9.4 Day Two

$$y = A\sin(B(x-C)) + D$$

CONTROLS Amplitude	CONTROLS PERIOD	CONTROLS LEFT/RIGHT	CONTROLS UP/DOWN
Vertical STRETCH	HORIZONTAL STRETCH	HORIZONTAL SHIFT	VERTICAL SHIFT

OF THE FOUR TRANSLATIONS OF THE SINE AND COSINE GRAPHS, WE ARE ONLY WORKING WITH A & B FOR NOW

FROM PAGE 487

Stretching and Shrinking Sine and Cosine Functions

The graphs of $y = a \sin bx$ and $y = a \cos bx$ represent transformations of their parent functions. The value of a indicates a vertical stretch ($a > 1$) or a vertical shrink ($0 < a < 1$) and changes the amplitude of the graph. The value of b indicates a horizontal stretch ($0 < b < 1$) or a horizontal shrink ($b > 1$) and changes the period of the graph.

$$y = a \sin bx$$
$$y = a \cos bx$$

vertical stretch or shrink by a factor of a —⌐ ⌐— horizontal stretch or shrink by a factor of $\frac{1}{b}$

⑤ Core Concept

Amplitude and Period

The amplitude and period of the graphs of $y = a \sin bx$ and $y = a \cos bx$, where a and b are nonzero real numbers, are as follows:

$$\text{Amplitude} = |a| \qquad \text{Period} = \frac{2\pi}{|b|}$$

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

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

$$\left.\begin{array}{l} y = -\sin(x) \\ y = -\cos(x) \end{array}\right\}$$

A NEGATIVE "A" VALUE CREATES A REFLECTION ABOUT THE CENTER LINE AXIS