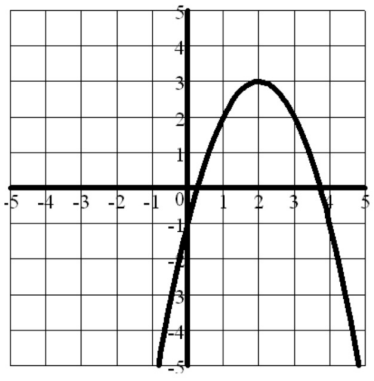


What is the maximum value of this function?

3

When does this maximum occur?

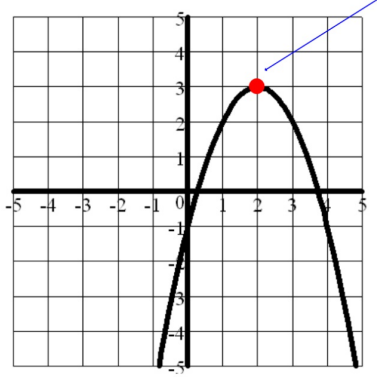
when x = 2

What is the minimum value this function?

this function has NO minimum

When asked for the value of a function, or what a function equals, you are being asked for the y-coordinate

The x-coordinate of a point tells us when a certain y-value occurs.

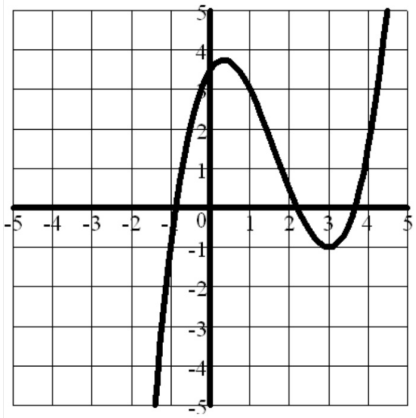


This point is called the Absolute Maximum of the function.

It is the highest point anywhere on the entire graph.

In other words, there is no other point on the graph that is higher than this point.

This function doesn't have an Absolute Minimum because there is no point on this graph that is lower than all of the other points.



What is the Absolute Maximum of this function?

It has none

(this graph doesn't have a highest point, it goes up forever)

What is the Absolute Minimum of this function?

It has none

(this graph doesn't have a lowest point, it goes up forever)

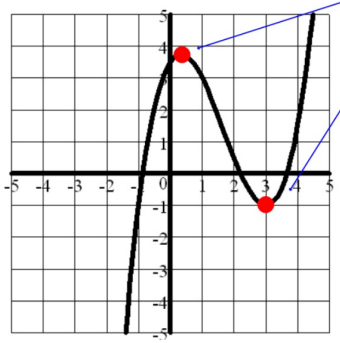
Absolute Maximums and Minimums of ALL Polynomials:

ODD Degree:

Odd degree polynomials have NO Absolute Max or Min!

Even Degree:

Even degree polynomials MUST have either an Asolute Max or an Absolute Min.

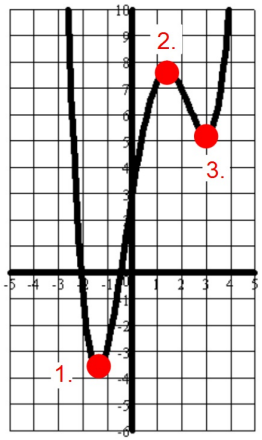


What would you call these two points?

Relative Maximum and Relative Minimum

Other books/authors use this terminology:
Local Max/Min

Together, Maximums and Minimums are called EXTREMA



What name would you give to each of these points?

1. Absolute Minimum
2. Relative Maximum
3. Relative Minimum

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

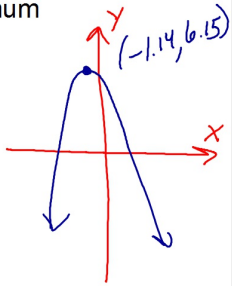
The smallest value of a function in a given area of the graph

Finding a max or a min with the graphing calculator.

Graph this function in a Standard Window: $y = -x^4 - 6x + 1$

Find the coordinates of the Absolute Max.

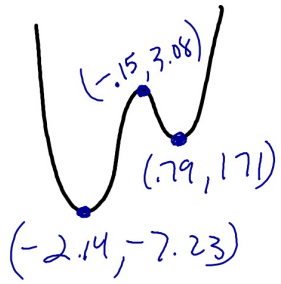
1. Press 2nd TRACE
2. Choose option 4: maximum
3. Left bound: Move the cursor to the left of the Maximum then press ENTER
5. Right bound: Move the cursor to the right of the Maximum then press ENTER.
6. Guess means to move the cursor closer to the point you are trying to find then press ENTER



(-1.14, 6.15)

Find the coordinates of all Absolute and Relative Extrema, if any, for the function below:

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



Absolute Max: NONE

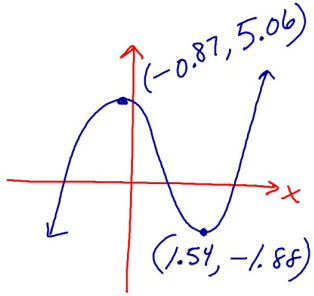
Absolute Min: (-2.14, -7.23)

Relative Max: (-.15, 3.08)

Relative Min: (.79, 1.71)

Find the coordinates of all Absolute and Relative Extrema, if any, for the function below:

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



Absolute Max: NONE

Absolute Min: NONE

Relative Max: (-.87, 5.06)

Relative Min: (1.54, -1.88)

How do you find the Extrema without a Graphing Calculator?

Check my blog!