

Intro to Calculus

Workshop 9

1. Find three different polynomial functions of degree 6 whose only zeros are $x = -67$, -31 , and π .
2. Find a polynomial g of degree 3 such that the zeros of $g(x)$ are -4 , 2 , 5 , and where $g(-3) = 10$.
3. Create a third degree polynomial h whose only real root is 3 and where $h(5) = -40$.
4. List the inferences you can make about the graph of $f(x) = (x + 13)(x + 1)^2(x - 2)^3$ based on the equation and what you have learned about graphs of polynomial functions. Confirm by making a graph with your calculator.
5. Without using your calculator to graph, create a sketch of the graph of $f(x) = -\left(\frac{1}{5600}\right)(x + 5)^2(x + 1)(x - 4)^3(x - 7)$. Then confirm your result using a graph from your calculator. (A very nice tutorial on this problem can be found at <http://www.purplemath.com/modules/polyends5.htm>)
6. Without using your calculator to graph, create a sketch of the graph of $g(x) = -x^5 + 4x^3$. Then confirm your result using a graph from your calculator.
7. Without actually graphing, create lists of the similarities and differences of the graphs of the following functions:
$$f(x) = -(x - 2)^2(x + 5) \qquad g(x) = (2 - x)(x + 5)^3$$
Then confirm your solution with the help of a graph of each of the functions. How did you do?
8. Point A is located at $(0, 2)$ and point B is located on the graph of $y = x^2 + 1$. What should be the approximate location of point B so that the distance from A to B is as short as possible? Justify with clear and complete work. (A Geogebra sketch of this is at the class website.)
9. A window is being built such the bottom is a rectangle and the top is a semicircle. If there are 12 meters of framing material what should be the width of the window in order to let in the most light? Justify with clear and complete work.
10. Point A is located at $(3, 1)$ and point B is located on the circle with center at $(1, 2)$ with radius of 4. What is the closest point B could come to point A ? Approximate to the nearest thousandth. Justify with clear and complete work. (A Geogebra sketch of this is at the class website.)