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| **TUESDAY (10.29.24)****Learn how to graph the sine function.****New OBJECTIVES: CHAPTER 4, Section 4 (Pages 343 – 349)*** Graph ***y = sin (x)*** and ***y = cos (x).***
* Graph ***y = a sin (b (x - s )) + v***.
* Graph ***y = a cos (b (x - s )) + v***.
* **Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.**
* **Model actual situations with the sine and cosine functions.**
* **Know that the term *sinusoidal function* refers to BOTH the sine and the cosine functions.**

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|  | **NOTES: *y* = sin(*x*), y = cos(*x*),** ***y = a sin (b (x - s)) + v*** |

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Graphs of trigonometric functions can be produced in degrees or in radians. The graphs appearing here will be done in radians.  The sine and cosine functions take on *y*-values between -1 and 1.

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| **Sine Function:   http://regentsprep.org/Regents/math/algtrig/ATT7/sincos6.gif** |

**http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** called a "wave" because of its rolling wave-like appearance (also referred to as oscillating) **http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** amplitude: 1  (height)**http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif**period:http://regentsprep.org/Regents/math/algtrig/ATT7/graphv1.gif(length of one cycle)**http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif**frequency:  1cycle in http://regentsprep.org/Regents/math/algtrig/ATT7/graphv1.gifradians **http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif**domain:  **http://regentsprep.org/Regents/math/algtrig/ATT7/sincos7.gif    http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif**range:**http://regentsprep.org/Regents/math/algtrig/ATT7/sincos8.gif**  | **http://regentsprep.org/Regents/math/algtrig/ATT7/sincos6.gif**

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| http://regentsprep.org/Regents/math/algtrig/ATT7/sincos5.gif |

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| **Cosine Function:   http://regentsprep.org/Regents/math/algtrig/ATT7/sincos9.gif**  |
| **http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif**called a "wave" because of its rolling wave-like          appearance  **http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** amplitude: 1 **http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** period:http://regentsprep.org/Regents/math/algtrig/ATT7/graphv1.gif**http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** frequency:  1cycle in http://regentsprep.org/Regents/math/algtrig/ATT7/graphv1.gifradians **http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** domain:  **http://regentsprep.org/Regents/math/algtrig/ATT7/sincos7.gif  http://regentsprep.org/Regents/math/algtrig/ATT7/bullet.gif** range:**http://regentsprep.org/Regents/math/algtrig/ATT7/sincos8.gif**  |  |

 |  **http://regentsprep.org/Regents/math/algtrig/ATT7/sincos9.gif**

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| **http://regentsprep.org/Regents/math/algtrig/ATT7/sincos10.gif** |

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|  | Did you notice that the cosine curve is really the exact same graph as the sine curve shifted 90º (or http://regentsprep.org/Regents/math/algtrig/ATT7/sincos12.gifradians) to the left?

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| **Sine Function: y = a sin (b ( x - s )) + v** |

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**Discuss the previously assigned work \_\_\_\_\_\_\_\_** **Graph one period of the following functions for 0o ≤ x ≤ 360o, using The Five Point Method that we discussed in class.**1. **y = sin (x)**
2. **y = - sin (x)**
3. **y = 2 sin (x)**
4. **y = - 2 sin (x)**
5. **y = 0.5 sin (x)**
6. **y = - 0.5 sin (x)**

**Notes:** The ***FIVE-POINT METHOD OF GRAPHING THE SINE FUNCTION*** is an efficient way to graph one period of the sine function, using 5 points. Use the following steps to graph a sine function in the following form:**y = a sin (b (x - s)) + v****Step 1:**  Identify all the constants: ***a***, ***b***, ***s***, and ***v***.**Step 2:** The **AMPLITUDE** of the sine function is **|a|**. The total vertical distance occupied by this graph is **2|a|**. **Step 3:**  Calculate the **PERIOD** with the formula: **2π/b** or **360o/b****Step 4:** Calculate the ***INTERVAL LENGTH*** for the 5 points of one period by using the formula: **PERIOD/4** **(Note: There will be 5 points & 4 intervals.)****Step 5:**  Use the ***s-***value, the ***PHASE SHIFT***, to calculate the endpoints of the new interval on the **x-axis.**Using degrees, the original graphing interval of y = sin(x) is [0 **o**, 360 **o**]  Using radians, the original graphing interval of y = sin(x) is [0, 2**π].** The new x-axis interval will be [s **o**, period + s **o** ].  In radians, this interval will be [s**,** period + s]. **Step 6:** Use the ***v*** –value to find the ***VERTICAL SHIFT***. **Step 7:** **BUILD A TABLE,** starting with the minimum x-value point of the x-axis interval, calculated in Step 5 above. The second x-value is obtained by adding the INTERVAL LENGTH to the first point. The third x-value is calculated by adding the INTERVAL LENGTH to the second point. Continue this process, until you have obtained 5 x-values. Use your calculator to find the y-values that correspond to your five x- values; record them in your table.**Step 8:**  Label your x and y axes with the values from your table in Step 7.**Step 9:**  Plot the 5 points, using the ordered pairs, indicated by your table. Connect the 5 points with a smooth curve.**MODEL:** Use ***THE FIVE-POINT METHOD OF GRAPHING THE SINE FUNCTION*** to graph the following function:***y = 3sin (0.5(x - 45)) o + 1*** ***y = a sin (b (x - s)) + v*****Step 1:**  a = \_\_\_\_\_\_\_; b = \_\_\_\_\_\_\_\_; s = \_\_\_\_\_\_\_\_; v = \_\_\_\_\_\_\_\_**Step 2: AMPLITUDE = |a| = \_\_\_\_\_\_\_****Step 3:**  **PERIOD** = **360o/b = \_\_\_\_\_\_\_\_\_\_\_****Step 4:** ***INTERVAL LENGTH*** = **PERIOD/4 = \_\_\_\_\_\_\_\_\_****(Note: There will be 5 points & 4 intervals.)****Step 5:**  ***PHASE SHIFT*** = ***s-***value = \_\_\_\_\_\_\_\_ Using degrees, the original graphing interval of y = sin(x) is [0 **o**, 360 **o**]  The new x-axis interval will be [s **o**, period + s **o**]. Here, the new x-axis interval is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. **Step 6: *VERTICAL SHIFT = v*** –value = \_\_\_\_\_\_\_\_\_\_ **Step 7:** **BUILD A TABLE,** starting with the minimum x-value point of the x-axis interval, calculated in Step 5 above. The second x-value is obtained by adding the INTERVAL LENGTH to the first point. The third x-value is calculated by adding the INTERVAL LENGTH to the second point. Continue this process, until you have obtained 5 x-values. Use your calculator to find the y-values that correspond to your five x- values; record them in the table below.

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| **x** | **y** |
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**Step 8:** Start your graph below. Label your x and y axes with the values from your table in Step 7. **Step 9:** Plot the 5 points, using the ordered pairs, indicated by your table. Connect your 5 points with a smooth curve. Your graph represents one period of the function, ***y = 3sin (0.5(x - 45)) o + 1.*****CLASS WORK: Now, u**se the ***Five-Point Method*** to graph one period of the following: ***y = -3sin (0.5(x - 45)) o + 1.*****Class Work: Unit Circle Review****Homework:** * **Study for the Test (Unit Circle) to be taken on Thursday.**
* Use the ***Five-Point Method*** to graph the following:
1. **y = -3sin (0.5(x-45)) o + 1**
2. **y = 2sin (3(x +60)) o – 4**
3. **y = -2sin (3(x +60)) o + 5**

**THURSDAY (10.31.24)** **Discuss the previously assigned homework.****Unit Circle Test****Class Work:** Use the ***Five-Point Method*** to graph the following:1. y **= 4sin (0.2(x-10)) o**

(2) y **= -6sin (12x) o + 4****Take-Home Quiz: Use** the ***Five Point Method*** to graph one period of a given sine function. Be sure to label the tick marks on your x and y axes and to label your five points with their ordered pairs.State the amplitude, period, phase shift, and vertical shift.Due at the beginning of your class on Thursday, November 7.**FRIDAY (11.1.24) A-DAY, NO CLASS** |