2.2 Evaluate and Graph Polynomial Functions

Monday, November 13, 2017 7:20 AM

Polynomial Function- 1) exponents are all whole numbers and 2) coefficients are all real numbers

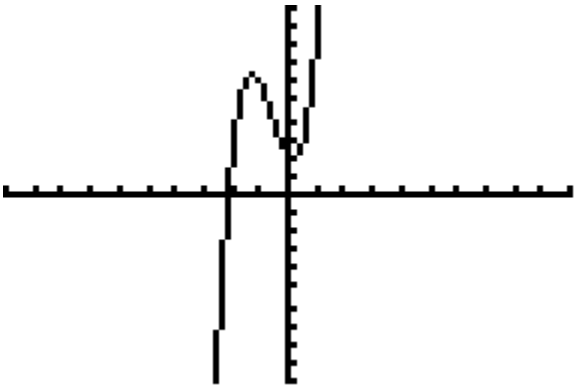
$f(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$

a_n is the leading coefficient
n is the degree

Standard Form-terms are written in descending order of exponents from left to right

Degree	Type	Standard Form	Example
0	Constant	$f(x) = a_0$	$f(x) = 39$
1	Linear	$f(x) = a_1 x + a_0$	$f(x) = 2x + 1$
2	Quadratic	$f(x) = a_2 x^2 + a_1 x + a_0$	$f(x) = 5x^2 - 3x + 7$
3	Cubic	$f(x) = a_3 x^3 + a_2 x^2 + a_1 x + a_0$	$f(x) = 6x^3 + x^2 - x + 1$
4	Quartic	$f(x) = a_4 x^4 + a_3 x^3 + a_2 x^2 + a_1 x + a_0$	$f(x) = x^4 - x + 17$

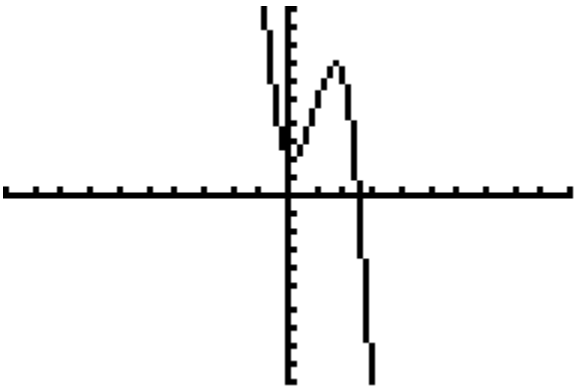
End Behavior of Polynomial Functions



Degree: Odd

Leading Coefficient: Positive

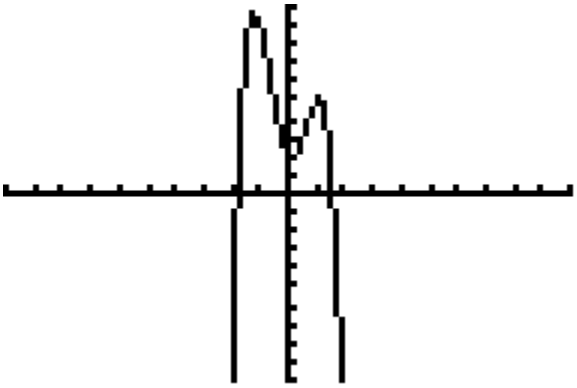
$f(x) \to -\infty \; as \; x \to -\infty$	$f(x) \to= +\infty \; as \; x \to +\infty$



Degree: Odd

Leading Coefficient: Negative

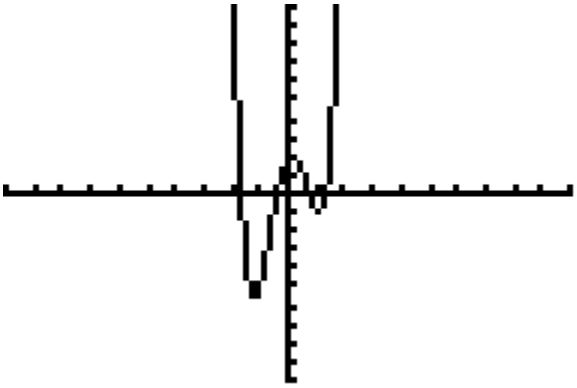
$f(x) \to +\infty \; as \; x \to -\infty$	$f(x) \to= -\infty \; as \; x \to +\infty$



Degree: Even

Leading Coefficient: Negative

$f(x) \to -\infty \; as \; x \to -\infty$	$f(x) \to= -\infty \; as \; x \to +\infty$



Degree: Even

Leading Coefficient: Positive

$f(x) \to +\infty \; as \; x \to -\infty$	$f(x) \to= +\infty \; as \; x \to +\infty$

Synthetic Substitution

$f(x) = 2x^4 - 5x^3 - 4x + 8 \qquad when \; x = 3$

3 ⌋ 2 -5 0 -4 8	Plug in x value and coefficients. Insert 0 for any that are missing.
3 ⌋ 2 -5 0 -4 8 x + 6 3 9 15 2 1 3 5 23	Add on the inside Multiply on the outside. The final sum is the value of f(x)