Polynomial Functions
Algebra 2: End Behavior Homework

Name: _____

Complete the following <u>without</u> a calculator. Determine the following: a) the leading coefficient, b) the degree of the polynomial, and c) the end behavior of the graph. Answers to part (c) will be in the following form:

(↖, ↗) (↙, ↘) (↙, ↗) (↖, ↘)

1. $y = x^2 - 5x + 2$

a. _____

b. _____

c. _____, _____

2. $y = -5x^4 - 4x^2$

a. _____

b. _____

c. _____, _____

3. $m(x) = 7x^6 - 2x^2 + 7x$

a. _____

b. _____

c. _____, _____

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

a. _____

b. _____

c. _____, _____

5. $y = -\frac{1}{2}x^3 + 4x^2 + x - 1$

a. _____

b. _____

c. _____, _____

6. $h(x) = x - x^3 + 5$

a. _____

b. _____

c. _____, _____

7. $y = -\frac{1}{5}x^5 + 2x^4 - x + 8$

a. _____

b. _____

c. _____, _____

8. $k(x) = 3x^2 + 5 + 7x^3$

a. _____

b. _____

c. _____, _____

9. $8x - 6x^7 + 4x^6 - 2x^3$

a. _____

b. _____

c. _____, _____

10. $f(x) = 9x^{11} + 4x^9 - 3x + 2$

a. _____

b. _____

c. _____, _____

11. $y = (x-2)(x+4)(x-3)$

a. _____

b. _____

c. _____, _____

12. $f(x) = (x-1)^9$

a. _____

b. _____

c. _____, _____

13. $y = -4(x^2 + -4x^5)$

a. _____

b. _____

c. _____, _____

14. $y = -3 + 4x^2 + 5x^8$

a. _____

b. _____

c. _____, _____

15. $y = 234x^{84} - 3$

a. _____

b. _____

c. _____, _____

16. $y = x^3 + -x^5 + x^7 + -x^9$

a. _____

b. _____

c. _____, _____

17. $f(x) = 5x^3 + 7x^9 - 4x^4$

a. _____

b. _____

c. _____, _____

18. $y = -0.3x^{12} + 5x - 14$

a. _____

b. _____

c. _____, _____

19. $f(x) = -5x + 2$

a. _____

b. _____

c. _____, _____

20. $f(x) = 276x^{56}$

a. _____

b. _____

c. _____, _____

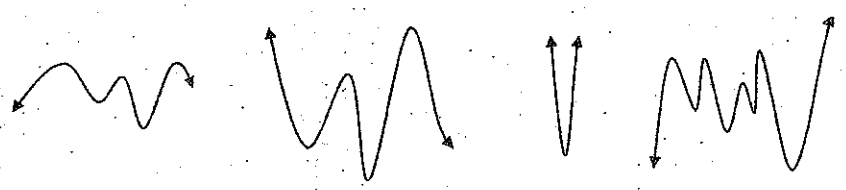
21. $f(x) = 23x^2 + 3x - 48$

a. _____

b. _____

c. _____, _____

22. Write down what the leading term and the degree would look like for the polynomials with these graphs...

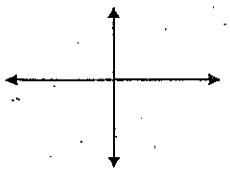
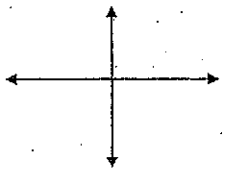
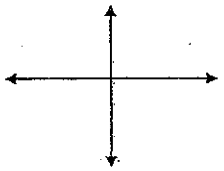
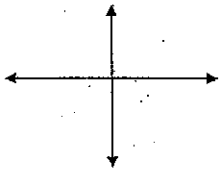


HOMEWORK

Polynomial Functions Name: _____

Polynomial Functions and Their Graphs (Patterns of Polynomials) Worksheet

Fill out this table. Sketch the graph of this function using the critical points.

Function	$f(x) = \frac{1}{2}(x-2)(x+4)$	$f(x) = \frac{1}{2}(x-2)^2(x+3)$	$f(x) = -\frac{1}{2}(x+2)(x+1)(x-3)$	$f(x) = -\frac{1}{2}(x-2)^2(x+2)(x+4)$
Leading Coefficient				
Degree				
Number of Linear Factors				
End Behavior	(___, ___)	(___, ___)	(___, ___)	(___, ___)
Number of Turning Points				
y-intercept				
Number of Real Zeros	Crossing: Touching: Total:	Crossing: Touching: Total:	Crossing: Touching: Total:	Crossing: Touching: Total:
Sketch of Graph				

HOMEWORK

Polynomial Functions Name: _____

Polynomial Functions & their Graphs WITHOUT a Graphing Calculator

Summary

- The *maximum possible* number of turning points is one less than the degree of the polynomial.
- The *maximum possible* number of zeros of a polynomial is the same as its degree.
- The graph of a polynomial will touch, but not cross, the x-axis at zeros of even multiplicity.
- The graph of the polynomial will cross the x-axis at zeros of odd multiplicity.

Directions: Complete each of the following WITHOUT a graphing calculator. Sketch a *general* graph of the function. Be sure to include the x-intercepts and y-intercept on this graph!

1) $f(x) = -2(x+2)(x-5)^2$

a. Leading Coefficient: a = _____

b. Degree: _____

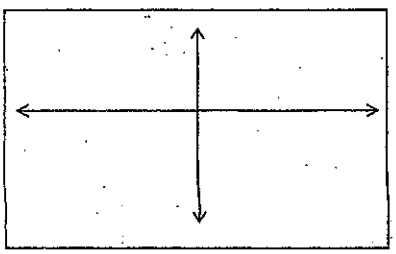
c. End Behavior (_____, _____)

d. Cross: _____ Touch: _____ Total: _____

e. y-intercept: _____

f. Max number of Turning Points: _____

g. Sketch the graph of the function.



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

a. Leading Coefficient: a = _____

b. Degree: _____

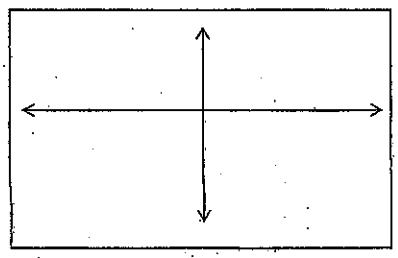
c. End Behavior (_____, _____)

d. Cross: _____ Touch: _____ Total: _____

e. y-intercept: _____

f. Max number of Turning Points: _____

g. Sketch the graph of the function.



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

a. Leading Coefficient: a = _____

b. Degree: _____

c. End Behavior (_____, _____)

d. Cross: _____ Touch: _____ Total: _____

e. y-intercept: _____

f. Max number of Turning Points: _____

g. Sketch the graph of the function.