Name: _____ **Precalculus Unit 4, Lesson 5**

Aim: How do we graph higher degree polynomial functions?

I. Do Now:

1. Complete the following
(*a*, *b*, and *c* are constants)

Equation	Describe Graph
$f(x) = a$	_____
$f(x) = ax + b$	_____
$f(x) = ax^2 + bx + c$	_____

2. Use your graphing calculator to find the minimum value of the function $f(x) = 4x^3 - x^2 - 7x - 5, \ x \geq 0$.

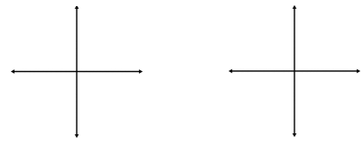
II. Development:

Equations with degree greater than two are more difficult to sketch. Here are some facts that will help us:

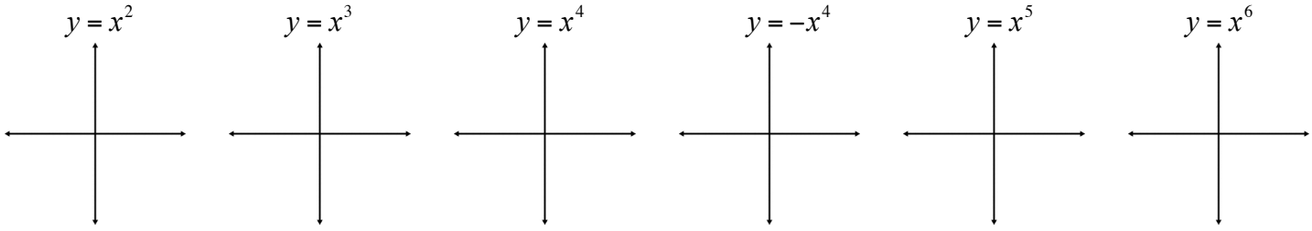
Two Features of the Graphs of Polynomial Functions

i. smooth curves
ii. continuous (no gaps, no holes)

State whether each graph represents a polynomial function.



III. Use your graphing calculator to sketch each of the following equations:



IV. Conclusions: Given $f(x) = x^n$

(a) If *n* is a positive even integer, the graph _____

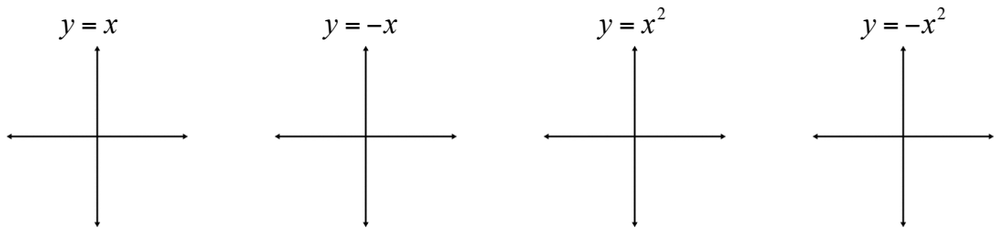
(b) If *n* is a positive odd integer, the graph _____

(c) As *n* increases, the graph is _____

V. Leading Coefficient Test:

The "end behavior" of a polynomial function can be determined by the leading coefficient test. The function's ***degree*** (highest power) and the ***sign of its leading coefficient*** determine whether the function rises or falls (i.e., as $x \to \pm\infty$, $y \to \infty$ or $y \to -\infty$).

Graph each of the following equations:



Leading Coefficient \ Degree	EVEN	ODD
+		
−		

VI. Applications.

Determine the end behavior of each function. Check your answer using your graphing calculator.

$y = 2x^3 + x^2 - 7$

$y = -x^2 + 4$

$y = 2x^4 - x^3 + 7$

$y = 1 - x^5 + 6x$

HW28

- Read pages 100 – 103.
- p. 109: 9, 10, 13, 16, 17, 18, 29, 30, 32, 36
- p. 97: 44, 67