Pre Calculus **Name: _____**
Exploration on the sine graph: **Period: _____**
Amplitude, period and phase shift **2007-08**

In this activity, you will investigate properties of the transformations of the sine graph. You will need a ***TI Nspire*** calculator. Select a new application: **graphs and geometry**. Graph $y = \sin(x)$. To get the best viewing window, you will need to make the changes yourself. Make sure you look at **TWO** periods (include negative angles!). Record your viewing window below:

Xmin = _____

Xmax = _____

Ymin = _____

Ymax = _____

Why did you choose those particular values? _____

_____

I. **Zeroes, maximum values, minimum values.**

- Put a point on your graph. Grab the point and drag it on the curve. Find the following. Give your answers as ordered pairs:

Zeroes: _____

Maximums: _____

Minimums: _____

When does the function repeat? What is the range of the function? What is the domain? _____

_____

- Add the graphs $y = 2\sin(x)$ and $y = 3\sin(x)$. What is the difference between the graphs? What is the same with these graphs?

II. Amplitude: $y = a\sin(x)$

- Put **TWO** graphs in the same screen now. Both ***f1(x)*** and ***f2(x)*** will be ***sin(x).***
- Now grab **ONE** of the graphs and drag it vertically…so only the amplitude changes. What can you say about the zeroes of the function? The amplitude? What happens if you drag it so that the curve is now inverted? What happens to

the zeroes if the you invert the curve? What is the **NEW** function when you invert the curve? Write down your functions and draw the graphs. Record your observations below: _____

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III. **Period**: $y = a\sin(bx)$ Same picture…different changes!

Take one of your curves and grab it. Now drag it sideways being careful to keep the amplitude the same. Notice when the new function completes one cycle…that is the period. Drag it so that it completes ONE cycle in the same time that $y = \sin(x)$ completes only HALF a cycle. What is the period for this function? What does the calculator say that the coefficient of x is? (i.e. b) What if it completes one cycle in the time it takes the first sine function to complete 2 cycles? What is the coefficient of x now? What if the new function has a period of 6π. What does the equation look like? What does the graph look like? _____

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IV. **Phase Shift**: $y = a\sin(b(x-h))$