

### Investigation #5

#### The General Sine Function

In this lesson you will learn how A, B, C, and D affect the graph of  $y = A\sin(B(x - C)) + D$ .

- Use a graphing calculator to graph each of the following functions. Our work will be done in degrees, so you must set the calculator mode to DEG. The suggested window settings are  $X_{min} = -360$ ,  $X_{max} = 360$ ,  $X_{scl} = 90$ ,  $Y_{min} = -4$ ,  $Y_{max} = 4$ ,  $Y_{scl} = 1$ .

Be sure to identify the values of A, B, C, and D for each graph.

Equation	Sketch	Max & Min	Amp	Vert Shift	Per.	Phase Shift
$y = \sin(x)$ A = B = C = D =						
$y = \sin(x - 90)$ A = B = C = D =						
$y = 2\sin(x - 90)$ A = B = C = D =						
$y = 2\sin(x - 90) + 1$ A = B = C = D =						
$y = -2\sin(x - 90) + 1$ A = B = C = D =						

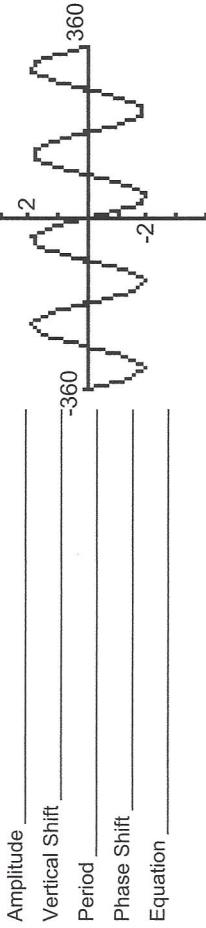
$y = 2\sin(2(x + 90)) + 1$

A = \_\_\_\_\_  
B = \_\_\_\_\_  
C = \_\_\_\_\_  
D = \_\_\_\_\_

- In the equation  $y = 1.5\sin(2(x - 45)) - 0.5$ ,

The value 1.5 determines the \_\_\_\_\_  
 The value 2 determines the \_\_\_\_\_  
 The value 0.5 determines the \_\_\_\_\_  
 The value 45 determines the \_\_\_\_\_

- Examine the graph below and find the values of A, B, C, and D that would generate it. Check your answer on the calculator.



- Complete the table below. The first one has been done for you.

Max	Min	Vertical Shift	Period	Phase Shift	A	B	C	D	Equation
2	-2	0	360	0	2	1	0	0	$y = 2\sin(x)$
1	-1	0	180	-90					
2	0	1	360	0					
1	-3	-1	180	0					

- In your own words, explain how the constants A, B, C, and D affect the graph of the equation

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