

Calculator Project #2

22M:002

Due Friday, December 7

For each of the given functions, use your graphing calculator to analyze the graph of the function. Be sure to set the window size appropriately so you can see your entire function. When asked to graph a function, use your calculator to generate a graph and sketch what you see. For each exercise, turn in your sketch along with answers to the questions.

1. Let $f(x) = x^5 + 6x^4 - 133x^3 - 78x^2 - 1740x - 1800$

- Graph f on your graphing calculator.
- Use your calculator to solve for all the zeros of f .
- Find the minimum value of f between 0 and 10.
- Find the maximum value of f between -5 and 5.

2. Let $f(x) = x^3 - 3x^2 - 64x - 60$,

and let $g(x) = x^3 - 12x^2 - 208x + 960$

- Graph f and g on your graphing calculator.
- Use your calculator to solve for all zeros of f and g .
- Find the minimum value of f between 0 and 10.
- Find the maximum value of f between -5 and 5.
- Find the minimum value of g between 0 and 10.
- Find the maximum value of g between -5 and 5.
- Use your calculator to find the points at which the two functions intersect.

3. Let $f(x) = \begin{cases} x+2 & \text{if } x \leq 2 \\ x-3 & \text{if } x > 2 \end{cases}$

- Graph f on your graphing calculator.

4. Let $f(x) = \frac{x^2 + 2x + 1}{x - 1}$

- Graph f on your graphing calculator.
- Describe the asymptotes of f . What happens at $x = 1$?
- Find the zeros of each function.

5. Let $g(x) = \frac{x^2 + 2x + 1}{x + 1}$

- Graph g on your graphing calculator.
- Why are there no asymptotes in g ?
- Rewrite the equation for g so that it is linear.

6. Let $h(x) = \frac{x^2 - 2}{x - 1}$
- Graph h on your graphing calculator.
 - What is the equation for the vertical asymptote? What is the equation for the oblique asymptote?
 - Set your window values so that $x_{min} = -50$, $x_{max} = 50$, $y_{min} = -50$, and $y_{max} = 50$. What does the function look like?
7. Let $k(x) = \frac{x^3 + 3x^2 + 3x + 1}{x - 1}$
- Graph k on your graphing calculator.
 - What is the equation for the vertical asymptote? Use polynomial long division to determine the behavior of $k(x)$ as $x \rightarrow$ infinity. What function does $k(x)$ approach as x gets very large?
 - Set your window values so that $x_{min} = -10$, $x_{max} = 10$, $y_{min} = -10$, and $y_{max} = 10$. What does the function look like? (Sketch it)
 - Set your window values so that $x_{min} = -20$, $x_{max} = 20$, $y_{min} = -10$, and $y_{max} = 20$. What does the function look like? (Sketch it)
 - Set your window values so that $x_{min} = -40$, $x_{max} = 40$, $y_{min} = -10$, and $y_{max} = 1000$. What does the function look like? (Sketch it)