



**Classifying Polynomials**

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

What kind of polynomial is  $f(x)$  ?  
 What degree is  $f(x)$  ?  
 What is the leading term of  $f(x)$  ?  
 What is the leading coefficient of  $f(x)$  ?

$$g(x) = -6x - 5$$

What kind of polynomial is  $g(x)$  ?  
 What degree is  $g(x)$  ?  
 What is the leading term of  $g(x)$  ?  
 What is the leading coefficient of  $g(x)$  ?

**Roughly Graphing Polynomials**  
**(Using End Behavior and Zeros of Multiplicity 1)**

If  $n$  is even, and  $a_n > 0$ :    If  $n$  is even, and  $a_n < 0$ :    If  $n$  is odd, and  $a_n > 0$ :    If  $n$  is odd, and  $a_n < 0$ :

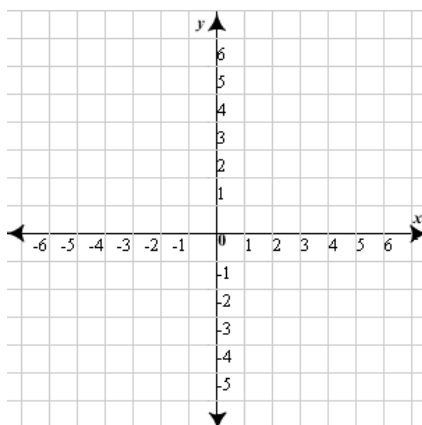
**Leading Term Test:**



$$y = x^3 + 2x^2 - 11x - 12 - 3 = (x + 4)(x + 1)(x - 3)$$

Is the degree even or odd?  
 Sign of the leading coefficient:  
 Thus the end behavior will be:

$x$	$y$

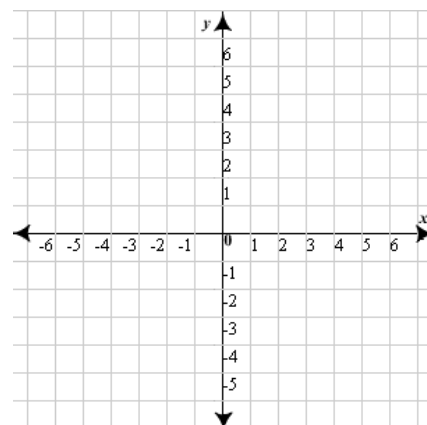


The zeros are:

$$y = x^4 - 5x^2 + 4 = (x - 2)(x + 2)(x - 1)(x + 1)$$

Is the degree even or odd?  
 Sign of the leading coefficient:  
 Thus the end behavior will be:

$x$	$y$



The zeros are:

## Roughly Graphing Polynomials (End Behavior; Zeros and Their Multiplicity)

If  $n$  is even, and  $a_n > 0$ :    If  $n$  is even, and  $a_n < 0$ :    If  $n$  is odd, and  $a_n > 0$ :    If  $n$  is odd, and  $a_n < 0$ :

**Leading  
Term Test:**



**Multiplicity of zeros:** If the multiplicity of the zero is odd, then the graph passes through the  $x$ -axis at that zero. If the multiplicity is even, the graph ‘bounces’ there at the  $x$ -axis.

Equation:  $y = x^2 - 3 = (x + 3)(x - 3)$

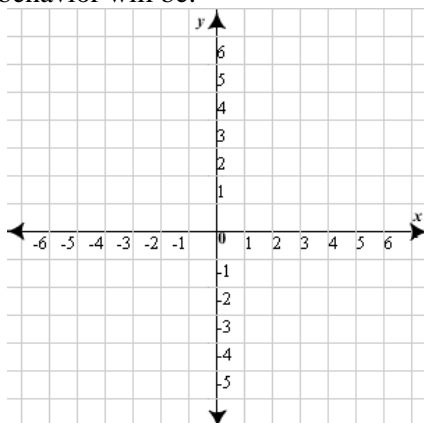
Zeros (multiplicity):

Is the degree even or odd?

Sign of the leading coefficient:

Thus the end behavior will be:

$x$	$y$



Equation:  $y = x^2 - 6x + 9 = (x - 3)^2$

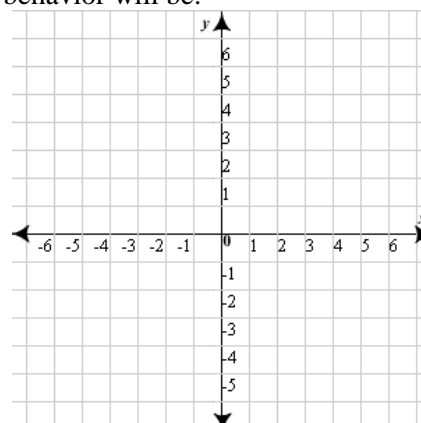
Zeros (multiplicity):

Is the degree even or odd?

Sign of the leading coefficient:

Thus the end behavior will be:

$x$	$y$



Equation:  $y = (x + 3)^2(x - 3)$

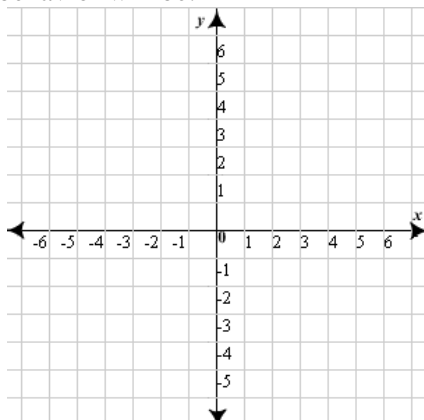
Zeros (multiplicity):

Is the degree even or odd?

Sign of the leading coefficient:

Thus the end behavior will be:

$x$	$y$



Equation:  $y = x(x + 2)(x + 1)^2(x - 2)^2$

Zeros (multiplicity):

Is the degree even or odd?

Sign of the leading coefficient:

Thus the end behavior will be:

$x$	$y$

