Name KEY Period _____ Date _____

H. Math 3 Polynomials Homework 1

Classify each polynomial by its degree. Then describe the end behavior of each function.

1. $f(x) = x^3 - 4x^2 + 7$

3; cubic; $x \to \infty, y \to \infty$; $x \to -\infty, y \to -\infty$

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

3; cubic. $x \to \infty, y \to -\infty$; $x \to -\infty, y \to \infty$

3. $f(x) = x^4 - 9x^2 + 24x - 15$

4; quartic $x \to \infty, y \to \infty$; $x \to -\infty, y \to \infty$

4. $f(x) = x^2 - 6x + 11$

2; quadratic $x \to \infty, y \to \infty$; $x \to -\infty, y \to \infty$

State the maximum number of turns the graph of each function could make.

5. $f(x) = x^5 - 4x^3 + 5x + 1$

4

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

3

7. $f(x) = 2x^6 - 4x^5 + 7x - 3$

5

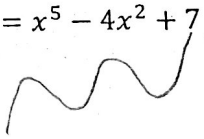
8. $f(x) = -x^3 - 4x - 7$

2

Sketch the general shape of each function.

9. $f(x) = -x^2 - 6x + 5$

10. $f(x) = x^5 - 4x^2 + 7$

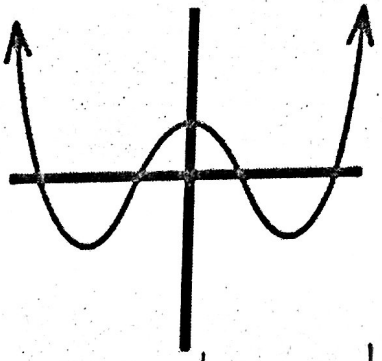


11. $f(x) = x^3 - 2x^2 - 3$

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

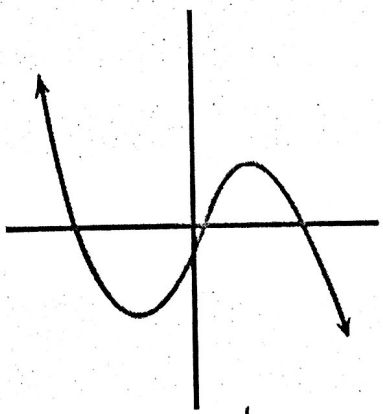
State the degree and possible value of the leading coefficient based on the shape and end behavior of the graph.

13.



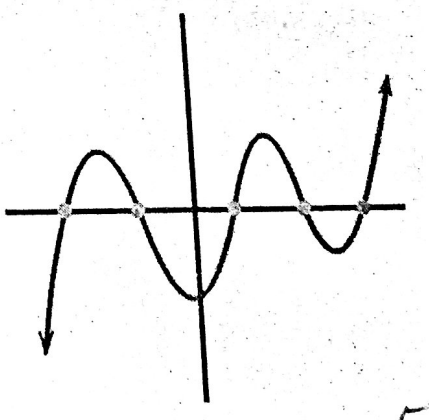
pos. degree 4

14.



neg degree 3

15.



pos. degree 5

For each polynomial, classify be degree, use a graphing calculator to find the extrema, and state the end behavior. For the extrema, state whether the point is a relative maximum, relative minimum, absolute maximum, or absolute minimum. Sketch the graph.

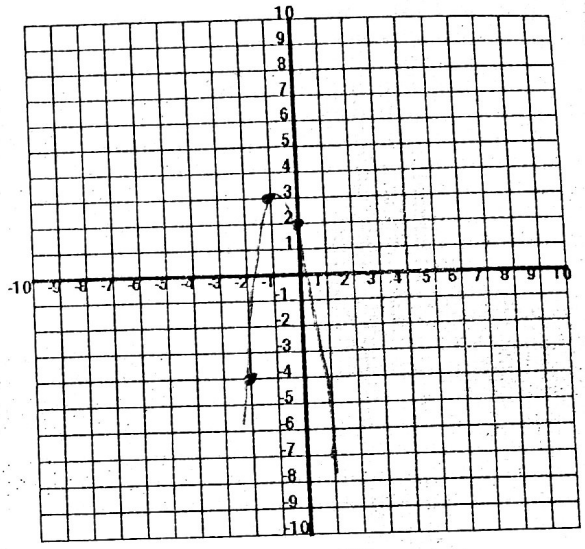
16. $f(x) = 2 - 5x - 4x^2$

degree 2, quadratic

absolute max $(-.63, 3.56)$

$x \to \infty, y \to -\infty$

$x \to -\infty, y \to -\infty$



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

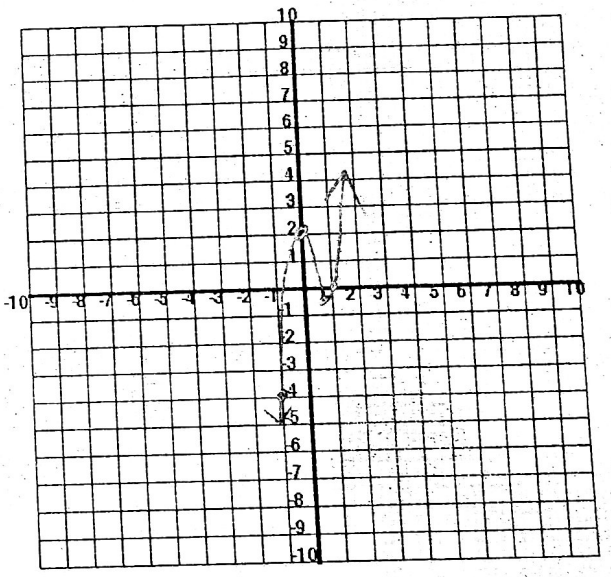
degree 5

local max: $(0, 2)$

local min: $(.86, -.51)$

$x \to \infty, y \to \infty$

$x \to -\infty, y \to -\infty$



18. $f(x) = 2x^4 - 3x^3 - 4x^2 + 2x - 1$

degree 4, quartic

local min: $(-.73, -2.86)$

local max: $(.21, -.78)$

absolute min: $(1.64, -7.24)$

$x \to \infty, y \to \infty$

$x \to -\infty, y \to \infty$