Integrated Math 3
Unit 5: Graphing & Modeling Trig. Functions
5.0

Name: _____

Date:_____   Period:_____

Objective: To discover patterns in graphing trigonometric functions.

Review:

When provided with an absolute value function written in standard form ($y = a|x - h| + k$), we can create a graph by identifying the transformations. List the transformations for each of the following:

a.) $y = 2|x - 4| + 3$

b.) $y = |x + 5| - 1$

c.) $y = -|x - 1| + 6$

d.) $y = -\frac{1}{2}|x + 2| - 2$

Predict:

Using the same process, predict how the sine function ($y = a\sin(bx - c) + d$) is transformed below:

a.) $y = 2\sin(x - 4) + 3$

b.) $y = \sin(x + 5) - 1$

c.) $y = -\sin(x - 1) + 6$

d.) $y = -\frac{1}{2}\sin(x + 2) - 2$

Explore:

We will now explore these transformations further. Go to student.desmos.com and enter in the class code **772GVW**. Follow all of the prompts on the screen.

Slides 1 and 2: In your own words, determine what the various parts of the equation do by using the sliders. When given a sine function in the form $y = a\sin(bx - c) + d$ or a cosine function in the form $y = a\cos(bx - c) + d$

a changes

b changes

c changes

d changes

Vocabulary:

Phase Shift: The number of units the graph has been shifted in the horizontal direction from its usual position
Amplitude: The height of the function from its midline
Vertical Shift: The number of units the graph has been shifted in the vertical direction from its usual position
Period: The shortest repeating portion of the graph is called a cycle and the horizontal length of each cycle is called the period.

Slide 3: Changing the value of a best describes the:

  A. Phase Shift   B. Amplitude
  C. Vertical Shift   D. Period

Slide 6: Changing the value of b best describes the:

  A. Phase Shift   B. Amplitude
  C. Vertical Shift   D. Period

Slide 9: Changing the value of c best describes the:

  A. Phase Shift   B. Amplitude
  C. Vertical Shift   D. Period

Slide 12: Changing the value of d best describes the:

  A. Phase Shift   B. Amplitude
  C. Vertical Shift   D. Period

Extension: Navigate to https://www.desmos.com/calculator/rusqxyr4ux. Make your graph match the sound wave, as instructed on Desmos. Record the values that made your graph match the sound wave below:

$a =$ $b=$

$c=$ $d =$

Reflect:

1. Write an equation for a sine graph that has an amplitude of 2.

2. Write an equation for a cosine graph that has been vertically shifted.

3. Provide the equations for two sine graphs that have the same period.