

#43

Sinusoid: Word to describe a sine or cosine graph

$$f(x) = a \sin(b(x - h)) + k$$

a: Amplitude

b: Period Finder

h: Phase Shift

k: Vertical Shift

Period:  $\frac{2\pi}{|b|}$

**amplitude** is half the difference between the max and min on a sine or cosine graph (a vertical stretch or shrink) (the height of one mountain or valley from the midline)

what does it mean if the "a" is negative??

$$y = a \sin x$$

## Period:

what is the length of the parent period?

$$y = a \sin (bx)$$

to find the new period: parent period divided by "b"

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

**Frequency:** the reciprocal of the period - it's the number of cycles the wave completes in 1 unit interval

what is the frequency of the parent wave?

$$y = a \sin (bx)$$

to find the frequency: "b" divided by  $2\pi$

What is the period?

$$y = \sin x \qquad y = -2 \sin\left(\frac{x}{3}\right) \qquad y = 3 \sin(-2x)$$

**Phase Shift** - is used to describe moves left and right

**Vertical Shift** - is used to describe moves up and down

Graphing

$$y = -2 \sin\left(\frac{x}{3}\right)$$

- Always graph 2 periods
- Make 4 tick marks each direction
  - the last one: period
- Find a, period, h and k

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