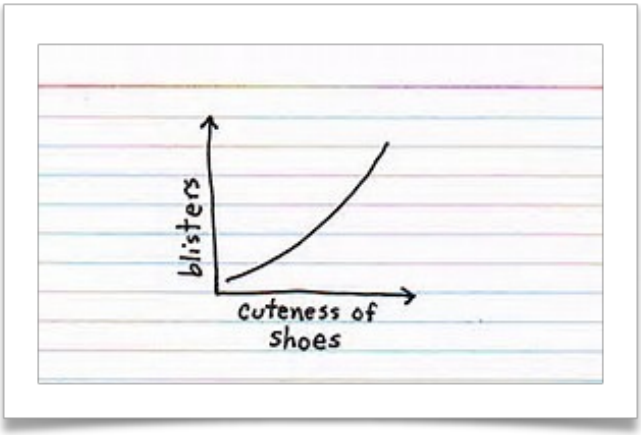


Functions: Episode II

By the end of this lesson, I will be able to answer the following questions…

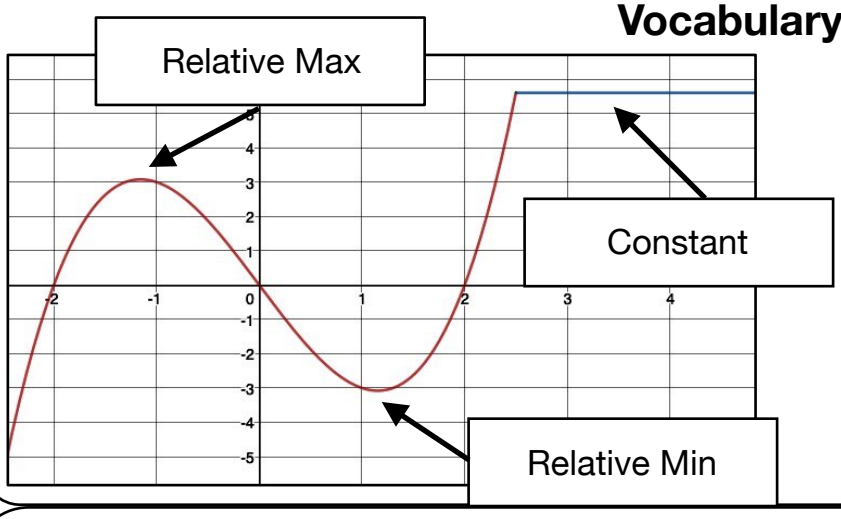
1. Can I identify when a function is **increasing, decreasing** or **constant** and use interval notion to state it?

2. How do I use a graphing calculator to find **minimums** and **maximums** of graphs?

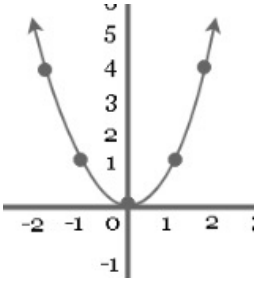
3. How can I determine if a function is **even or odd**?

4. What is the **Rate of Change** a function and how do I calculate it?

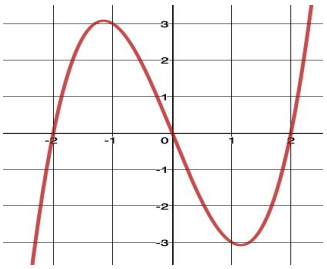
Vocabulary



Even Function: A function that is symmetric to the y-axis.



Odd Function: A function that is symmetric to origin.



Prerequisite Skills with Practice

Finding Mins/Maxes and Intercepts using your calculator

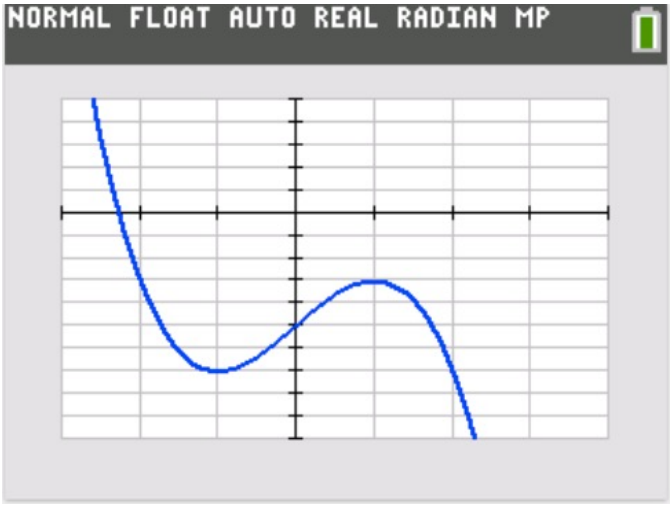
$$f(x) = -x^3 + 3x - 5$$

Min: _____

Max: _____

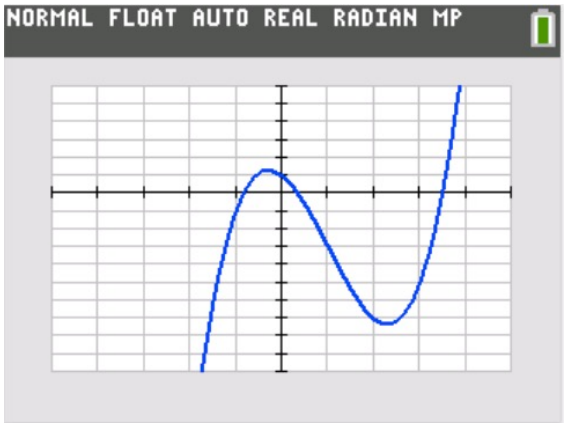
X-Intercept: _____

Y-Intercept: _____



Increasing/Decreasing Intervals and Relative vs. Absolute Extrema

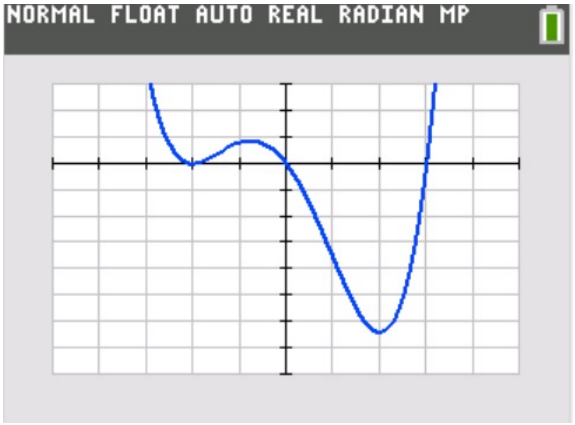
$f(x) = x^3 - 3x^2 - 2x + 1$



Increasing Interval(s): _____

Decreasing Interval(s): _____

$f(x) = x^4 + x^3 - 8x^2 - 12x$



Increasing Interval(s): _____

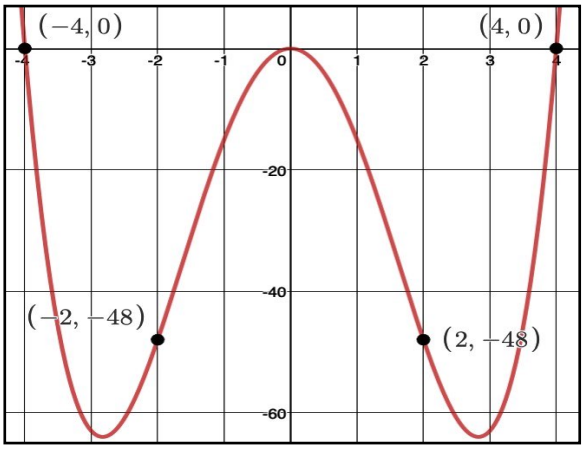
Decreasing Interval(s): _____

Even and Odd Functions

Using Algebraic Tests for Determining if a Function is Even or Odd (or Neither!)

If a function is EVEN, then the following holds true.

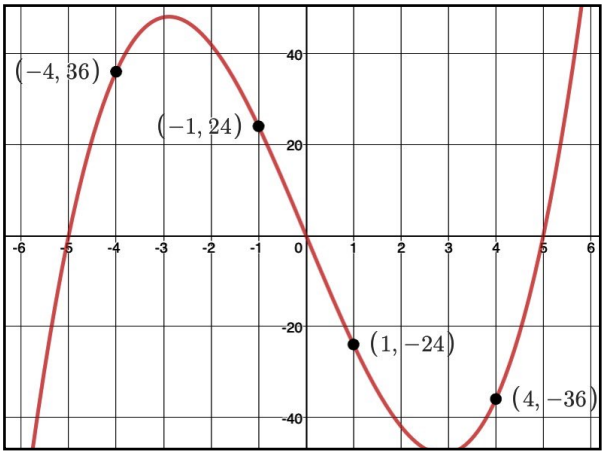
$$f(-x) = f(x)$$



$f(x) = x^4 - 16x^2$

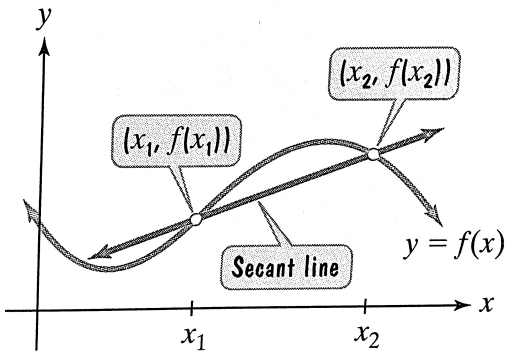
If a function is ODD, then the following holds true.

$$f(-x) = -f(x)$$



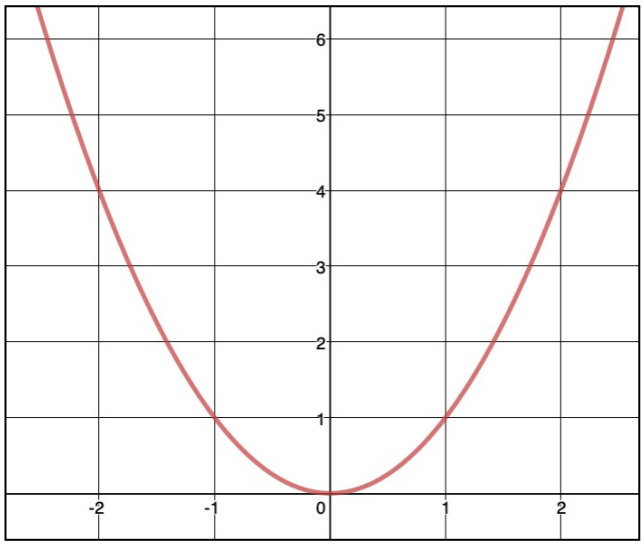
$f(x) = x^3 - 25x$

Average Rate of Change (Slopes of Secant Lines of Functions)



slope of secant line: $\frac{\Delta y}{\Delta x} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$ where $x_2 > x_1$

What does the Average Rate of Change predict about a function without actually seeing its graph?



Given the function $f(x) = x^2$ find the Average Rate of Change over the intervals below.

$[0,1]$ $[1,2]$ $[-2,-1]$

Average Velocity (Slopes of Secant Lines of Functions that are Based on Position with Respect to Time)

$s(t) \rightarrow$ Position with respect to time.

$v(t) \rightarrow$ Velocity with respect to time.

$a(t) \rightarrow$ Acceleration with respect to time.

Average Velocity Over Time: $\frac{\Delta s}{\Delta t} = \frac{s(t_2) - s(t_1)}{t_2 - t_1}$

Given a position function of a ball rolling down a ram where S(t) is distance in feet and "t" is time in seconds, find the Average Velocity over the following time intervals below.

Position $s(t) = 5t^2$

$[1,2]$ $[1,1.5]$ $[1,1.01]$