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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.**  |  |  |  | | --- | --- | --- | | |  |  | | --- | --- | |  | **NOTES: *y* = sin(*x*), y = cos(*x*),**  ***y = a sin (b (x - s)) + v*** | |   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.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | |  | | --- | | **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**   |  | | --- | | http://regentsprep.org/Regents/math/algtrig/ATT7/sincos5.gif | | | | |  | | --- | | **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**   |  | | --- | | **http://regentsprep.org/Regents/math/algtrig/ATT7/sincos10.gif** | | |  | 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?   |  | | --- | | **Sine Function: y = a sin (b ( x - s )) + v** | | | |   **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.   |  |  | | --- | --- | | **x** | **y** | |  |  | |  |  | |  |  | |  |  | |  |  |   **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** |