

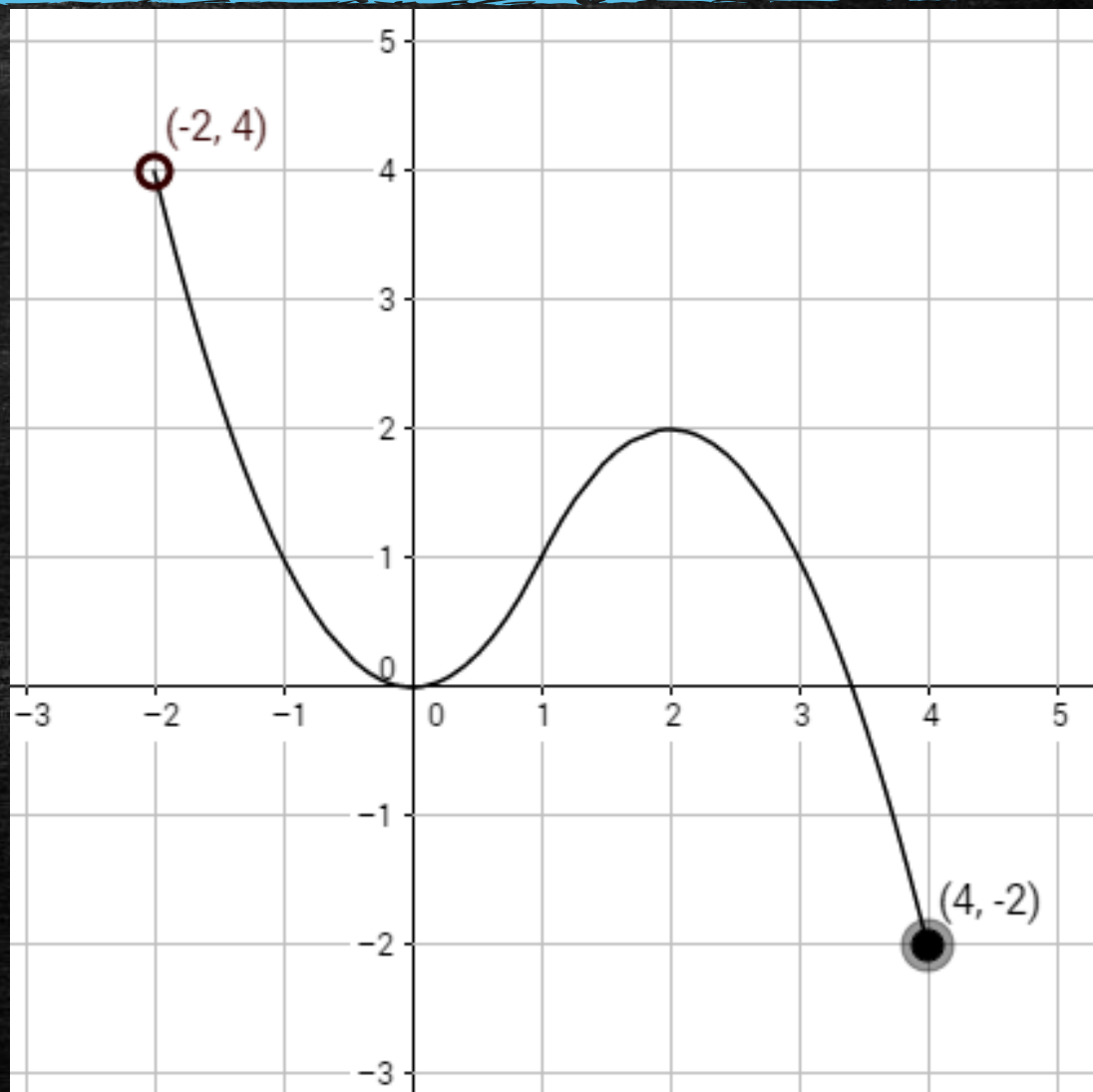
Analyzing Graphs of Functions

Lesson 1.5

Objectives

- Use the Vertical Line Test for functions
- Find the zeros of functions
- Determine intervals on which functions are increasing or decreasing and determine relative maximum and relative minimum values of functions
- Determine the average rate of change of a function
- Identify even and odd functions

Find the Domain and Range for the Function



Definition of a Function

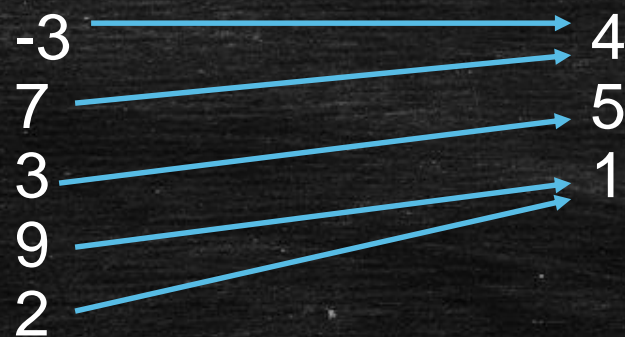
Are the Following Functions?

a.

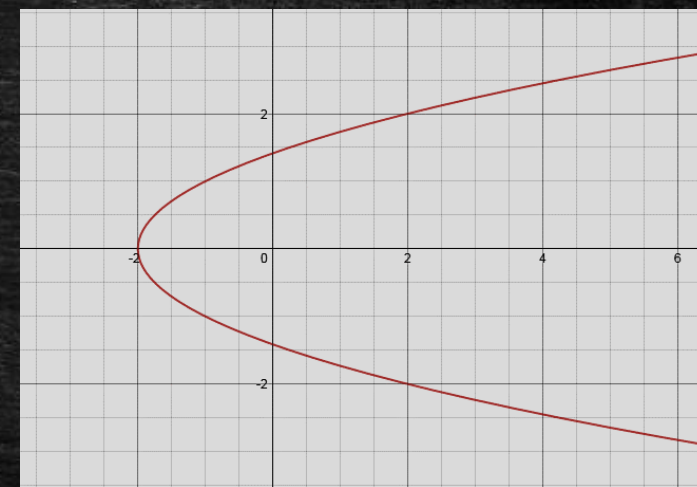
Input, x	Output, y
2	17
3	14
3	11
4	11

b.

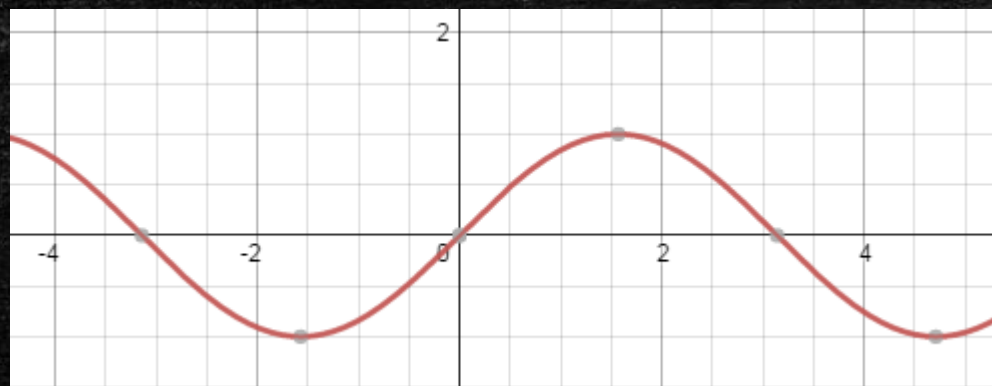
Domain, x Range, y



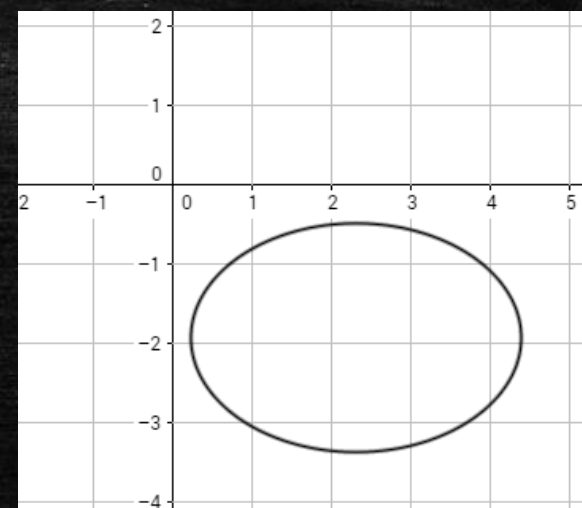
c.



d.

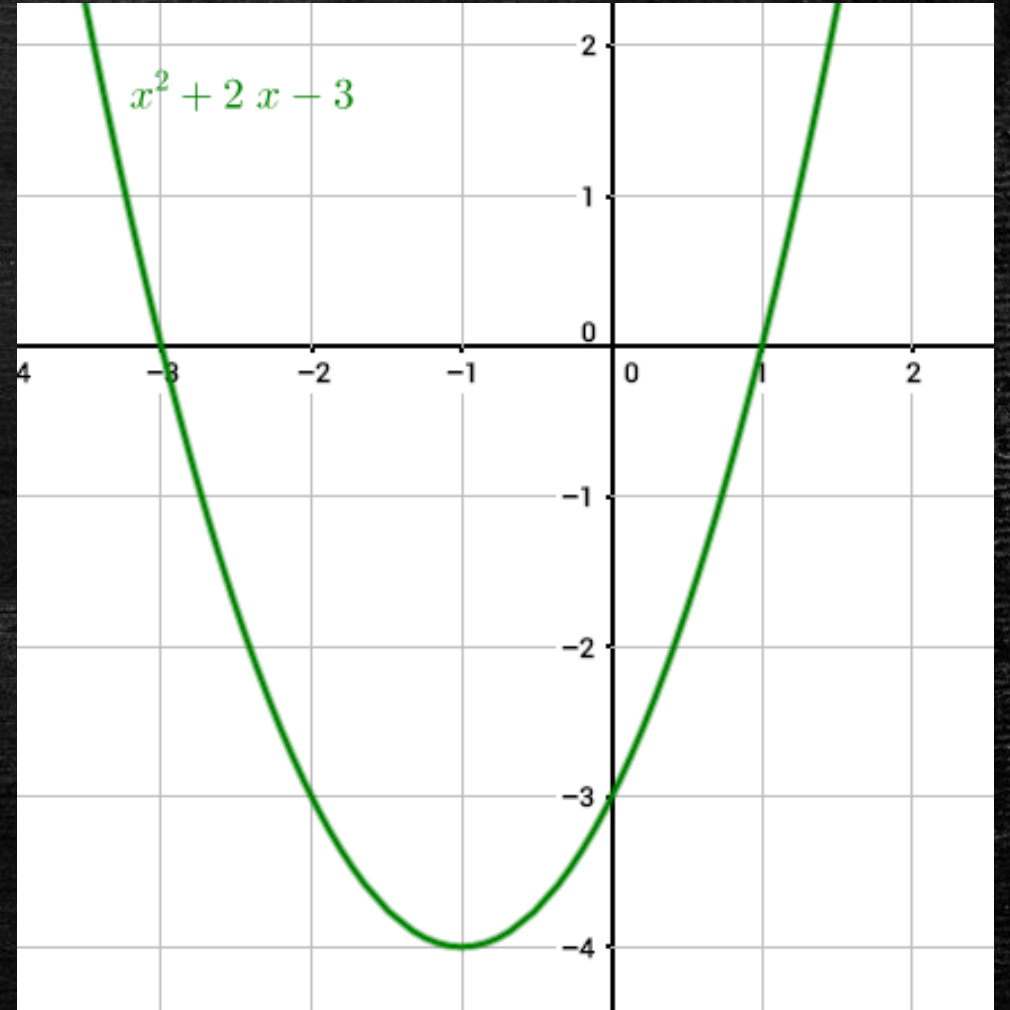


e.



Find the Zeros of the Function

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



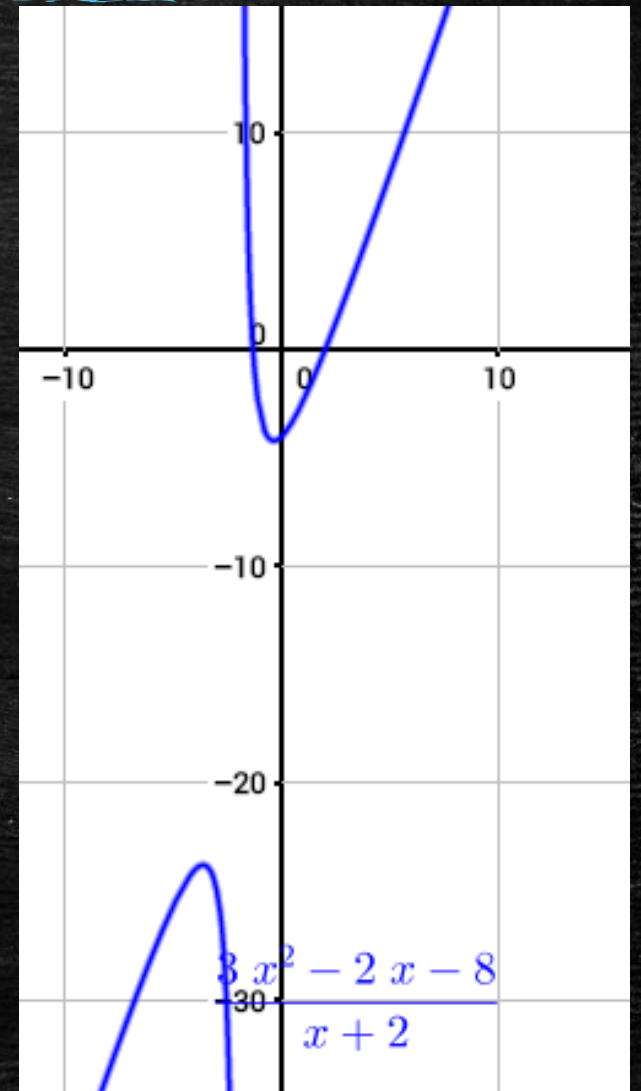
Find the Zeros of the Function

$$g(x) = \sqrt[3]{x} - 2.2$$

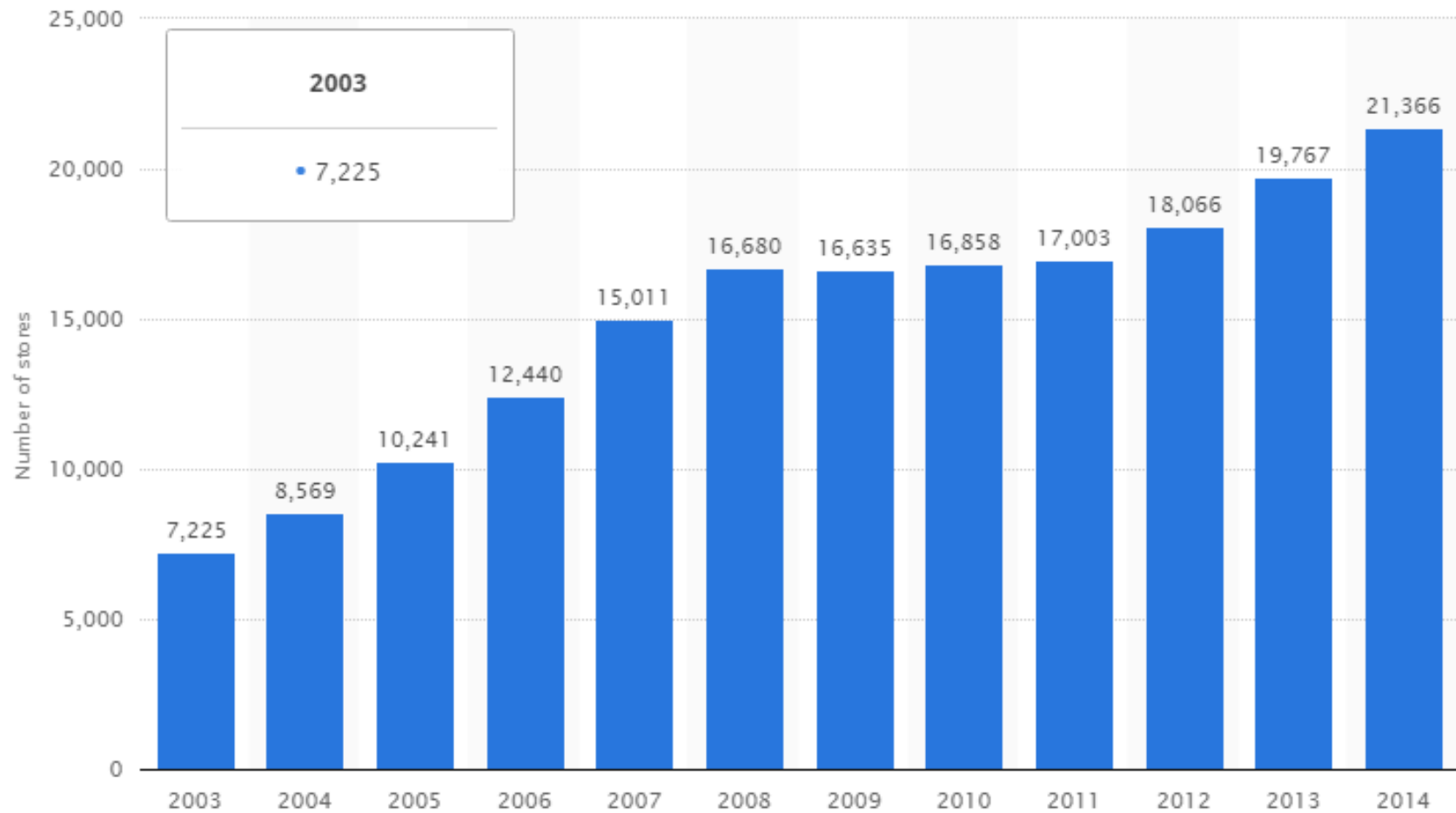


Find the Zeros of the Function

$$h(x) = \frac{3x^2 - 2x - 8}{x + 2}$$

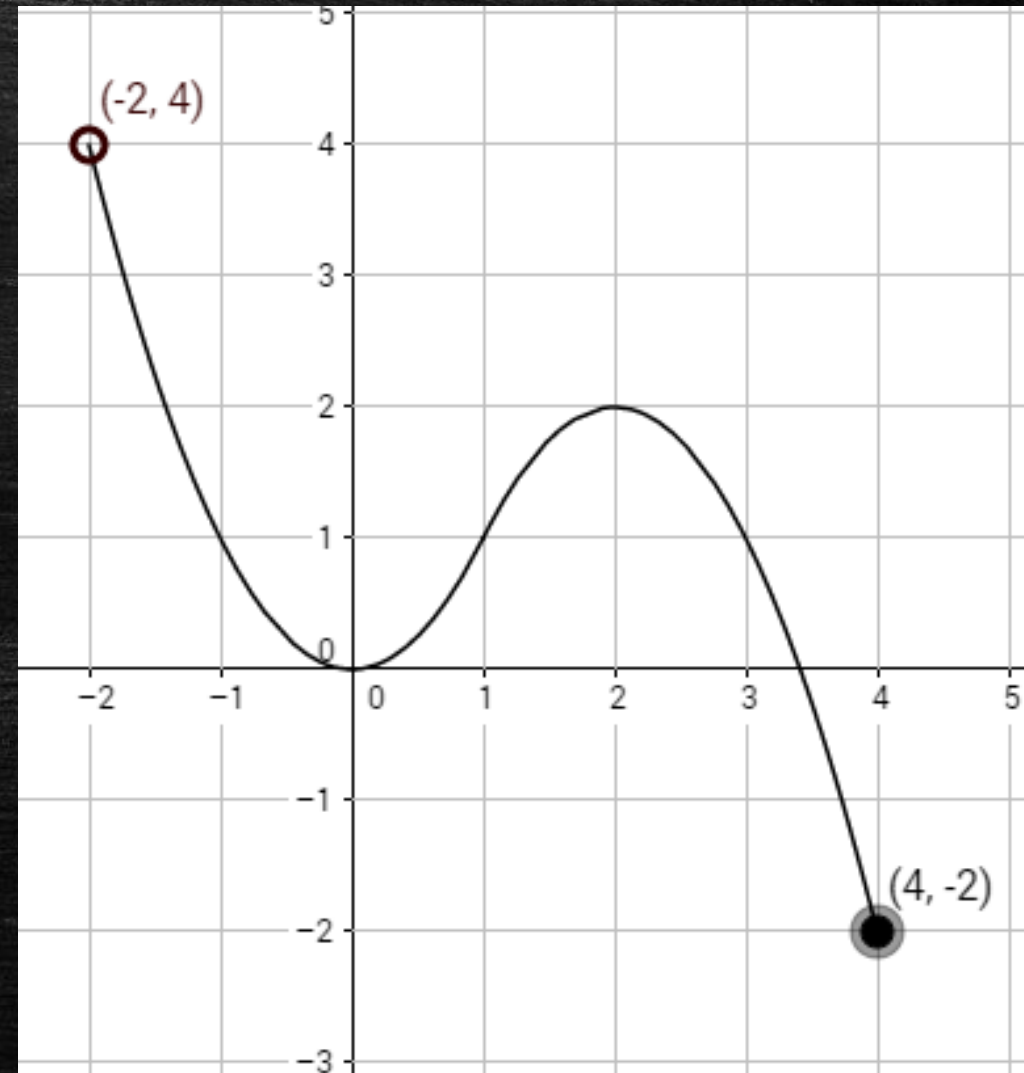


Who Likes Coffee? World-Wide Starbucks Stores



Describing Graphs

- Determine the intervals where the graph is increasing and decreasing. Also specify the relative minimum and maximum values.

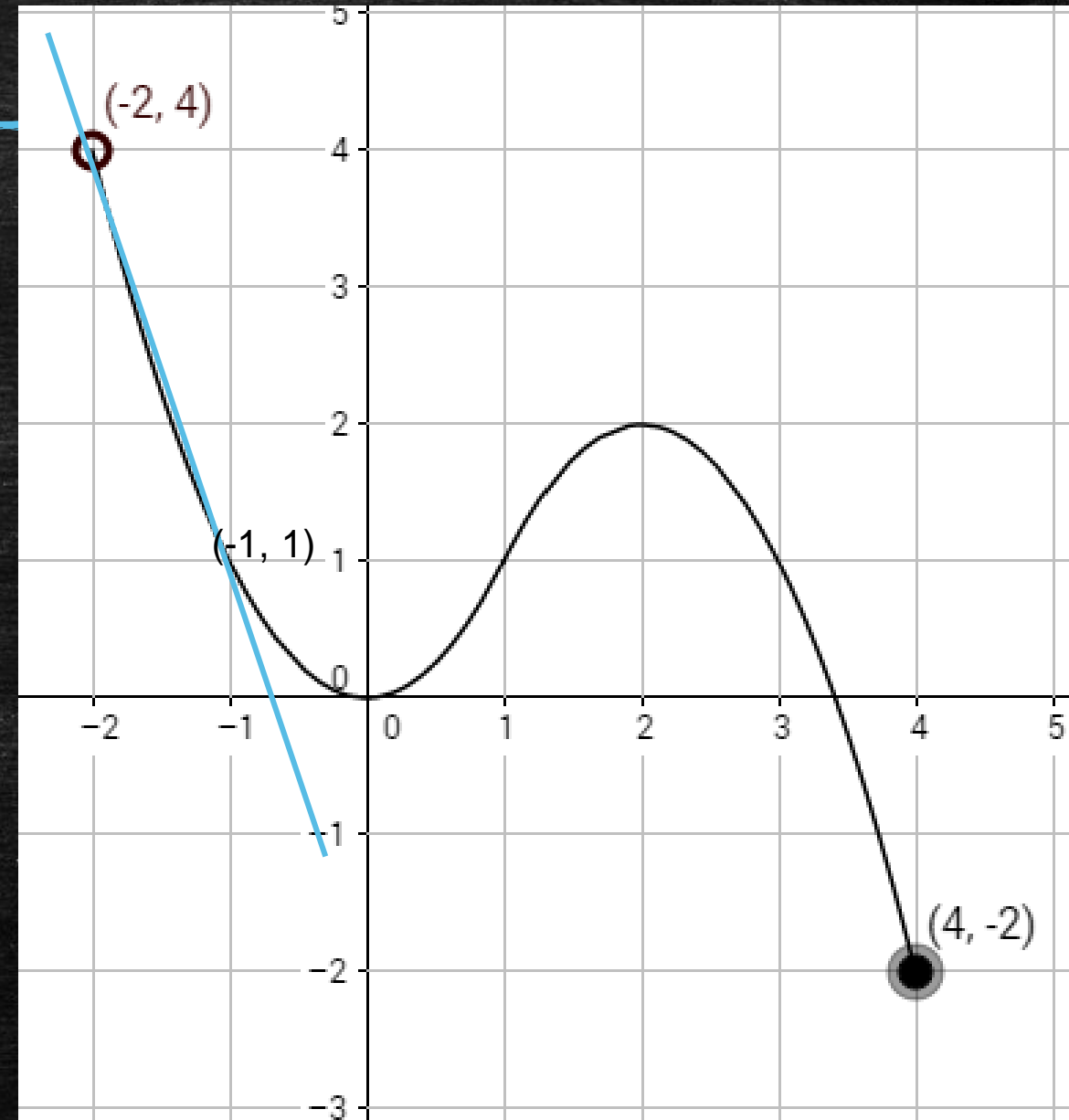


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- Use a graphing utility to estimate the relative minimum and maximum of $f(x) = -3x^2 - 2x + 1$

Average Rate of Change

- The slope of a line is often referred to as the rate of change of the line. The slope of a line is constant.
- With curves, you can pick two points on the curve and calculate the **average rate of change** by finding the slope between the two points.

- Find the average rate of change between $(-2, 4)$ and $(-1, 1)$.



Even and Odd Functions

- **Even** functions are symmetric with respect to the **y-axis** and **odd** functions are symmetric with respect to the **origin**.
- A function $y = f(x)$ is **even** when, for each x in the domain of f , $f(-x) = f(x)$.
- A function $y = f(x)$ is **odd** when, for each x in the domain of f , $f(-x) = -f(x)$.

Determine if the following functions are even or odd.

a. $f(x) = x^4 - |x|$

b. $g(x) = \frac{x}{x^2+1}$

c. $h(x) = x + 6$