

Polynomials and End Behavior (L.1) Notes

Example 1... Write each polynomial in standard form.

a. $x^2 + x^3 - 9$

b. $2a(a^2 - 4)$

A polynomial can be classified, or grouped, according to the number of terms it has, and according to the degree (highest exponent).

Degree	Name	Example	# Terms	Name	Example

Example 2... Classify each polynomial by degree and number of terms.

a. $5x^4 - 7$

b. $3x^3 - x^2 + 6$

Example 3... Simplify each polynomial, then classify by degree and number of terms.

a. $(7x^2 + 8x - 5) + (9x^2 - 9x)$

b. $(3x^3 - 4x + 1) - (1 - 4x + x^2)$

Example 4... Find a cubic model (equation) for the following set of points. (Calculator)
 $(-2, -7), (-1, 0), (0, 1), (1, 2), (2, 9)$

The end behavior of a polynomial function is the behavior of the graph of $f(x)$ as x approaches positive or negative infinity. The degree and the leading coefficient of a polynomial function determine the end behavior of the graph.

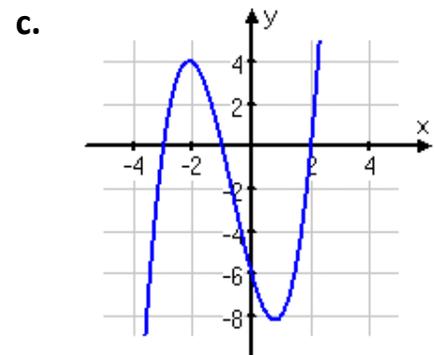
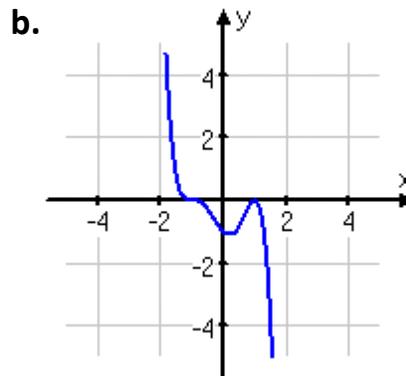
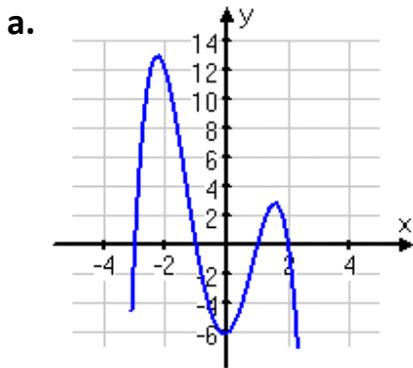
Polynomial	Leading Coefficient	Degree	End Behavior
$P(x) = 3x^4 - 4x^3 - 6x + 8$			
$P(x) = -2x^2 + 5x - 2$			
$P(x) = 2x^3 - 9$			
$P(x) = -x^5 - 4x^3 + x$			

Example 5... Determine the end behavior for the following polynomials and sketch a basic graph.

a. $-2x^5 + 4x^3 - x - 5$

b. $x^4 - 5x^2 + 2x + 6$

Example 6... Identify whether the following graphs have an odd or even degree and a positive or negative leading coefficient.



Example 7: "Key Attributes"

Let $g(x) = -x^4$.

- What is the end behavior of $g(x)$?
- What is the x-intercept of the graph of $y = g(x - 3)$?
- What is the y-intercept of $g(x)$?
- What is the domain of $g(x)$?
- Is $g(x)$ an odd or even function?

Example 8: Additional Transformation Review

The cubic parent function, $f(x) = x^3$, is transformed to $h(x) = (3x)^3 + 2$.

- What is the end behavior of $h(x)$?
- How is $h(x)$ being translated?
- What is the y-intercept of $h(x)$?
- What is the domain of $h(x)$?
- Is $h(x)$ an odd or even function?
- How is $h(x)$ being stretched or compressed?