Lesson Plan 4 Math 48C Mitchell Schoenbrun

1) Attendance
2) Homework

Graphing the Sine and Cosine function

Take a look at this animation.

http://schoenbrun.com/foothill/math48c-2/gsps/rCircularMotion2.gsp

Demonstrate how to graph a function on the calculator

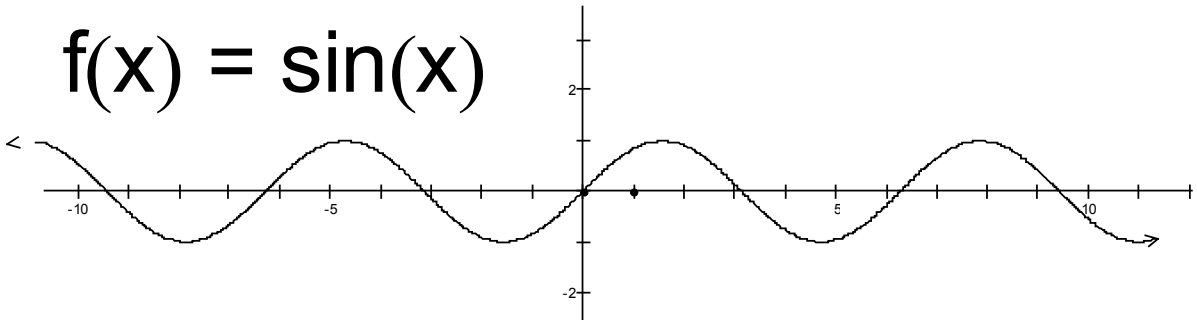
We want to write a very general form of these functions and understand it.

$$f(\theta) = A\sin\left(B(\theta - C)\right) + D$$

$$f(\theta) = A\cos\left(B(\theta - C)\right) + D$$

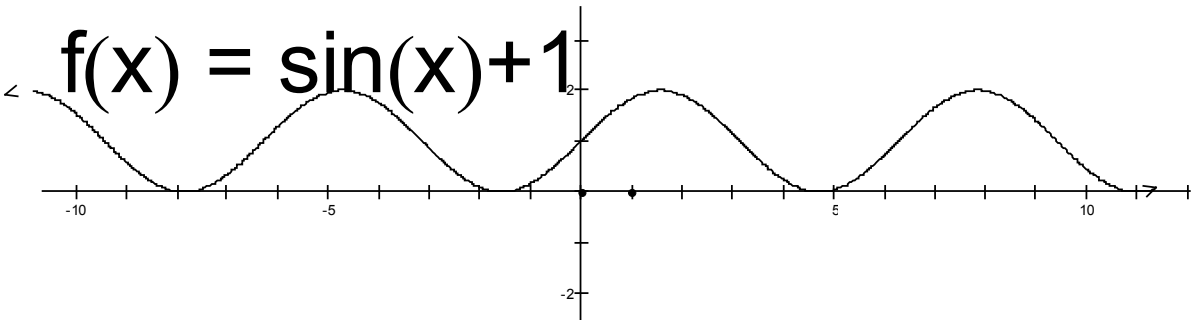
$$f\left(\theta\right)=A\sin\left(B\left(\theta-C\right)\right)+D$$

Start with a simple sine function A=1, B=1, C=0, D=0!



$$f(\theta) = \sin(\theta) + D$$

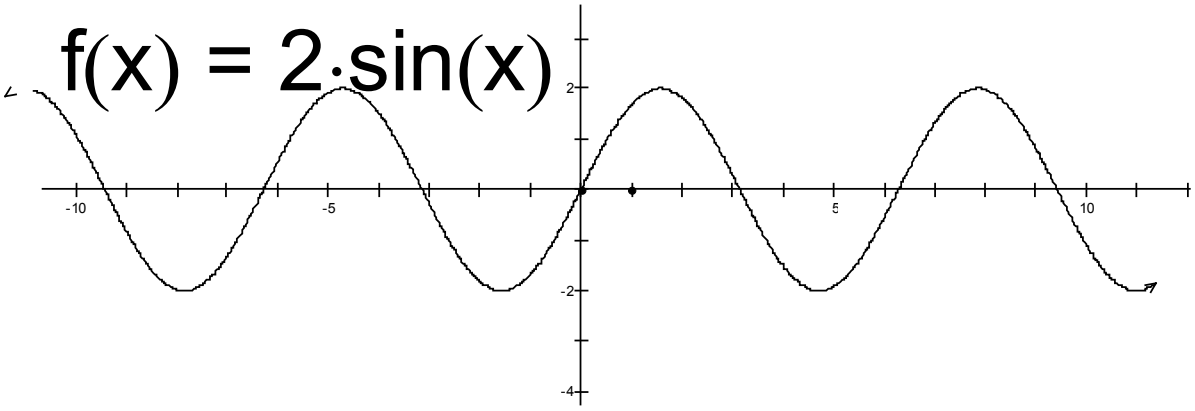
What does having $D \neq 0$ do?



So *D* moves the function up and down. Notice that *D* is the **midline**. This is a **Vertical Translation.**

$$f(\theta) = A\sin(\theta)$$

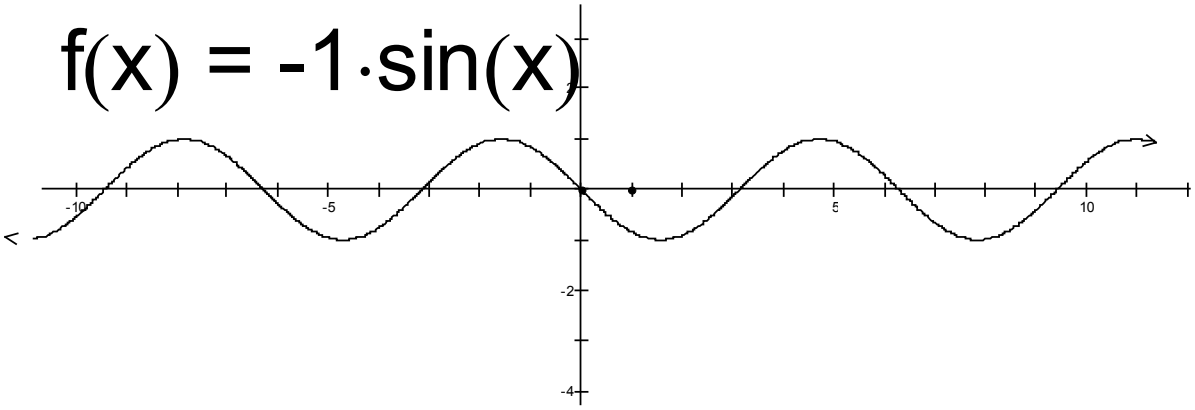
What does changing *A* do?



Notice that *A* is the **Amplitude**.

$$f(\theta) = A\sin(\theta)$$

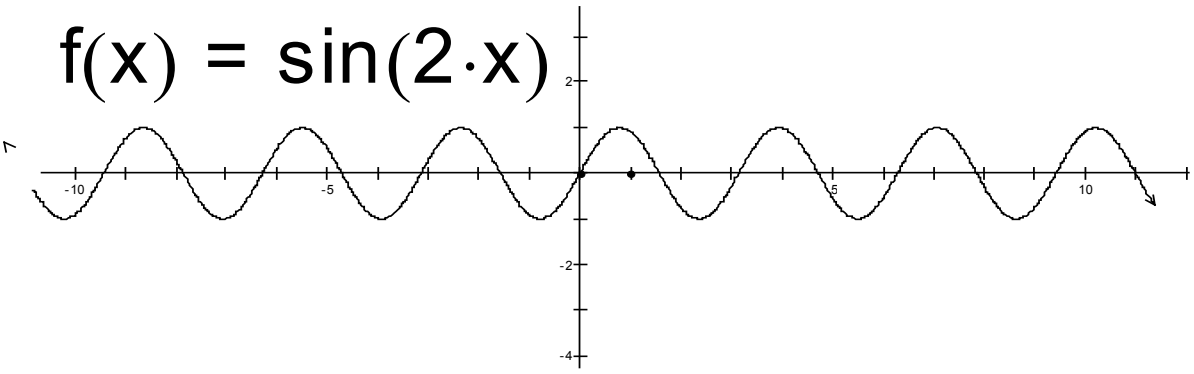
What if A is negative?



This causes a reflection across the x axis. This is also a type of translation.

$$f\left(\theta\right)=\sin\left(B\theta\right)$$

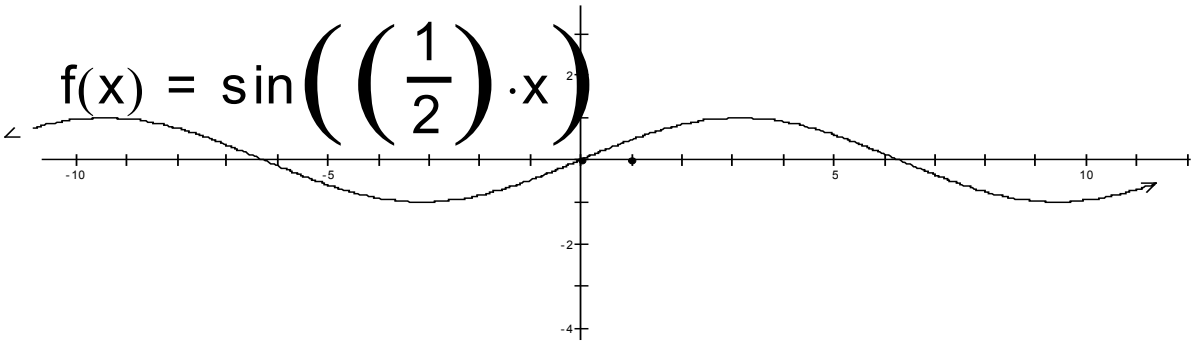
What does changing *B* do?



Note that as *B* gets larger, the period gets smaller.

$$f(\theta) = \sin(B\theta)$$

What happens when *B* gets smaller?



When *B* gets smaller, the period gets larger.

So *B* changes the PERIOD or the FREQUENCY! Note the inverse relationship to Period.

B = 1 Period = 2π

B = 2 Period = π

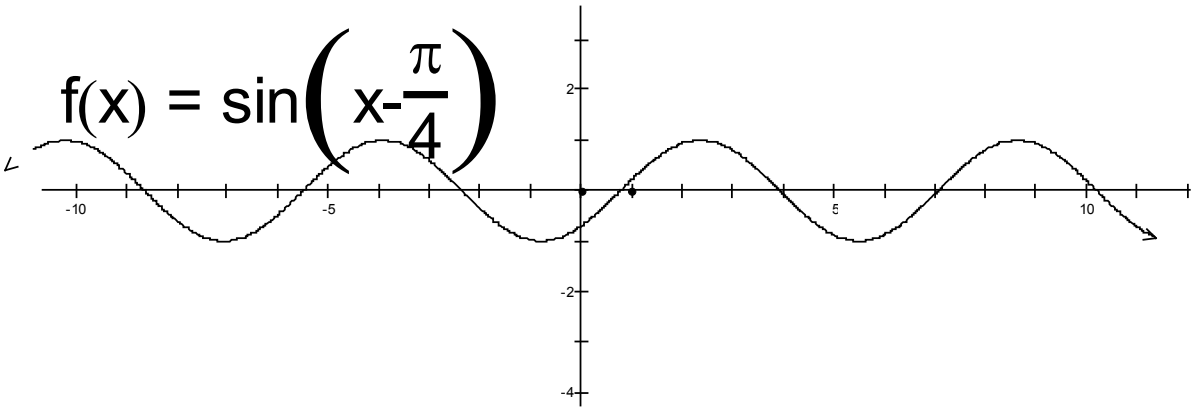
B = 1/2 Period = 4π

So the Period of a Sine or Cosine function is $2\pi/B$.

What is the Frequency? Its reciprocal = $B/2\pi$

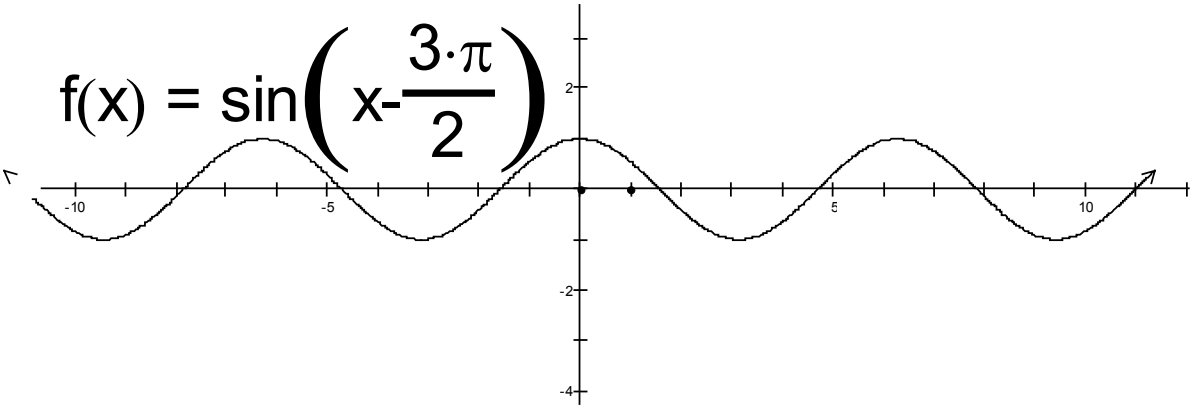
$$f(\theta) = \sin(\theta - C)$$

Finally what does *C* do?



Notice the starting point (0,0) has now moved to the right ($\pi/4$, 0). This is a horizontal translation. It is also known as a **PHASE SHIFT**!

Definition: A **phase shift** is the portion of one period shifted horizontally. Note that a Phase shift of $\frac{3\pi}{2}$ of a sine function gives you a cosine function



Problems on handout

HW: P. 558 #1-6, 9, 13,16,35,48