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| **INSTRUCTIONAL OBJECTIVES, Chapter 4, Sections 4.3 – 4.5**  **Trigonometry Extended: The Circular Functions (Pages 331 – 339)**   * Use the unit circle (with a radius of 1 unit and a center at the origin) and any other circle of radius, r, to evaluate the 6 trigonometric functions for an angle when given a point on its terminal side. * Use circular trigonometry to find the six trigonometric functions of an angle θ for which you know a point on the terminal side of angle θ. * Understand that extending trigonometric functions beyond right triangle ratios of acute angles more aptly applies to real world situations where angular measures can be any number, either positive or negative. * Graph the sine, cosine, and tangent functions.   Technology: Smart Board, graphing calculator (TI-83 or TI-84)  **Technology:** Graphing calculator (TI-83 or TI-84) |
| **TUESDAY (10.22.24)**  **Class Work:**   * Practice filling out the degrees/radians and ordered pairs on a unit circle.     **Discuss the previously assigned homework:**   * Page 393 (#11 – 32, 45 – 48, 51, 69 – 72, 77 – 82).   **Class Work/Homework:**  **Study for the Test (Circular Trig)** to be taken on Thursday. You may use one page of notes, written on both sides of a sheet of paper, 8.5 by 11 inches, when you take this test. You will turn in your notes with your test paper.  **THURSDAY (10.24.24)**  **Learn how to graph the sine function.**  **Test (Circular Trig)**  **Class Work/Homework:**  **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** | | | |   **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)**   **FRIDAY (10.25.24)**  **Discuss 6 previously assigned graphs.**  **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/HOMEWORK: Now, u**se the ***Five-Point Method*** to graph the following: ***y = -3sin (0.5(x - 45)) o + 1.*** |