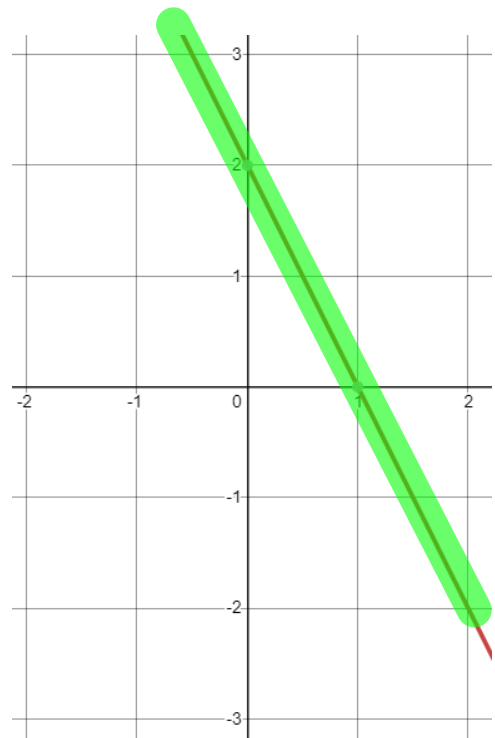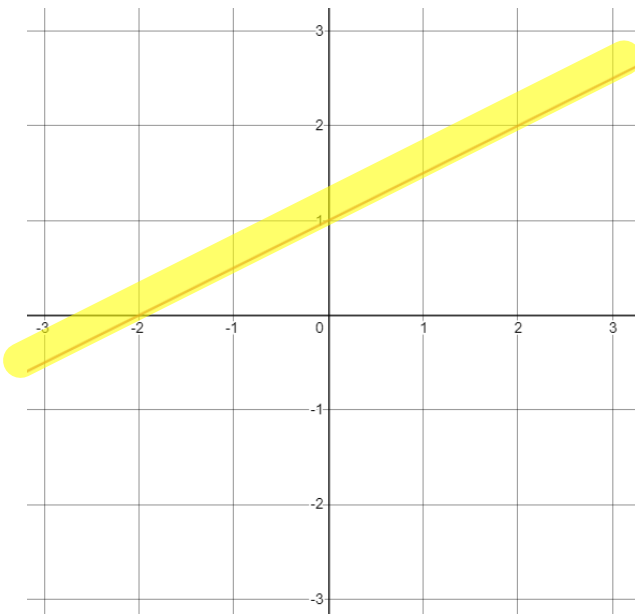# Algebra 2 - Unit 3.7

Increasing and Decreasing

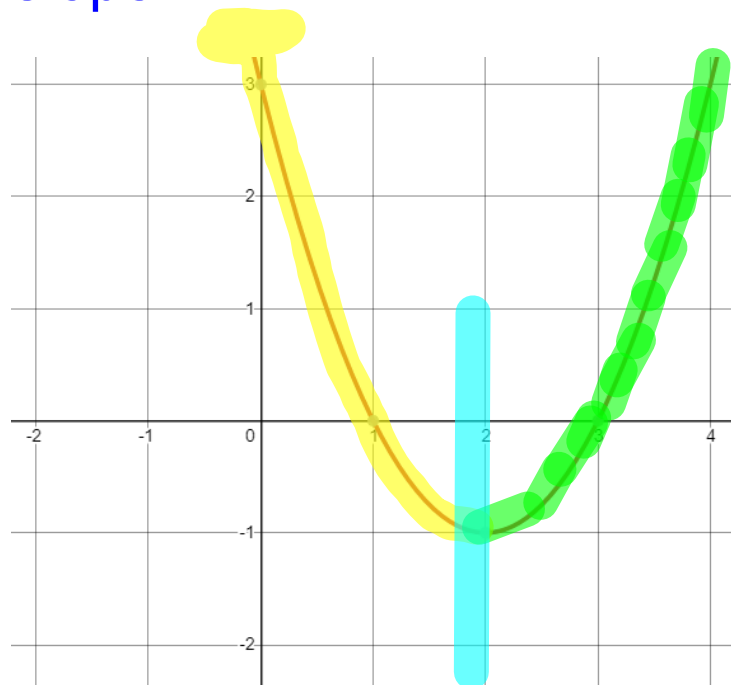Refresher over slope:

A line has <mark>positive slope</mark> if the graph is going UP as you trace the graph from **Left to Right**.

A line has <mark>negative slope</mark> if the graph is going DOWN as you trace the graph from **Left to Right**.

You can look at slope on graphs that aren't lines. Let's look at a quadratic function.

Does a quadratic function have a positive slope or negative slope?

The slope changes from negative to positive. At what x-value does the graph change?
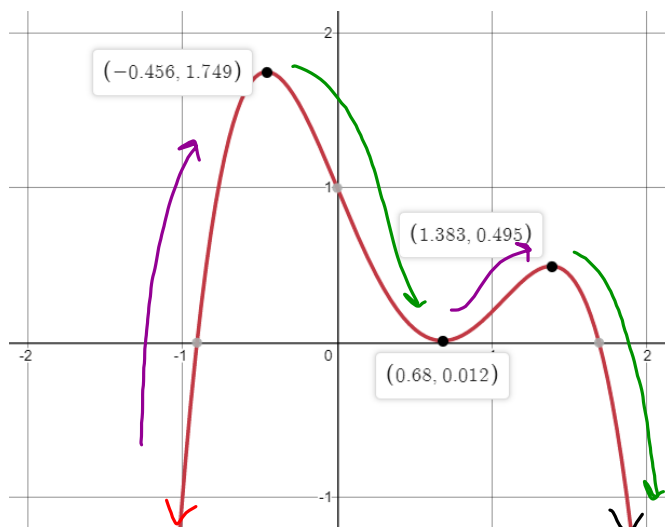
2

Definitions:

A graph is considered to be <u>increasing</u> on an interval if the slope of the graph is <u>positive</u> on that interval.

A graph is <u>decreasing</u> on an interval if the slope of the graph is <u>negative</u> on that interval.
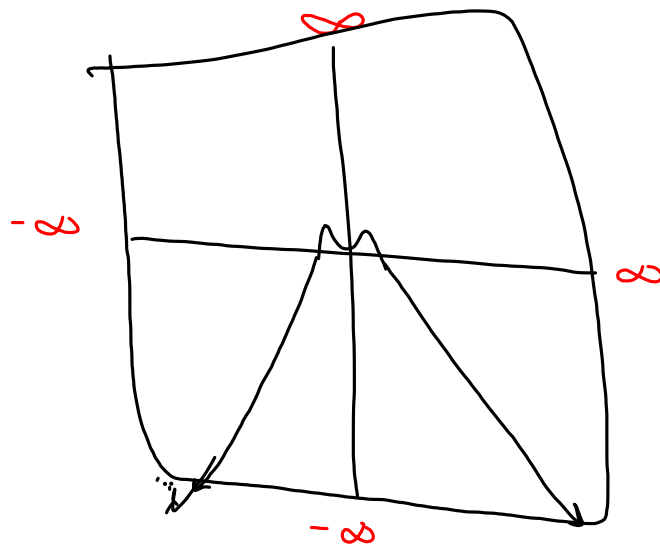
Ex: State the interval of increasing and decreasing for the function graphed below.

Increasing: $\left(-\infty, -.456\right) \cup \left(.68, 1.383\right)$

Decreasing: $\left(-.456, .68\right) \cup \left(1.383, \infty\right)$
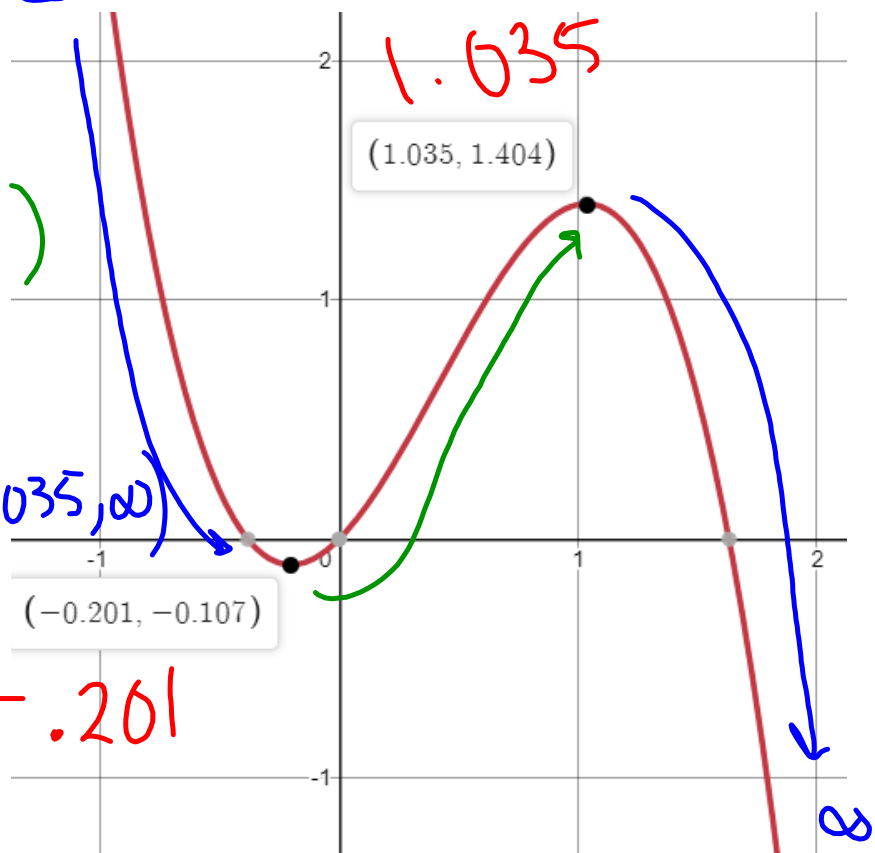
Now you try: State the intervals of increasing/ decreasing.

Increasing:

$(-.201, 1.035)$

Decreasing:

$(-\infty, -.201) \cup (1.035, \infty)$

1.035

$(1.035, 1.404)$

2

$(-0.201, -0.107)$

$-.201$

Ex: Graph the function, then state the intervals of increasing/decreasing.

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

Reflect over x-axis
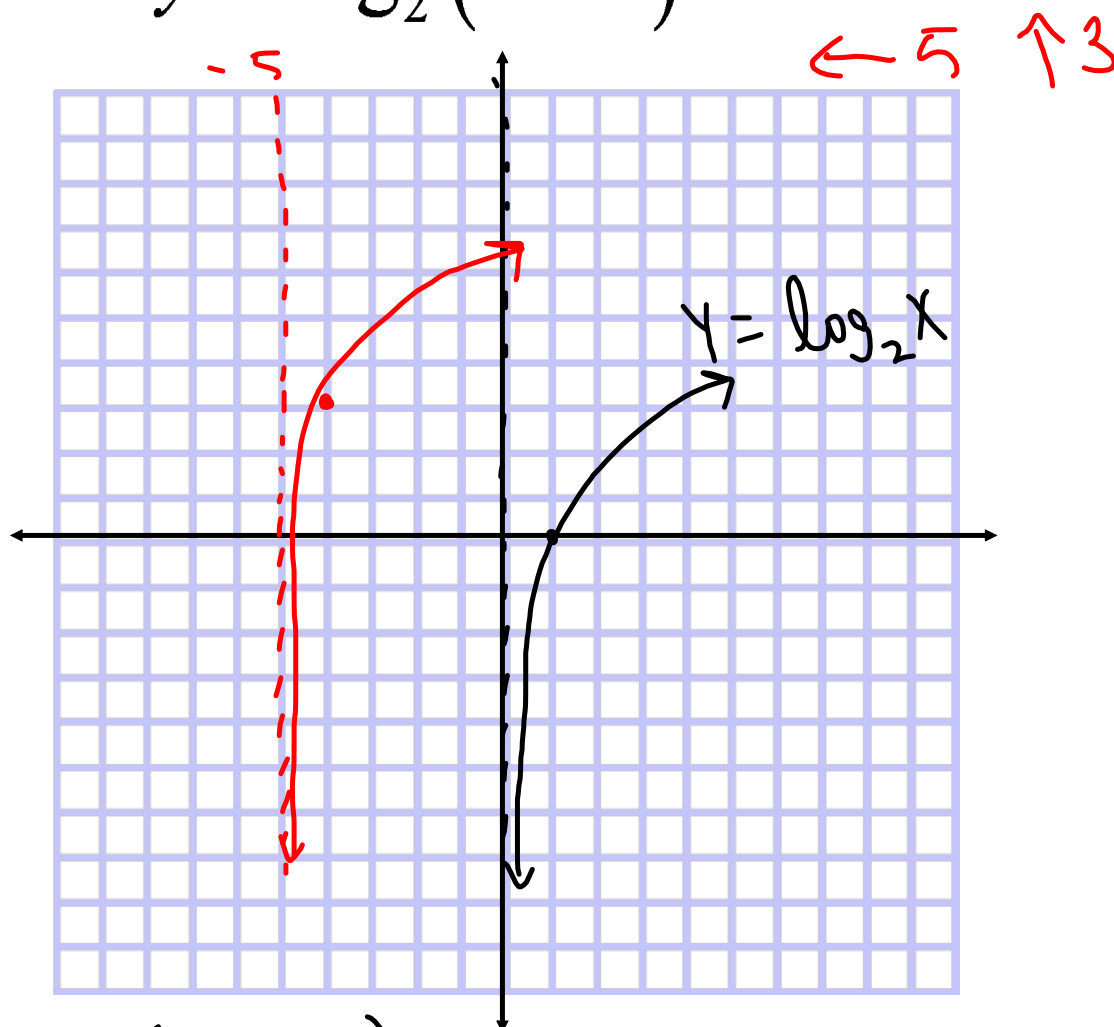V Stretch 3
→ 4 ↑ 2

Parent: $y = x^2$

(4,2)
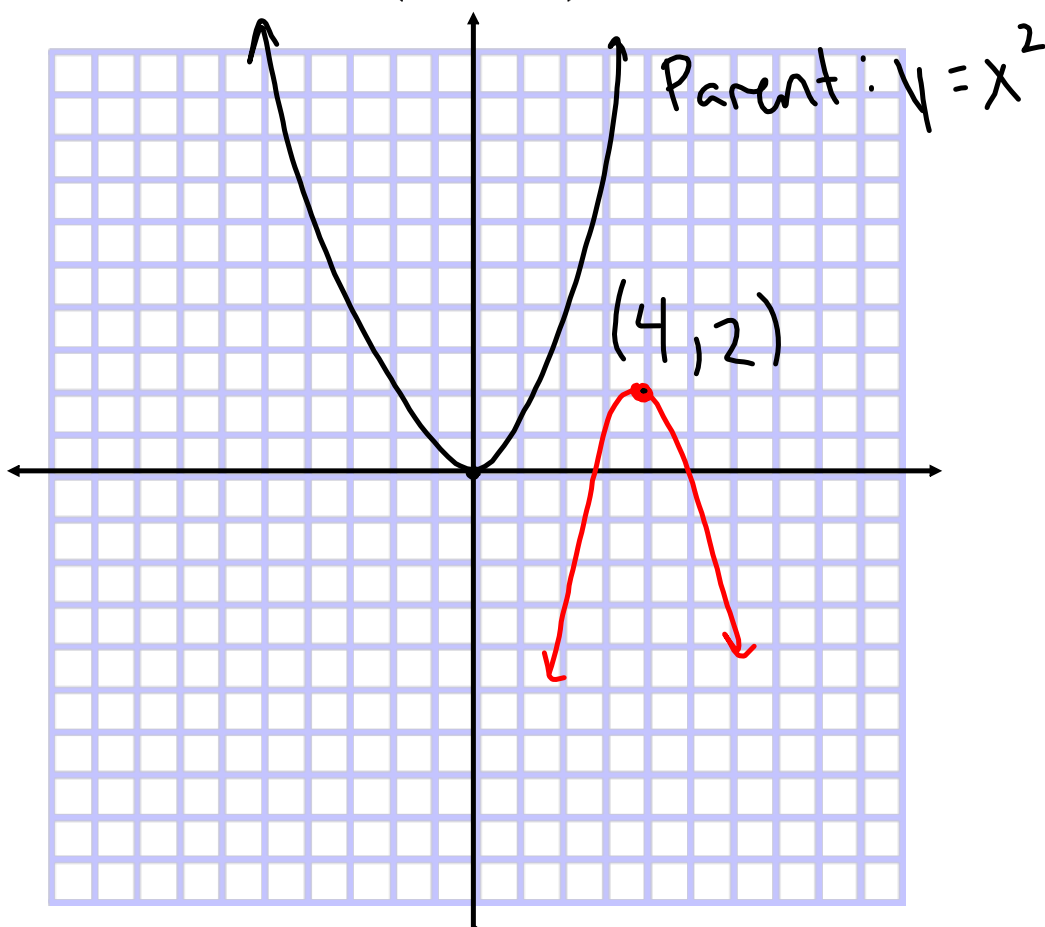
Increasing: $(-\infty, 4)$

Decreasing: $(4, \infty)$

Ex: Graph the function then state the domain/ range, and intervals of increasing/decreasing.

$$y = \log_2 (x+5) + 3$$

-5   ←5 ↑3

$$y = \log_2 x$$

Domain: $(-5, \infty)$

Range: $(-\infty, \infty)$

Increasing: $(-5, \infty)$

Decreasing: N/A

Homework: U3.7 Worksheet

This is the end of Unit 3. You will be expected to do the following:
- Graph parent functions.
- Graph transformations of functions.
- State the domain/range of functions.
- State the Intervals of increasing/decreasing of functions.