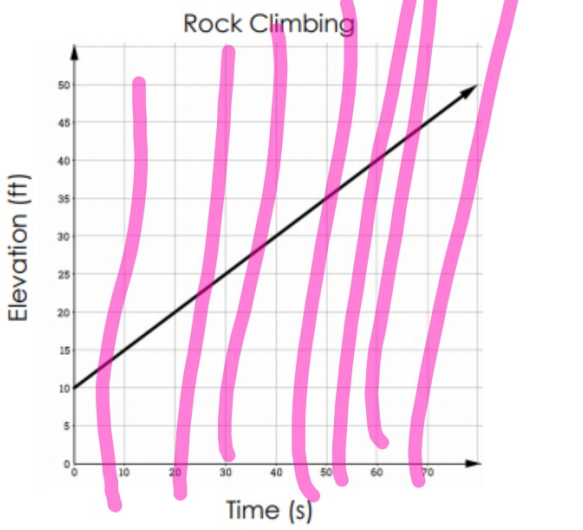
Bellwork: Algebra 1

1. Write down your work for the week in your planner.
2. You will need your Algebra Nation book and a highlighter (2 if you have them)
3. Answer the following question in the TUESDAY section of your bellwork sheet.

The graph below represents a rock climber's height as she ascends a hill.



a. The above graph is (circle one) linear/nonlinear.

b. Is the above graph a function? Explain.

Yes

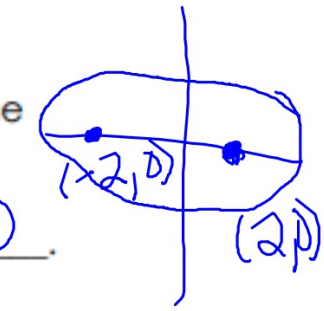
c. What is the y –intercept and what does the y –intercept represent?

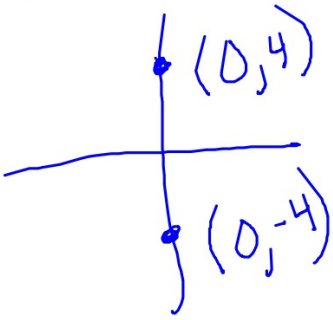
(0, 10)

d. Why would there not be an x –intercept for this situation?

It's important to understand key features of graphs.

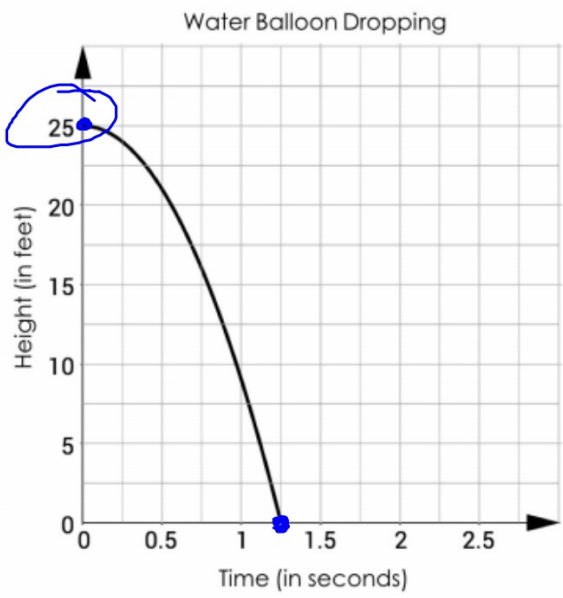
- An ***x*-intercept** of a graph is the location where the graph crosses the x axis.
- The y-coordinate of the x-intercept is always 0.
- The ***y*-intercept** of a graph is the location where the graph crosses the y axis.
- The x-coordinate of the y-intercept is always 0.
- The x-intercept is the solution to $f(x) = 0$.





All of these features are very helpful in understanding real-world context.

4. Consider the following graph that represents the height, in feet, of a water balloon dropped from a 2nd story window after a given number of seconds.



a. What is the x-intercept? (1.25, 0)

b. What is the y-intercept? (0, 25)

c. Label the intercepts on the graph.

Try It!

5. Refer to the previous problem for the following questions.

   a. What does the y-intercept represent in this real-world context?

   The height he's throwing the water balloon from.

   b. What does the x-intercept represent in this real-world context?

   The time it takes for the balloon to hit the ground

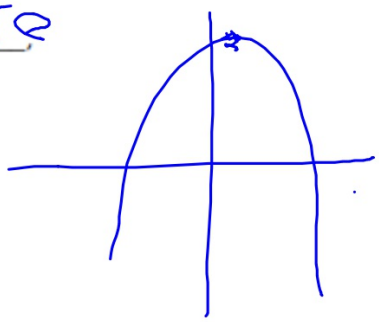
   c. What is the solution to this situation?

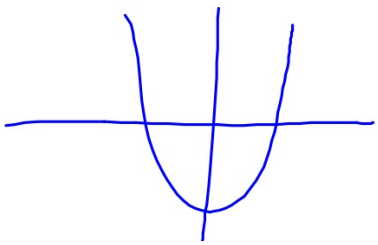
   1.25 seconds

Section 3 – Topic 8
Key Features of Graphs of Functions – Part 2

Let's discuss other key features of graphs of functions.

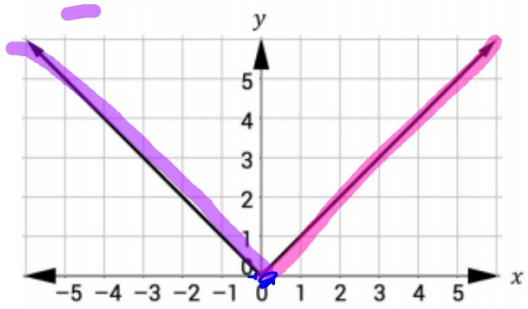
- ***Domain***: the input or the x values.
- ***Range***: the output or the y-values.
- ***Increasing intervals***: as the x-values increase, the y-values increasing.
- ***Decreasing intervals***: as the x-values increase, the y-values decrease.
- ***Relative maximum***: the point on a graph where the interval changes from increasing to decreasing.
- ***Relative minimum***: the point on a graph where the interval changes from decreasing to increasing.





Let's Practice!

1. Use the following graph of an ***absolute value function*** to answer the questions below.



a. Define the domain. $x = \mathbb{R}$ - All real #'s

b. Define the range. $y \geq 0$

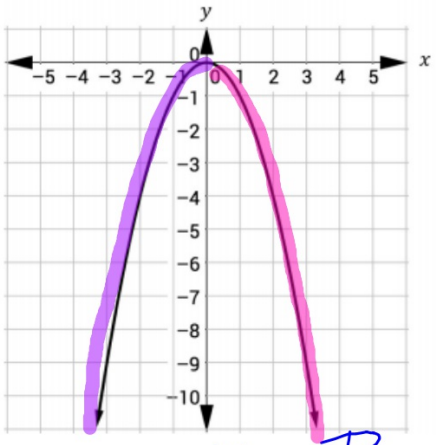
c. Where is the graph increasing? $x > 0$

d. Where is the graph decreasing? $x < 0$

e. Identify any relative maximums. No!

f. Identify any relative minimums. $(0, 0)$

2. Use the graph of the following ***quadratic function*** to answer the questions below.



x^2

a. Define the domain. $X = \mathbb{R}$

b. Define the range. $y \leq 0$

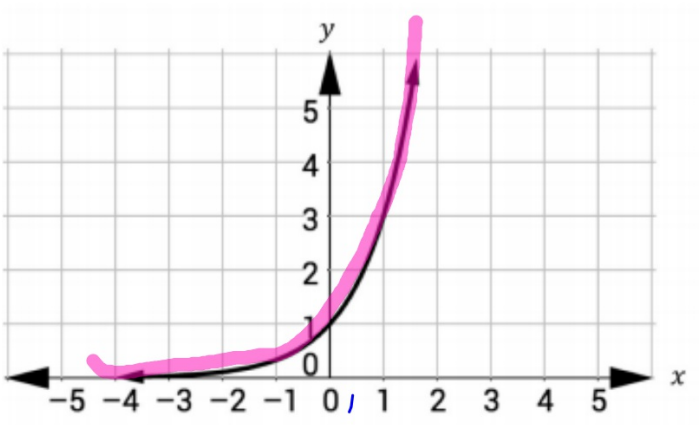
c. Where is the graph increasing? $x < 0$

d. Where is the graph decreasing? $x > 0$

e. Identify any relative maximums. $(0, 0)$

f. Identify any relative minimums. No!

3. Describe everything you know about the key features of the following graph of an ***exponential function***.



3^x

domain: $x = \mathbb{R}$

range: $y > 0$

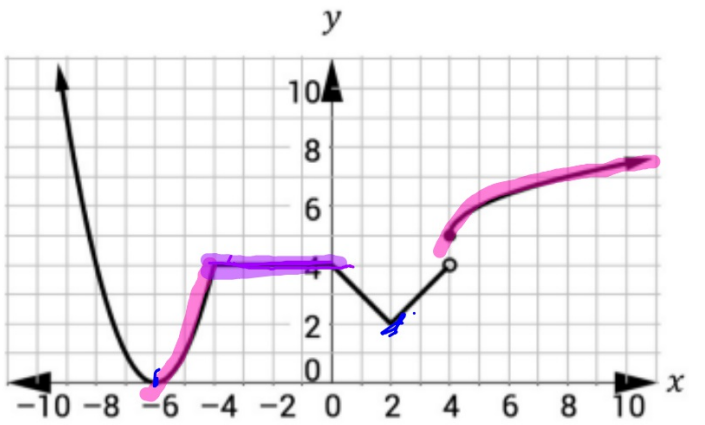
increasing: $x = \mathbb{R}$

decreasing: Never!

No max or min

BEAT THE TEST!

1. The following graph is a ***piecewise function***.



Which of the following statements are true about the graph? Select all that apply.

- ☑ The graph is increasing when the domain is $-6 < x < -4$.
- ☐ The graph has exactly one relative minimum.
- ☐ The graph is increasing when $-4 \leq x \leq 0$.
- ☑ The graph is increasing when $x > 4$.
- ☐ The graph is decreasing when the domain is $\{x | x < -6 \text{ U } x > 2\}$.
- ☐ The range is $\{y | 0 \leq y < 4 \text{ U } y = 5\}$.
- ☑ There is a relative minimum at $(2, 2)$.