

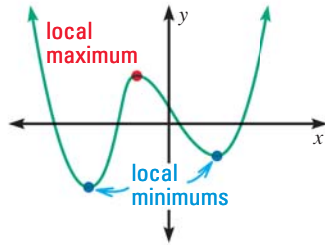
## BIG IDEAS

## For Your Notebook

## Big Idea 1

TEKS a.5

## Graphing Polynomial Functions



The end behavior of the graph of  $f(x)$  is  $f(x) \rightarrow +\infty$  as  $x \rightarrow -\infty$  and  $f(x) \rightarrow +\infty$  as  $x \rightarrow +\infty$  so  $f(x)$  is of even degree and has a positive leading coefficient.

The graph has 3 turning points, so the degree of  $f(x)$  is *at least* 4 and  $f(x)$  has *at least* 4 zeros.

## Big Idea 2

TEKS 2A.2.A

## Performing Operations with Polynomials

You can add, subtract, multiply, and divide polynomials. You can also factor polynomials using any combination of the methods below.

Factoring method	Example
General trinomial	$6x^2 - 7x - 3 = (3x + 1)(2x - 3)$
Perfect square trinomial	$x^2 + 10x + 25 = (x + 5)^2$
Difference of two squares	$x^2 - 49 = (x + 7)(x - 7)$
Common monomial factor	$15x^3 + 9x^2 = 3x^2(5x + 3)$
Sum or difference of two cubes	$8x^3 - 27 = (2x - 3)(4x^2 + 6x + 9)$
Factor by grouping	$x^3 - 5x^2 + 9x - 45 = x^2(x - 5) + 9(x - 5) = (x^2 + 9)(x - 5)$

## Big Idea 3

TEKS 2A.2.A

## Solving Polynomial Equations and Finding Zeros

The terms *zero*, *factor*, *solution*, and *x-intercept* are closely related. Consider the function  $f(x) = 2x^3 - x^2 - 13x - 6$ .

-2 is a <b>zero</b> of $f$ .	$f(-2) = 2(-2)^3 - (-2)^2 - 13(-2) - 6 = 0$
$x + 2$ is a <b>factor</b> of $f(x)$ .	$2x^3 - x^2 - 13x - 6 = (x + 2)(x - 3)(2x + 1)$
$x = -2$ is a <b>solution</b> of the equation $f(x) = 0$ .	$2(-2)^3 - (-2)^2 - 13(-2) - 6 = 0$
-2 is an <b>x-intercept</b> of the graph of $f$ .	