APPC Lesson 2.4 Homework

Name _____

1. Describe the behavior of $g(x) = -3x^4 + 5x^3 - 8x^2 + 4x + 1$ as x approaches ∞ and as x approaches $-\infty$.

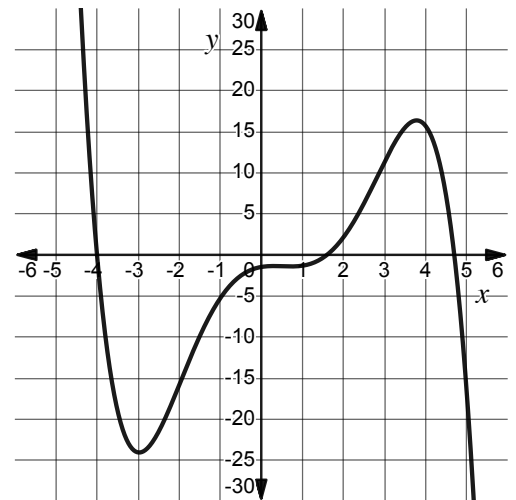2. It is known for a polynomial function f that $\lim\limits_{x \to \infty} f(x) = \infty$ and $\lim\limits_{x \to -\infty} = -\infty$. What must be true about the leading coefficient of f and the degree of f?

3. Consider the graph of the folynomial function f shown.

   a. Describe the end behavior of f using limit notation.

   b. Is it possible for f to have a degree of 5? Give a reason for your answer.

4. Describe the end behavior of $h(x) = (x+3)^2(x-5)(x+6)^3$. Use limit notation.

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5. Selected values of a cubic function f are given in the table.

x	0	1	2	3	4
$f(x)$	5	-3	-3	4	2

a. Find $\lim\limits_{x \to -\infty} f(x)$.
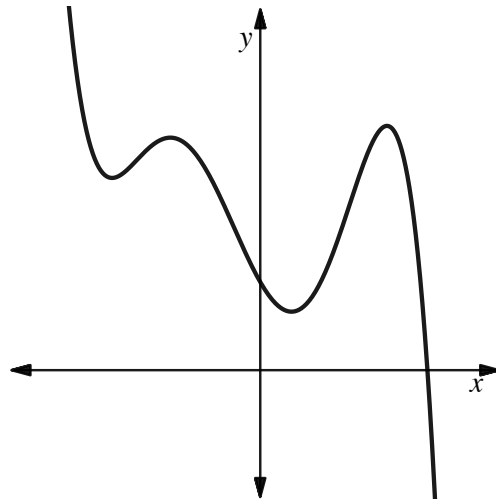
b. Find $\lim\limits_{x \to \infty} f(x)$.

6. The graph of the polynomial function shown has a leading coefficient of L and a degree of N. Which of the following could be true?

A) $L = 0.5, N = 3$
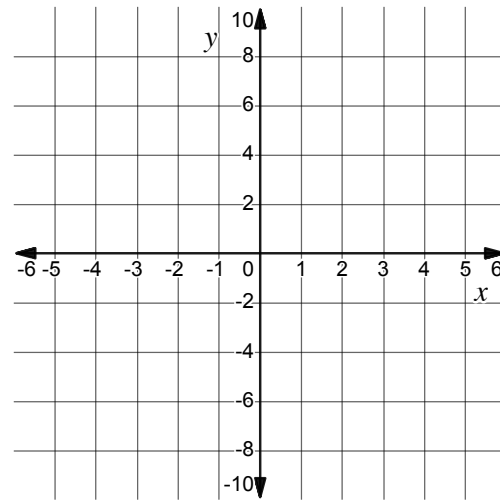
B) $L = -0.5, N = 3$

C) $L = -0.5, N = 4$

D) $L = -0.5, N = 5$

7. The function g has the following properties:
   - $g(0) = 4$
   - g has at least two real zeros, one of which has an even multiplicity.
   - $\lim\limits_{x \to \infty} g(x) = -\infty$
   - $\lim\limits_{x \to -\infty} g(x) = -\infty$

   Sketch a possible graph of $y = g(x)$.

8. Explain why a polynomial with an odd degree has opposite end behavir.

9. Let $f(x) = -2x^3 + 180x^2$.

   a. Complete the table showing the value of each term of f for the given values of x.

x	$-2x^3$	$180x^2$
1		
10		
1000		
100,000		

   b. For small values of x, which term dominates the value of $f(x)$? Why?

   c. For large values of x, which term dominates the value of $f(x)$? Why?

   d. How are your answers to part b and c related to finding the end behavior of a polynomial function?

10. Consider the function $f(x) = 3x^2 + 5x^3 - 4x + 7$.

    a. Find a term that, when added to f, would change the end behavior of f as $x \to \infty$ but not at $x \to -\infty$.

    b. Find a term that, when added to f, would change the end behavior of f on both sides (as $x \to \infty$ and as $x \to -\infty$).

    c. Find a term that, when added to f, would NOT change the end behavior of f.