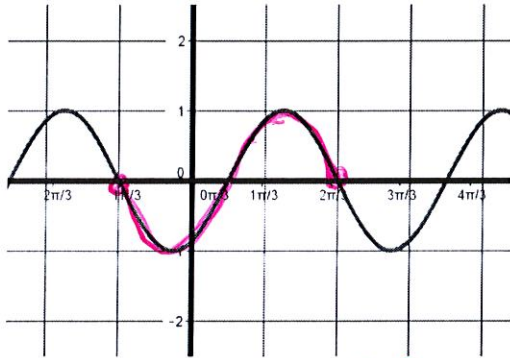


amp = 2  
 V.S. = NONE  
 Phase Shift  $3\pi/4$  left  
 Period  $\pi$   
 $b = 2$

$$y = 2 \cos 2(x + 3\pi/4)$$

8. Write equations in terms of sine for the given graphs.

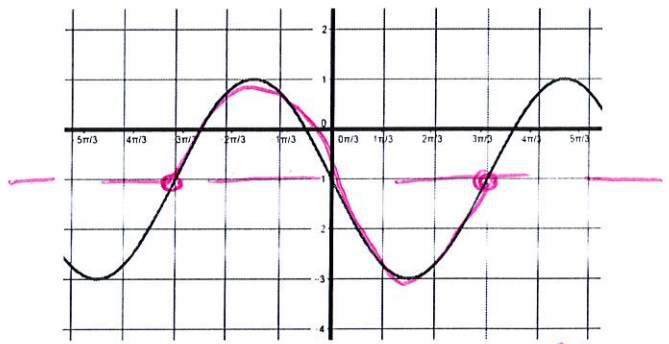
a.



amp = 1 Phase left  $\pi/3$   
 vs! 0 Period  $2\pi/3 - \pi/3 = \pi$   
 $b = 2$

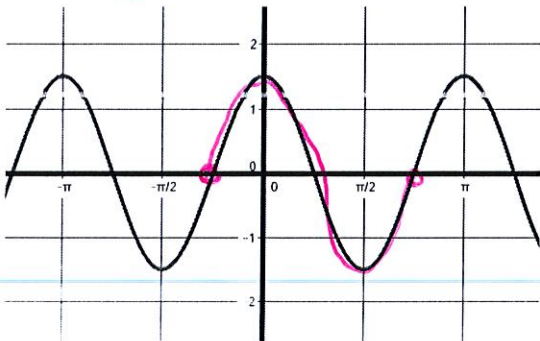
c.  $y = \sin 2(x + \pi/3)$

b.



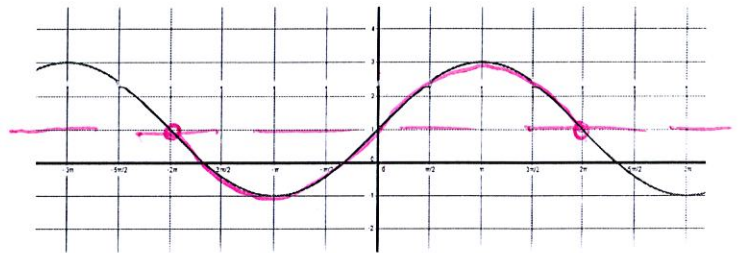
amp = 2 Phase left  $\pi$   
 vs! down 1 Period  $2\pi$

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



amp = 1.5 Phase! left  $\pi/4$   
 vs! = 0 Period  $\pi$   
 $b = 2$

$y = 1.5 \sin 2(x + \pi/4)$



amp = 2 Phase left  $2\pi$   
 vs. up 1 Period =  $4\pi$   
 $b = 1/2$

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

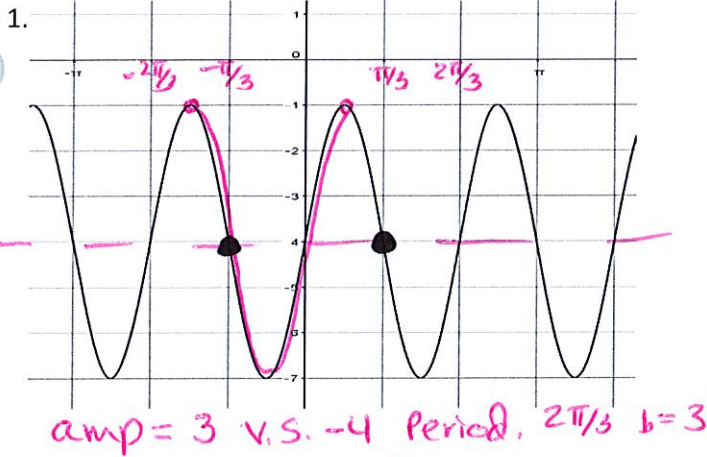


AFM Writing Sinusoidal Equations

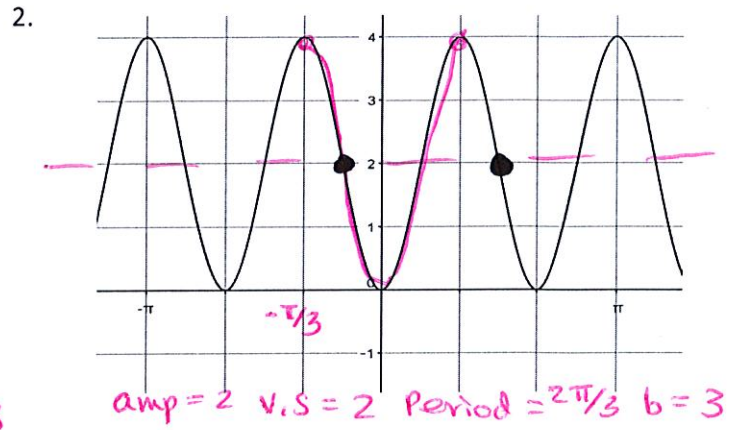
Write a sine and cosine equation for each graph.

pink = cosine  
black = sine

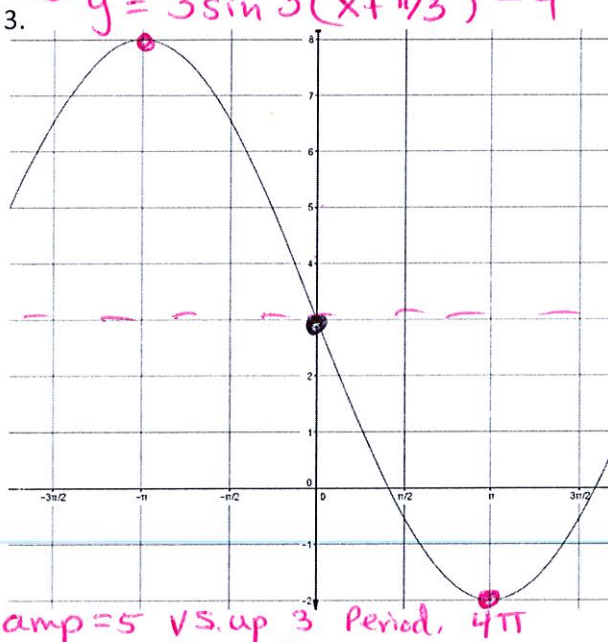
Name: \_\_\_\_\_



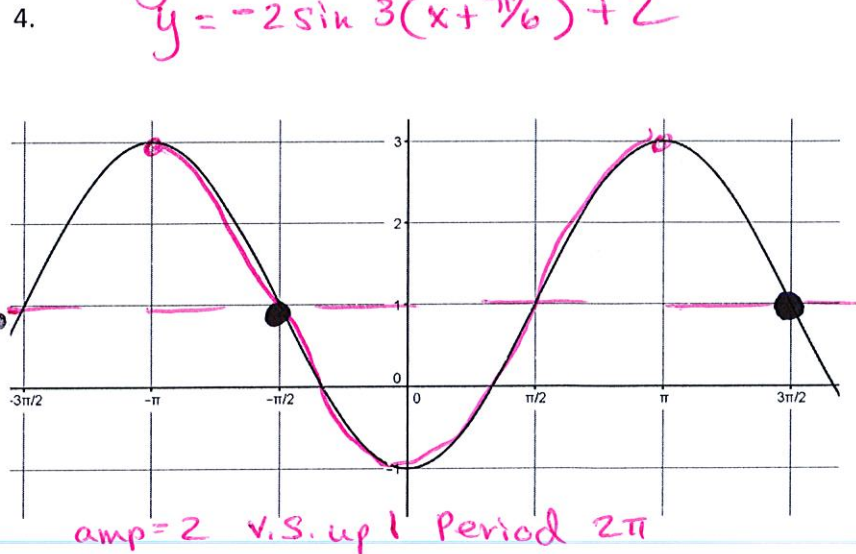
$y = 3 \cos 3(x + \pi/2) - 4$   
 $y = -3 \sin 3(x + \pi/3) - 4$



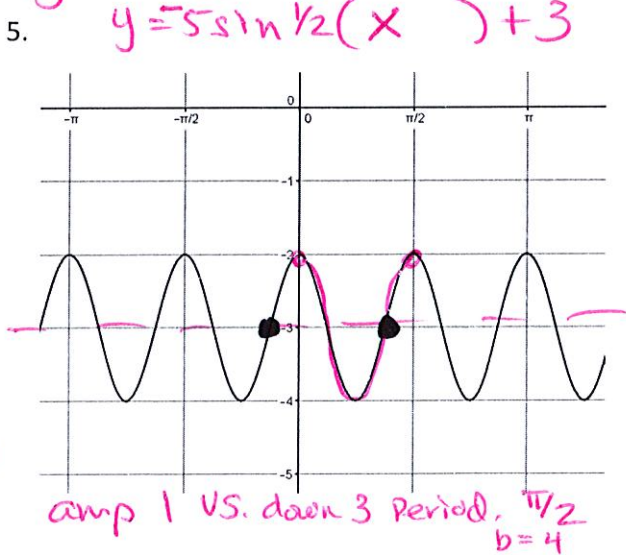
$y = 2 \cos 3(x + \pi/3) + 2$   
 $y = -2 \sin 3(x + \pi/6) + 2$



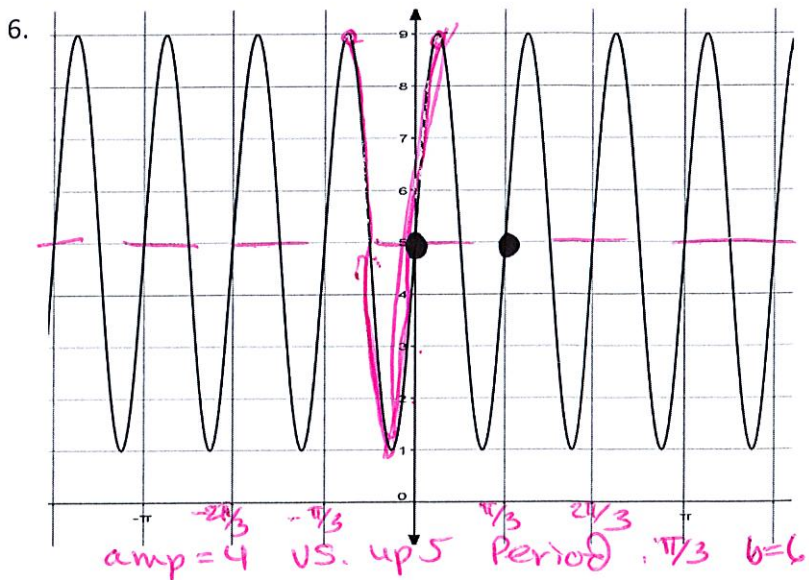
$y = 5 \cos \frac{1}{2}(x + \pi) + 3$   
 $y = 5 \sin \frac{1}{2}(x) + 3$



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



$y = \cos(4x) - 3$   $y = \sin 4(x + \pi/8) - 3$



$y = 4 \cos 6(x + \pi/4) + 5$   $y = 4 \sin(6x) + 5$