6.5 Transformations of Sinusoidal Functions Part II

**Learning Goal:** Determine how changing the values of $a, c, d$ and $k$ affects the graphs of $f(x) = a \sin(k(x - d)) + c$ and $f(x) = a \cos(k(x - d)) + c$

**Example 1:**

a. Sketch the graph of $f(x) = -2 \cos(3x) - 1$ over one cycle.

b. State the amplitude, period, equation of the axis, phase shift and range.

c. List the transformations

   $a = \, \, \, \, \, \, \, \, \,$ the Amplitude is ______  Equation of the axis is ________________

   $k = \, \, \, \, \, \, \, \, \, \,$ This is a horizontal compression by a factor of

   $\text{Period } = \frac{360^\circ}{k}$

   $\text{Period } = \, \, \, \, \, \, \, \,$

   $\text{Period } = \, \, \, \, \, \, \, \,$

   $\text{Period } = \, \, \, \, \, \, \, \,$

   This is a cosine function. However, there is a ______________ over the $x$ axis. There is no phase shift so the first point is at ______. The intervals between the points are ______, since the period is ______.

b. Amplitude: _____  Period ______  Equation of the axis: __________  Phase shift is _____  

Range ______________________

c. Transformations:
Example 2:

a. Sketch the graph of \( f(x) = 3 \sin(2(x - 60^\circ)) + 4 \) over one cycle.

b. State the amplitude, period, domain and range, maximum and minimum values.

c. List the transformations.

\[ a = \ldots \text{ the amplitude is } \ldots \text{ Equation of the axis is } \ldots \]

\[ k = \ldots \text{ This is a horizontal } \ldots \text{ by a factor of } \ldots \]

\[ \text{Period } = \frac{360^\circ}{k} \]

This is a sine function. So the first point is on the equation of the axis, which is \( \ldots \).

The \( x \) value has been shifted over by \( \ldots \). The first point is at \( \ldots \).

The intervals between the points are \( \ldots \), since the period is \( \ldots \).

b. Amplitude: \( \ldots \) Period \( \ldots \) Domain \( \ldots \) Range \( \ldots \)

Max: \( \ldots \) Min: \( \ldots \)

c. Transformations: