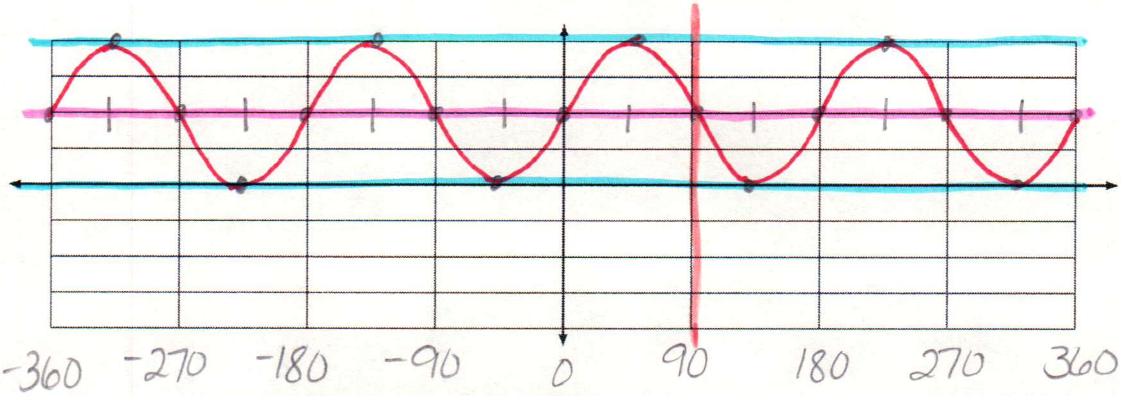
AGS 3 Name: ______________________________ Period: _____ Date: ___________

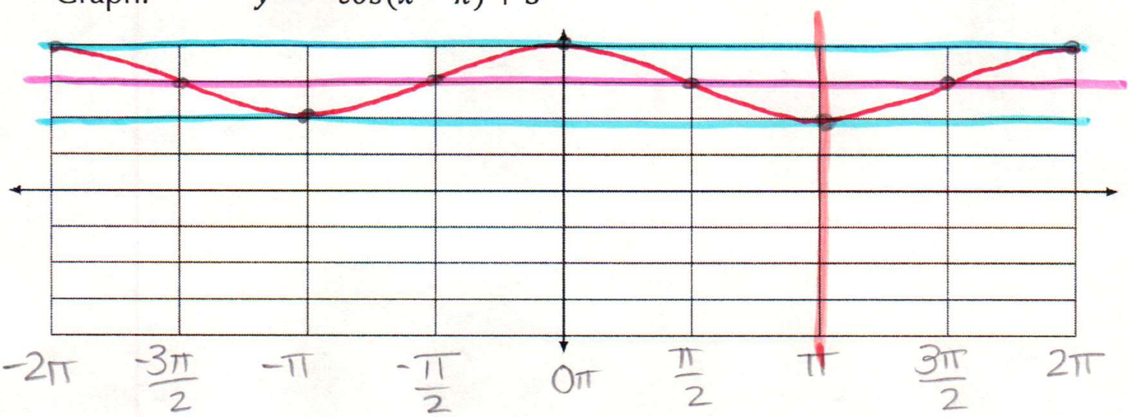
Unit 7 Review – Periodic Graphs

1. Graph: $y = -2sin(2\theta - 180) + 2$ $y = -2\sin(2(\theta - 90)) + 2$



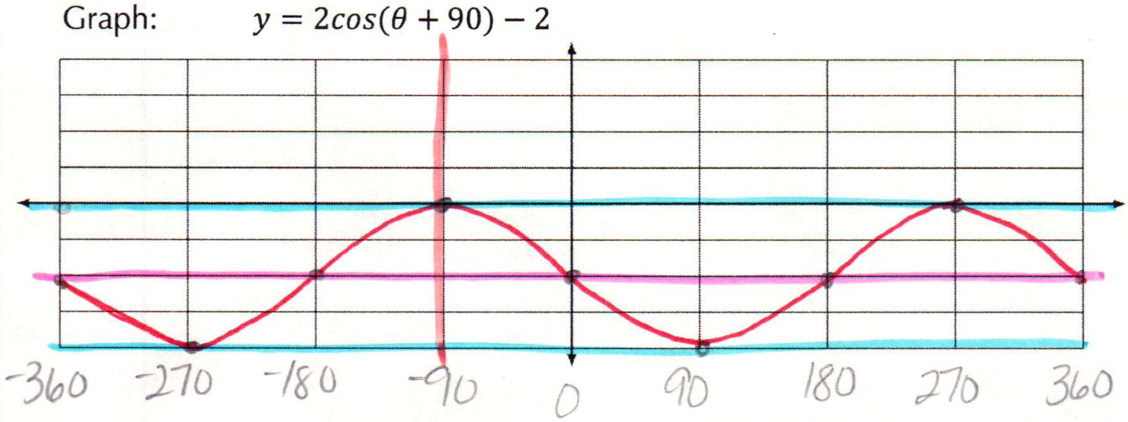
Amplitude: 2 Vertical Shift: 2 Period: 180° Phase Shift: 90°

2. Graph: $y = -cos(x - \pi) + 3$



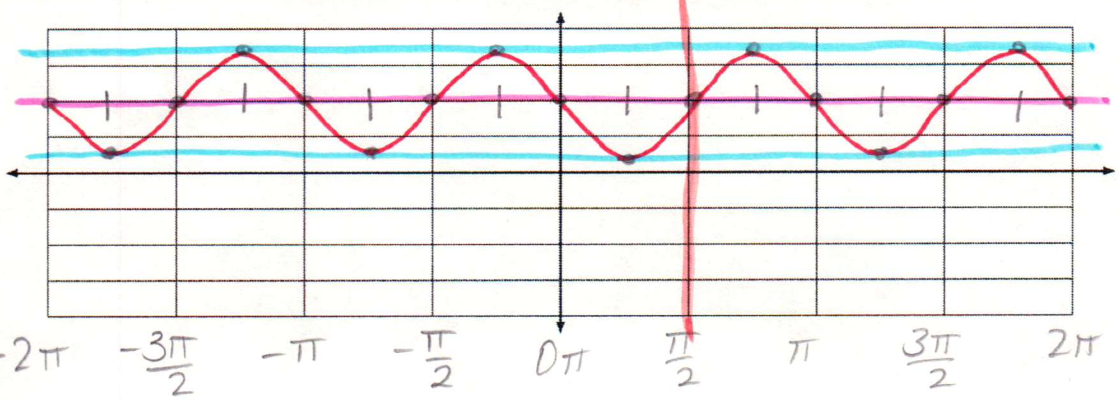
Amplitude: 1 Vertical Shift: 3 Period: 2π Phase Shift: π

3. Graph: $y = 2cos(\theta + 90) - 2$



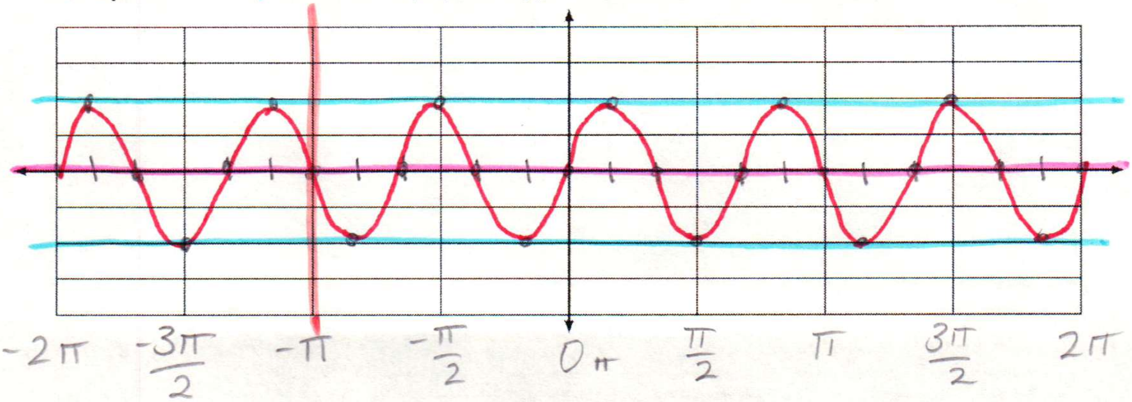
Amplitude: 2 Vertical Shift: -2 Period: 360° Phase Shift: -90°

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



Amplitude: $\frac{3}{2}$ Vertical Shift: 2 Period: π Phase Shift: $\frac{\pi}{2}$

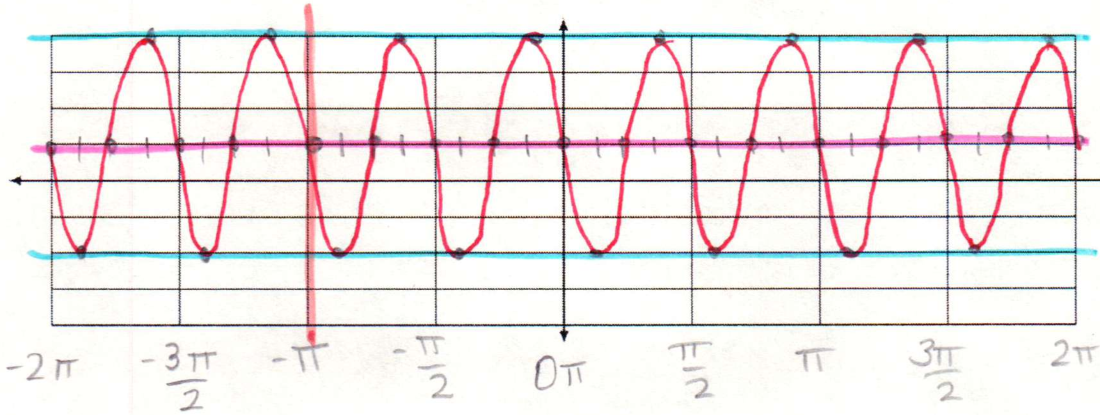
5. Graph: $y = -2sin(3(x + \pi))$



Amplitude: 2 Vertical Shift: 0 Period: $\frac{2\pi}{3}$ Phase Shift: $-\pi$

6. Write a sine equation with an amplitude of 3, a period of $\frac{\pi}{2}$, a phase shift of π to the left, a vertical shift up 1, and reflected over the center. Then graph.

Equation: $y = -3 \sin(4(x + \pi)) + 1$



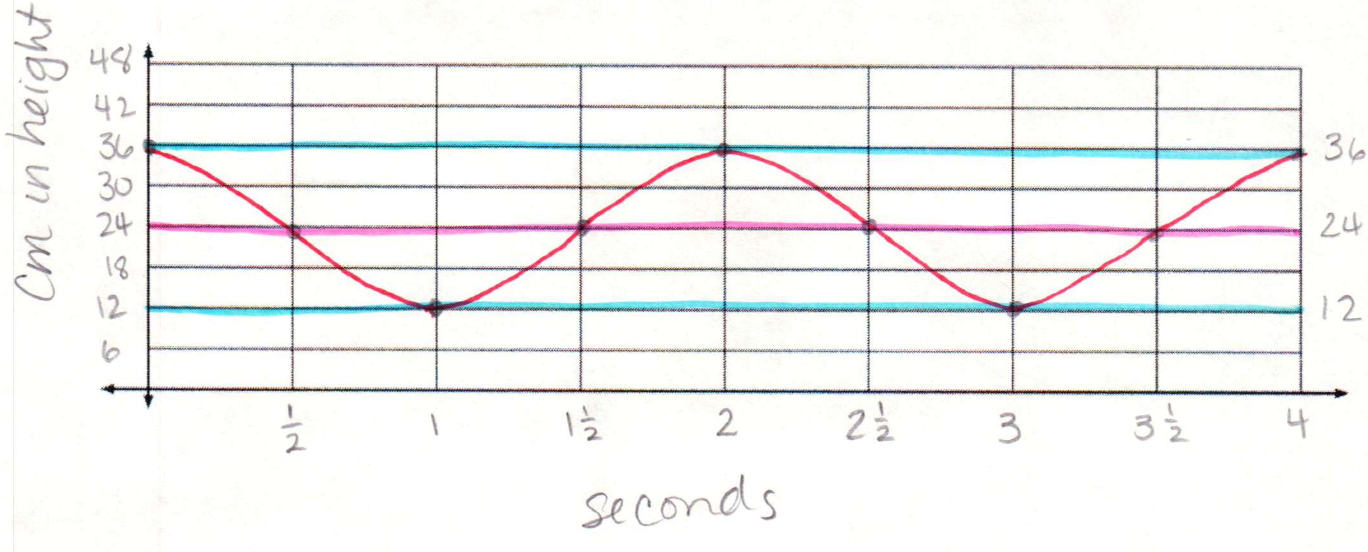
$\frac{2\pi}{b} = \frac{\pi}{2}$

7. Write a cosine equation with a vertical shift down 2, a period of 180°, a phase shift of 90° to the right, and an amplitude of 1. Then graph.

Equation: $y = \cos(2(\theta - 90)) - 2$

8. A pendulum on a grandfather clock is swinging back and forth as it keeps time. The pendulums highest point is 36 cm above the base of the clock, and exactly one second later the pendulum is at its lowest point of 12 cm.

a. Sketch a graph of the pendulum's motion starting at its highest point.



b. Write a function to model the height of the pendulum as a function of time.

$f(t) = 12\cos(\pi x) + 24$

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

c. Based on your function, how high will the pendulum be at 37 seconds?

$f(37) = 12\cos(\pi(37)) + 24 = 12$ cm

d. How would the function change if the pendulum took 4 seconds to swing from high point to high point?

$f(t) = 12\cos(\frac{\pi}{2} x) + 24$

$b = \frac{2\pi}{4} = \frac{\pi}{2}$

7.8

9. The low tide at Cannon, Beach Oregon is 0.4 feet and occurs at 3 AM. After 6 hours, Cannon Beach is at high tide, which is 7.8 feet. 4.1

.4

a. Write a function that gives the tide depth d (in feet) as a function of the time t (in hours). Let $t = 0$ represent midnight.

$d(t) = -3.7 \sin\left(\frac{\pi}{6} x\right) + 4.1$

b. Find all the times when low and high tide occur in a 24 hour.

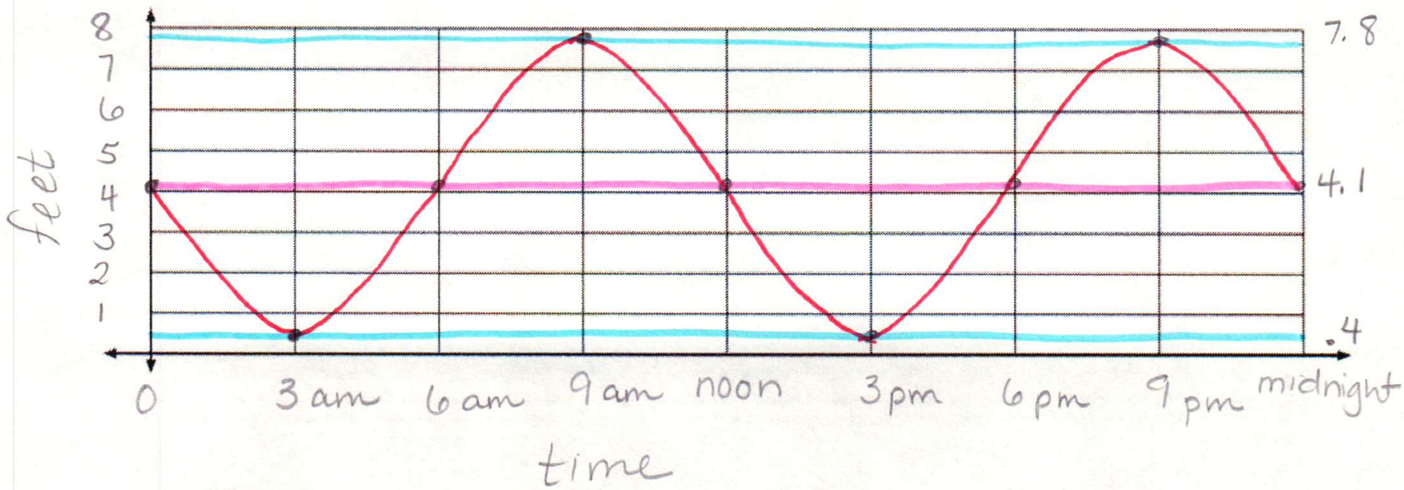
low: 3 am, 3pm

high: 9 am, 9 pm

c. Find the tide depth at 3 PM and noon.

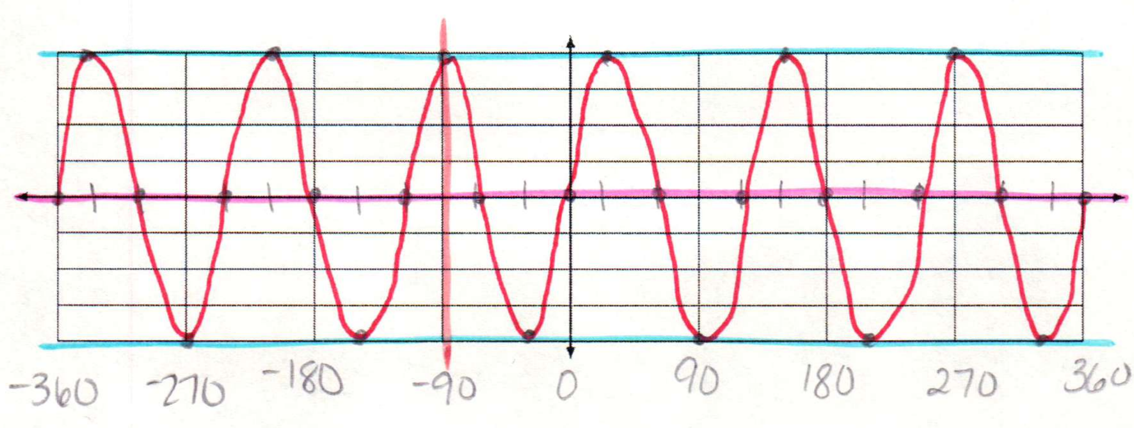
3:30 pm: $\approx .53$ ft $d(15.5) = -3.7 \sin\left(\frac{\pi}{6}(15.5)\right) + 4.1$

noon: 4.1 ft $d(12) = -3.7 \sin\left(\frac{\pi}{6}(12)\right) + 4.1$



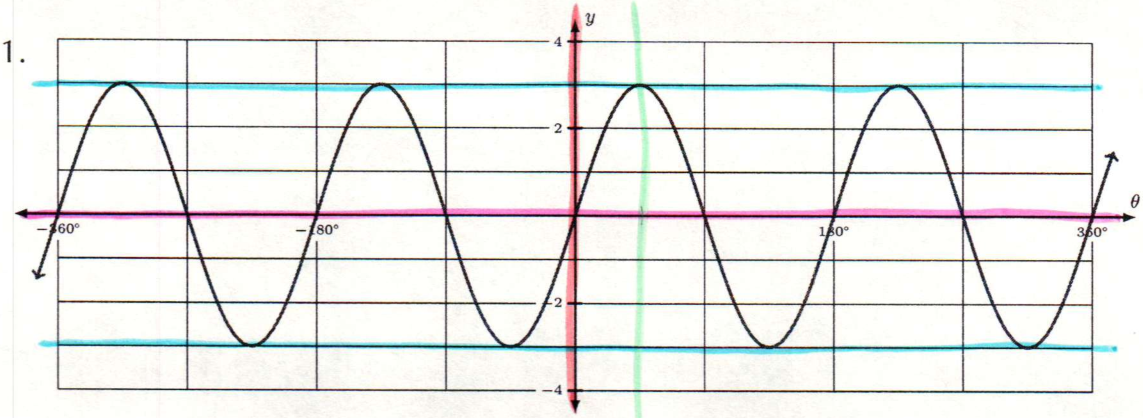
10. Write and graph a cosine function with an amplitude of 4, a period of 120°, and a phase shift 90° to the left.

Equation: $y = 4\cos(3(\theta + 90))$



Write two equations for each graph, one sine and one cosine equation for each. You must mark and label each equations phase shift.

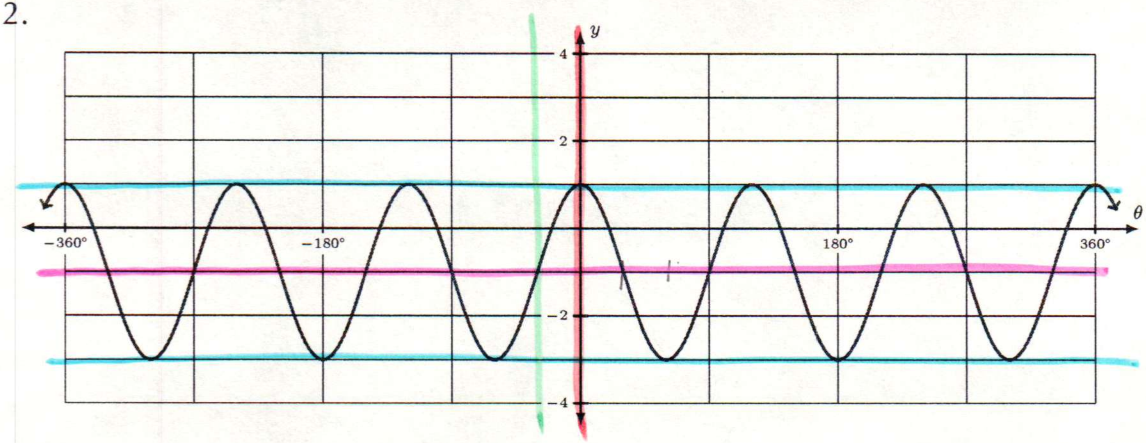
11.



Equation #1: $y = 3\sin(2\theta)$

Equation #2: $y = 3\cos(2(\theta - 45))$

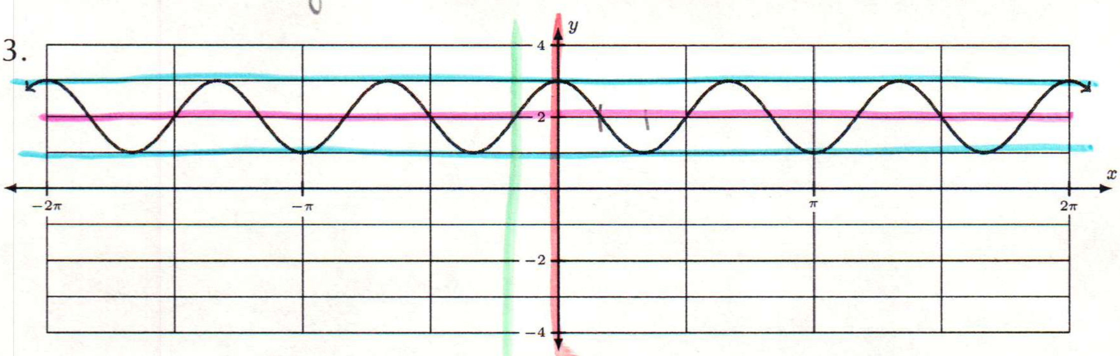
12.



Equation #1: $y = 2\cos(3\theta) - 1$

Equation #2: $y = 2\sin(3(\theta + 30)) - 1$

13.



Equation #1: $y = \cos(3x) + 2$

Equation #2: $y = \sin\left(3\left(x + \frac{\pi}{6}\right)\right) + 2$