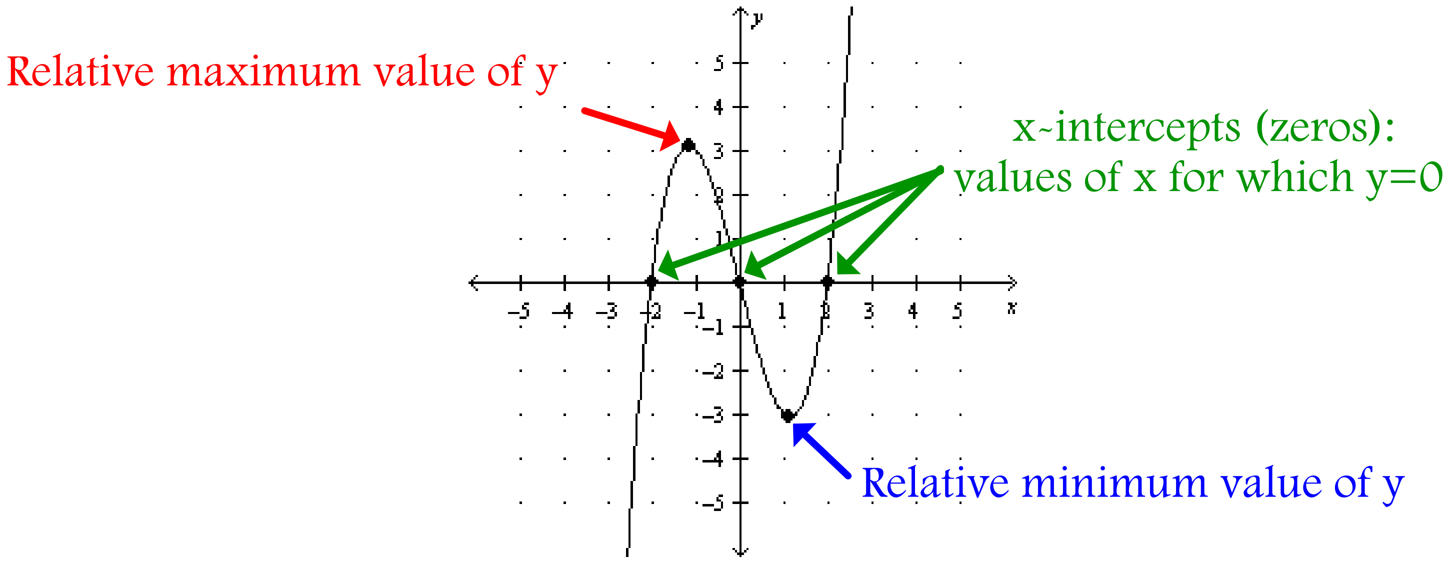
#2 ~ Sect. 6.2: Polynomials & Linear Factors

Ex. 1: Write the polynomial in factored form.

$$3x^3 - 18x^2 + 24x =$$

(Found on pg. 309)



Relative Maximum: The greatest y~value among nearby points on a graph.

Relative Minimum: The least y~value among nearby points on a graph.

x~intercepts are called zeros because the value of the function is zero at each x~intercept.

Ex. 2: Find the relative maximum, relative minimum, and zeros of the function.

$$f(x) = -x^3 + 16x^2 - 76x + 96$$

Zeros:

[2nd] [Graph]

Look for where y=0; the x-values are your zeros.

Relative Max:

[2nd] [Trace] [4:maximum]

Left bound? move curser to left of rel. max; press [Enter]

Right bound? move curser to right of rel. max; press [Enter]

Guess? press [Enter]

Relative Min:

[2nd] [Trace] [3:minimum]

Left bound? move curser to left of rel. min; press [Enter]

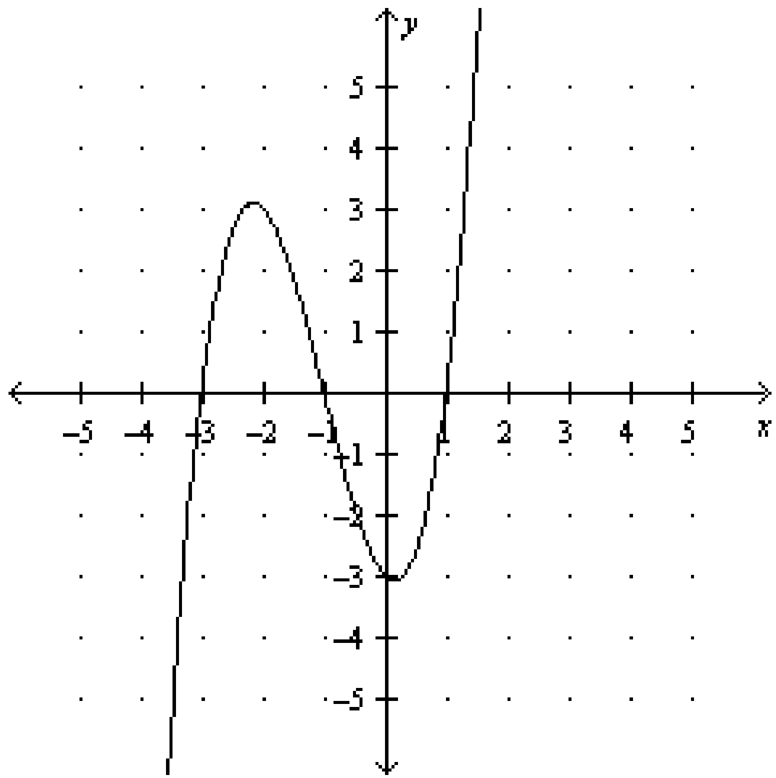
Right bound? move curser to right of rel. min; press [Enter]

Guess? press [Enter]

If a polynomial is in factored form, you can use the Zero Product Property (If ab=0 then a=0 or b=0) to find values that will make the polynomial equal zero.

<u>Ex. 3:</u> Find the zeros of the function. Then graph and label the zeros.

$$y=(x+1)(x-1)(x+3)$$



(Found on pg. 309)
You can reverse the process and write linear factors when you know the zeros.

Factor Theorem:
The expression $(x - a)$ is a linear factor of a polynomial if and only if the value of a is a zero of the related polynomial function.

Ex. 4: Write a polynomial function in standard form with zeros at 2, −3, & 0.

(Found on pg. 310)

If a linear factor of a polynomial is repeated, for example:

$$y=(x+2)(x-3)(x-3)$$

then the zero is repeated. A repeated zero is called a Multiple Zero . A multiple zero has a Multiplicity equal to the number of times the zero occurs.

Ex. 5: Find any multiple zeros of the function and state the multiplicity.

$$f(x)=x^5-6x^4+9x^3$$