AGS 3 Name: _____ Period: ____ Date: _____

Notes 7.4 – Periodic Graphs

Amplitude makes the graph get taller or shorter.

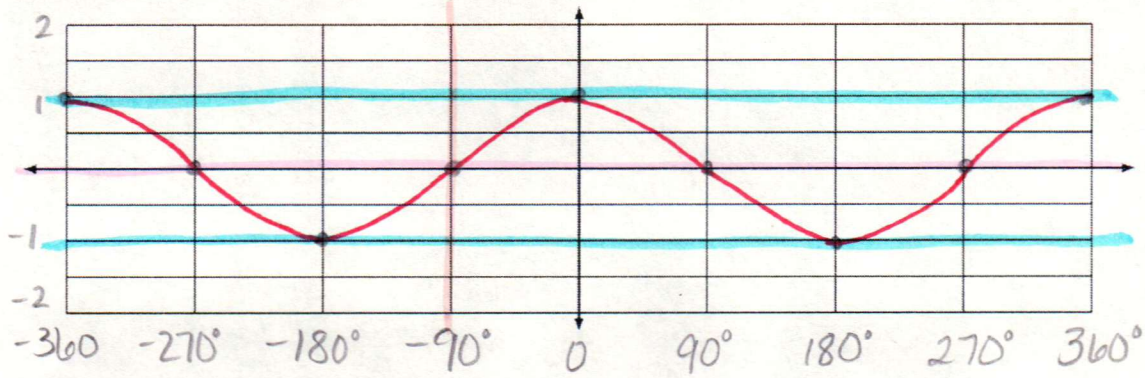
Vertical shift moves the graph up or down.

The period makes the graph cycle happen faster or slower.

What do you think phase shift will do?

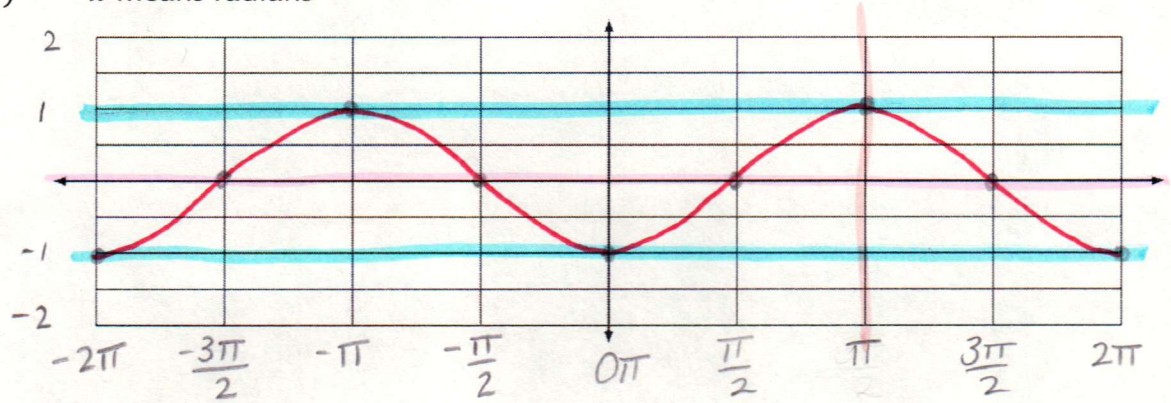
move the graph to the left or right

$y = \sin(\theta + 90)$ θ means degress



Amplitude: 1 Vertical Shift: 0 Period: 360° Phase Shift: -90°

$y = \cos(x - \pi)$ x means radians



Amplitude: 1 Vertical Shift: 0 Period: 360° Phase Shift: π

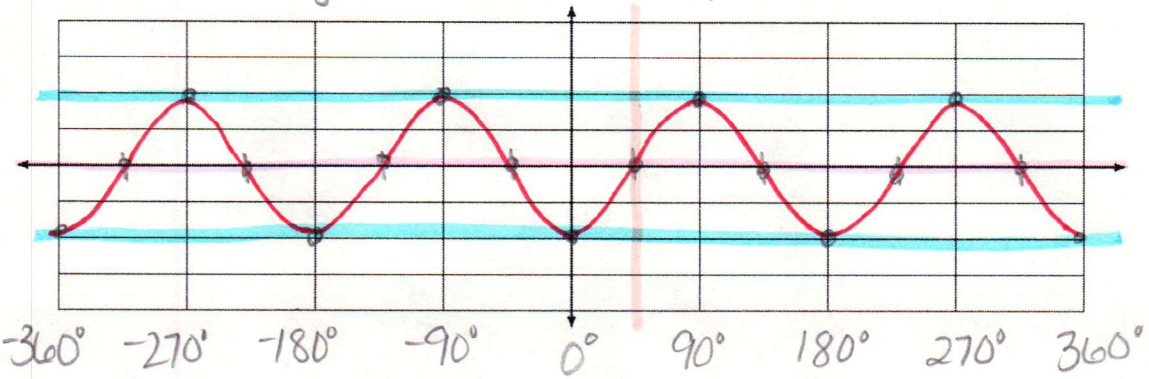
What happens when there is a change in period AND a phase shift?

You must separate them to see how much each is

$$y = a\sin(b(\theta - c)) + d$$

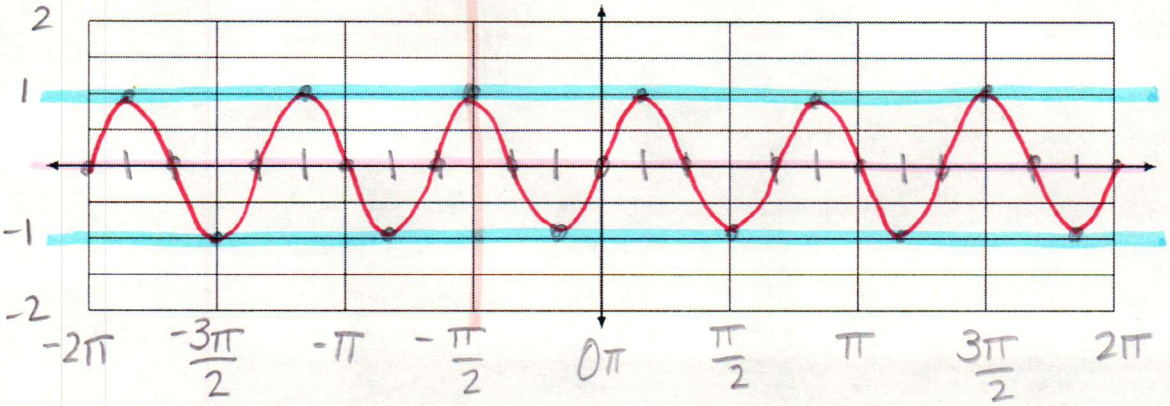
a: amplitude ↗ | b: determines period ↑ | c: phase shift ↖ | d: ← vertical shift

$y = \sin(2\theta - 90)$ $\quad y = \sin(2(\theta - 45))$



Amplitude: 1 Vertical Shift: 0 Period: 180° Phase Shift: 45

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



Amplitude: 1 Vertical Shift: 0 Period: $\frac{2\pi}{3}$ Phase Shift: $-\frac{\pi}{2}$

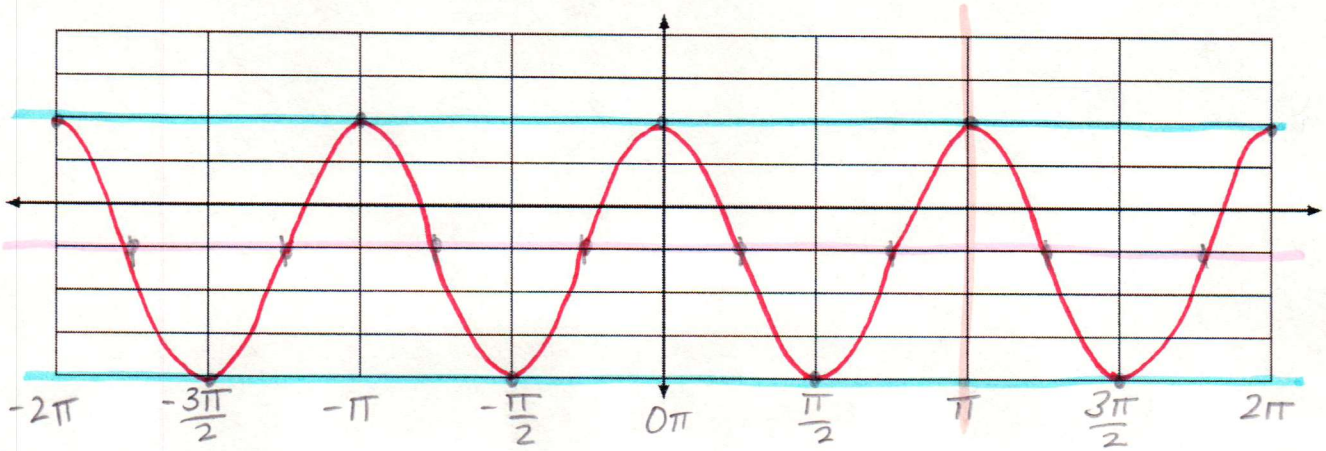
Determine how much and in which direction for each phase shift.

$y = \sin\left(2x - \frac{\pi}{2}\right)$ $\quad \sin(2(x - \frac{\pi}{4}))$ $\quad y = \cos(3\theta + 270)$ $\quad \cos(3(\theta + 90))$

$\frac{\pi}{4}$ to the right $\qquad$ 90° to the left

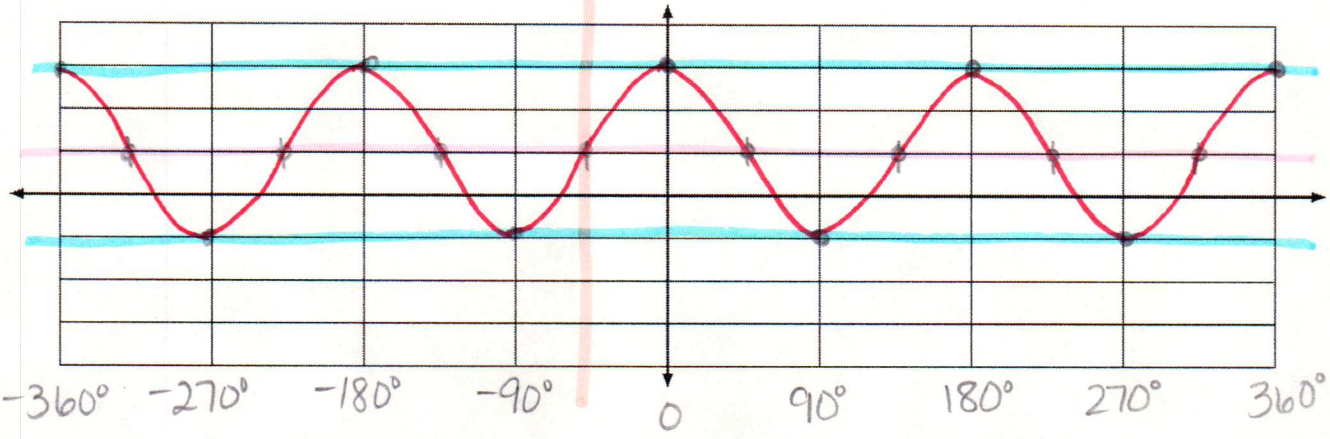
Practice:

$y = 3\cos(2x - 2\pi) - 1$ $3\cos(2(x-\pi)) - 1$



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

$y = 2\sin(2\theta + 90) + 1$ $2\sin(2(\theta+45)) + 1$



Amplitude: 2 Vertical Shift: 1 Period: 180° Phase Shift: $-45°$

Write an equation for the given info:

A sine function, with an amplitude of 3, a phase shift of $\frac{\pi}{2}$ to the left, and a vertical shift up 4.

$y = 3\sin(x + \frac{\pi}{2}) + 4$

A cosine function, with a phase shift of 180° to the right, a vertical shift up of 3, a period of $\frac{2\pi}{3}$ (120°), and reflected over the center.

$y = -\cos(3(\theta - 180°)) + 3$