Absolute Maximum and **Absolute Minimum**

The largest value of the function over the entire graph.

The smallest value of the function over the entire graph.

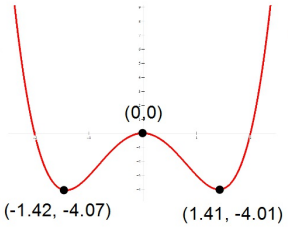
Relative Maximum and **Relative Minimum**

The largest value of a function in a given area of the graph

The smallest value of a function in a given area of the graph

Find all Absolute and Relative Extrema for this function (use a standard window):

$$y = x^4 + 0.01x^3 - 4.02x^2$$



Absolute Max: NONE

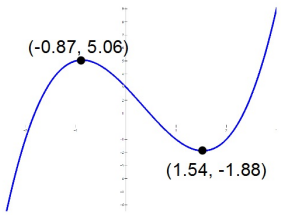
Absolute Min: -4.07

Relative Max: 0

Relative Min: -4.01

Find all Absolute and Relative Extrema for this function (use a standard window):

$$y = x^3 - x^2 - 4x + 3$$



Absolute Max: NONE

Absolute Min: NONE

Relative Max: 5.06

Relative Min: -1.88

How do you find the Extrema if you don't have a Graphing Calculator?

Borrow a graphing calculator

or

Check my blog for some links to help you find Extrema. Or search the internet for other resources.

Finding zeros of a function:

One way to find zeros of a function is to
FACTOR the function and find the zeros of each factor.

How many zeros does a polynomial have?

A polynomial of degree n has exactly n zeros.

Factor to find the zeros of each polynomial, both real and imaginary.

1. $y = 3x^3 - 6x^2 - 24x$

$Y = 3x(x^2 - 2x - 8)$

$Y = 3x(x-4)(x+2)$

-8, -4, $+2$, -2

$X = 0, -2, 4$

Factor to find the zeros of each polynomial, both real and imaginary.

2. $y = 98x^4 - 72x^2$

$2x^2(49x^2 - 36)$

$2x^2(7x+6)(7x-6)$

$X = 0, \frac{-6}{7}, \frac{6}{7}$

This is really
a double zero (0 & 0)
but we only need to write 0 one time.

Factor to find the zeros of each polynomial, both real and imaginary.

3. $y = 3x^7 + 6x^5 - 9x^3$

$= 3x^3(x^4 + 2x^2 - 3)$

$= 3x^3(x^2 + 3)(x^2 - 1)$

$= 3x^3(x^2+3)(x+1)(x-1)$

$x = 0, \ x = \pm i\sqrt{3}, \ x = -1, \ x = 1$

x = 0 is a triple zero which means it really represent three zeros, 0, 0, and 0 but we just write 0 one time.

Factor to find the zeros of each polynomial, both real and imaginary.

4. $y = 6x^5 - 486x$

$= 6x(x^4 - 81)$

$= 6x(x^2+9)(x^2-9)$

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

Now find the zeros of each factor

$x = 0$

$x^2 + 9 = 0$, $-9 \ -9$, $\sqrt{x^2} = \sqrt{-9}$, $x = \pm 3i$

$x = \pm 3$

Factor to find the zeros of each polynomial, both real and imaginary.

5. $y = x^3 + 3x^2 - 4x - 12$

How would you factor a polynomial with four terms?

If there are four terms you can try factoring by placing them in the box as you would when you factor a trinomial.

	x	$+3$
x^2	x^3	$+3x^2$
-4	$-4x$	-12

$(x+3)(x^2-4)$

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

$x = -3, 2, -2$