

Name: _____

Polynomial Summative Task

Due Date: Monday, October 19th @ 7:34:59 via Google Classroom

Directions

Complete this task on a separate piece of paper or Kami (pdf editor). You can use your notes, but this an individual assignment. **You should work alone.** Do not discuss this assignment with anyone else except your teacher.

Correct answers without explanations/work will receive no credit and cheating will be assumed. If you are suspected of plagiarism/cheating, you will be asked to complete problems and explain them over Zoom in order to earn credit.

When you finish the task, take pictures of your work (camera or tiny scanner app) and add all pictures to ONE document. Make sure that your work is legible. Turn in that document on google classroom. If you are having technical difficulties with this process, email me the pictures/document.

Standard/Topic/Unit: F.IF.C.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	
Meets Competency Questions 1-3	☐ I can sketch a graph of a polynomial function given an equation in factored form, correctly graphing the y-int, end behavior, and zeros - o Given both factored and unfactored form ☐ I can identify the degree and sign of leading coefficient of a polynomial from its graph ☐ I can identify the domain, range, intervals of positive/negative, intervals of increasing/decreasing, extrema, end behavior, and intercepts of a polynomial function from its graph
Exceeds Competency Questions 4-6	☐ I can sketch a graph of a polynomial function given an equation in standard (unfactored) form, correctly graphing the y-int, end behavior, and zeros - o Factoring techniques: GCF, $a=1$, difference of squares, grouping ☐ I can explain why the degree and leading coefficient determine the end behavior of a polynomial function ☐ I can graph polynomial functions with factors that have multiplicity >1
Honors Designation Questions 7-8	☐ I can sketch a graph of a polynomial function given an equation in standard (unfactored) form, correctly graphing the y-int, end behavior, and zeros - o Factoring technique: $a>1$ ☐ I can identify the intervals of concave up/down of a polynomial function ☐ I can determine when polynomials, given by their equation, are positive or negative by making sign charts

Section 1: Meeting Competency

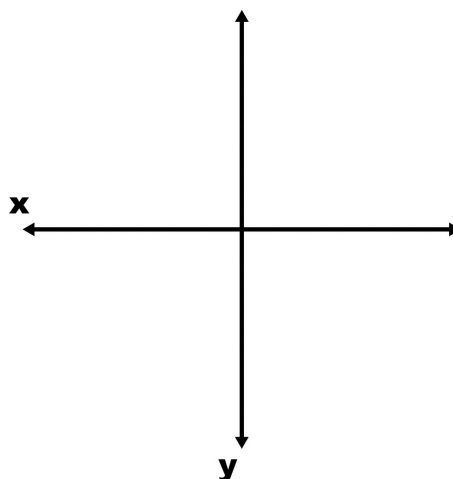
1. Let $g(x) = (x - 4)(x + 1)(x + 5) = x^3 + 2x^2 - 19x - 20$

Part a) What is the left and right end behavior of $g(x)$? Explain your process.

Part b) What is the y-intercept of $g(x)$. Explain your process.

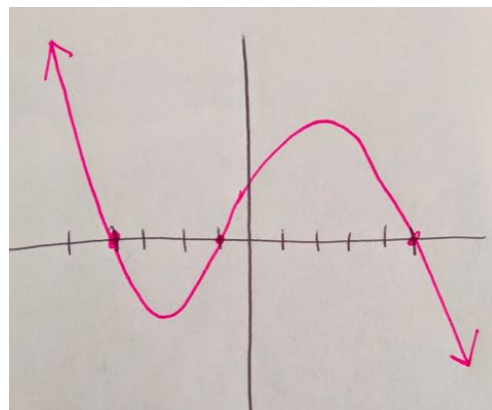
Part c) What are the x-intercepts of $g(x)$. Explain your process.

Part d) Sketch a graph of $g(x)$ showing correct end behavior and intercepts

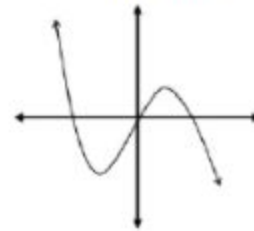


Part e) On what intervals is $g(x)$ positive? Negative? Explain your process.

Part f) A student drew this graph below. Give one reason the student is wrong.



GRAPH A



2. Use Graph A to answer the questions below

Part a) What can be said about the degree of the function graphed by Graph A? Explain your reasoning.

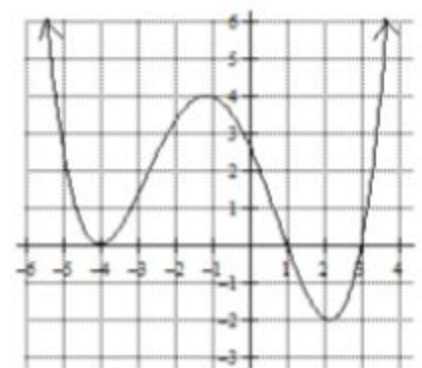
Part b) What can be said about the leading coefficient of the function graphed by Graph A? Explain your reasoning.

Part c) Which of the following is a possible equation for Graph A? Explain how you know.

- I. $f(x) = x(x+3)(x-2)$
- II. $f(x) = -x(x+3)(x-2)$
- III. $f(x) = -(x+3)(x+2)$
- IV. $f(x) = x(x-3)(x-2)$

3. Below you will find statements about the features of the function graphed to the right. Determine if EACH statement is true or false and correct the statements that are false.

- I. The function is increasing on the following intervals of x : $(-4, -1)$ and $(-2, \infty)$
- II. The function is negative on the interval $[1, 3]$ and $x = -4$
- III. The point $(2, -2)$ is an absolute minimum of the function
- IV. The domain of the function is all real numbers
- V. The range of the function is all real numbers
- VI. The absolute maximum of the function is $(-1, 4)$
- VII. The function has one relative minima



Section 2: Exceeds Competency

4. Pick one of the functions below. Then sketch a graph of the function showing correct end behavior and intercepts. **Be sure to show all work.**

1. $f(x) = 2x^3 + 9x^2 - 8x - 36$

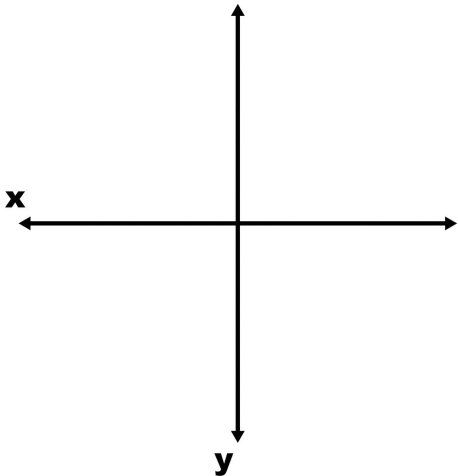
2. $f(x) = x^4 - x^3 - 12x^2$

3. $f(x) = x^4 - 13x^2 + 36$

4. $f(x) = x^3 - 2x^2 - 4x + 8$

5. $f(x) = x^4 - 2x^3 - 4x^2 + 8x$

I picked function _____

Work	Graph
	 A blank Cartesian coordinate system with a horizontal x-axis and a vertical y-axis. Both axes have arrows at their ends. The x-axis is labeled with a bold 'x' at its left end, and the y-axis is labeled with a bold 'y' at its bottom end. The two axes intersect at the origin.

5. Explain WHY the left and right end behavior of an even degree polynomial function will always be the same. Use examples to help explain your reasoning.

6. The following functions have the same x-intercepts, but they do not look the same. Using an argument based on **multiplicity and end behavior**, match each equation to the appropriate graph below and explain your choice.

a)

$f(x) = (x + 1)(x - 3)(x + 5)$

c)

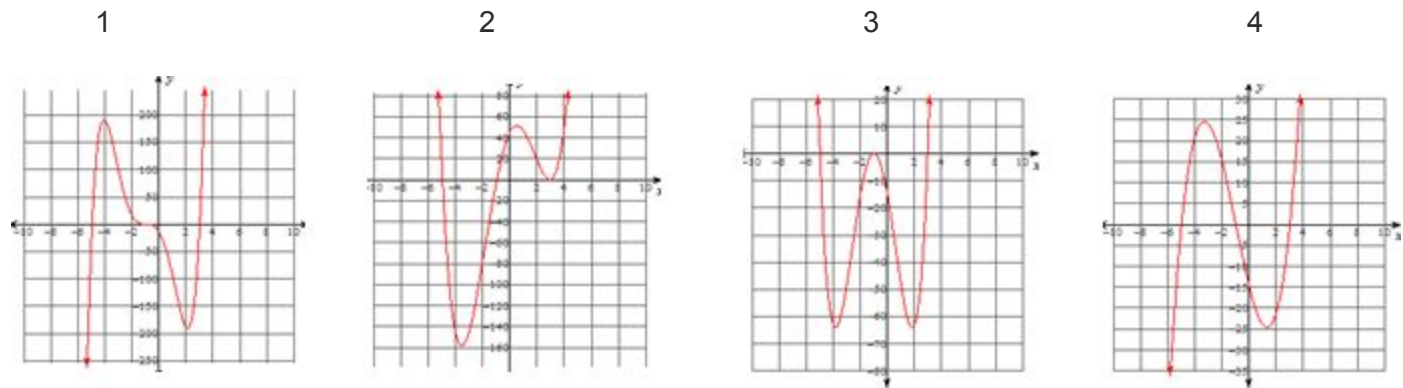
$h(x) = (x + 1)^3(x - 3)(x + 5)$

b)

$g(x) = (x + 1)^2(x - 3)(x + 5)$

d)

$k(x) = (x + 1)(x - 3)^2(x + 5)$



Equation	Graph (Number)	Explanation (include multiplicity and end behavior)
a		
b		
c		
d		

Section 3: Honors Designation

7.

Part a) Solve this inequality $5x^4 - 13x^3 - 6x^2 < 0$ showing all work, including your sign chart.

Part b) Explain how your sign chart connects with the multiplicity and end behavior of this function.

8. Which of the following statements is/are true about the function, $h(x)$, pictured to the right? **Justify your choice.**

- I. $h(x)$ is concave down on the interval of x $(-\infty, -3)$
- II. $h(x)$ is concave up on the interval of x $(-1.5, 1.5)$
- III. The graph has three points of inflection

- A. I and II only
- B. II and III only
- C. I and III only
- D. II only
- E. I, II, and III

Answer: _____

Justification:

