

## Today's Plan:

**Learning Target (standard):** I will evaluate and graph piecewise functions. I will determine their domain and range. I will calculate the average rate of change for functions.

**Students will:** Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

**Teacher will:** Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

**Assessment:** Board work, homework check and homework assignment

**Differentiation:** Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

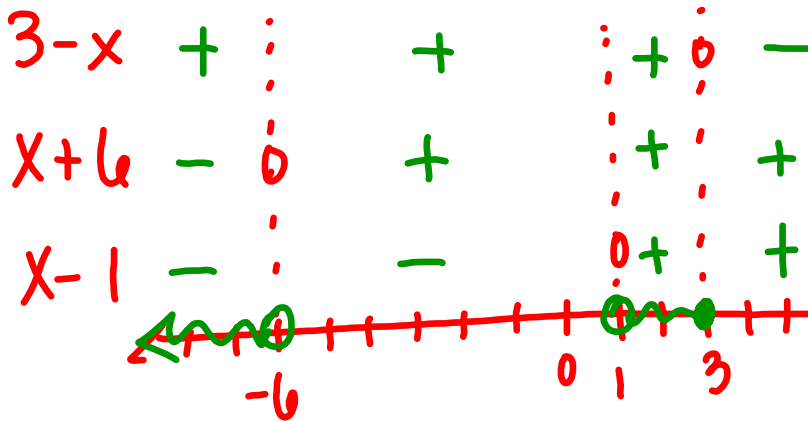
Take a few minutes to look over your graphs with one another. If you have questions, please do not hesitate to ask!



Find the domain of the function:

$$f(x) = \sqrt{\frac{3-x}{x^2+5x-6}}$$

$$\frac{3-x}{(x+6)(x-1)} \geq 0$$



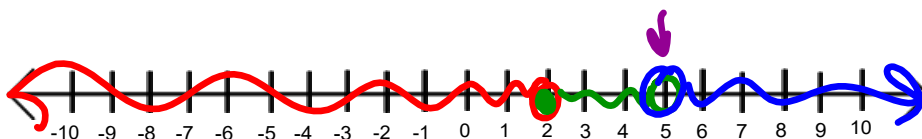
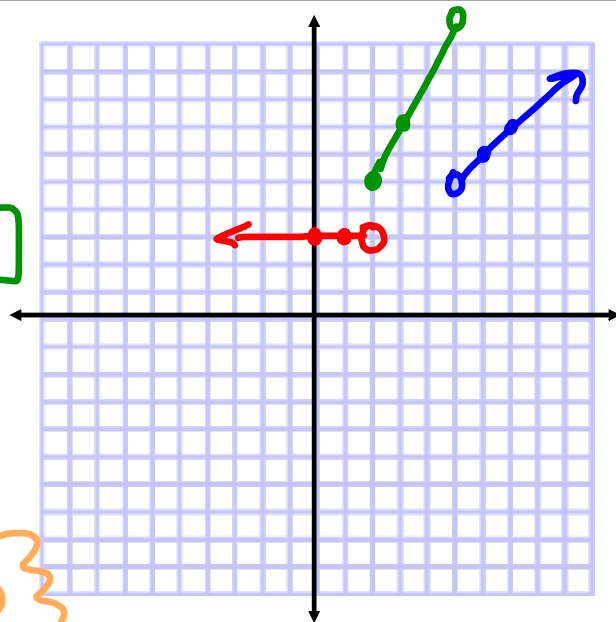
$$D: \{x \mid x < -6, 1 < x \leq 3\}$$

Graph:

$$g(x) = \begin{cases} 3, & x < 2 \\ 2x+1, & 2 \leq x < 5 \\ x, & 5 < x \end{cases}$$

$$D: \{x \mid x \neq 5\}$$

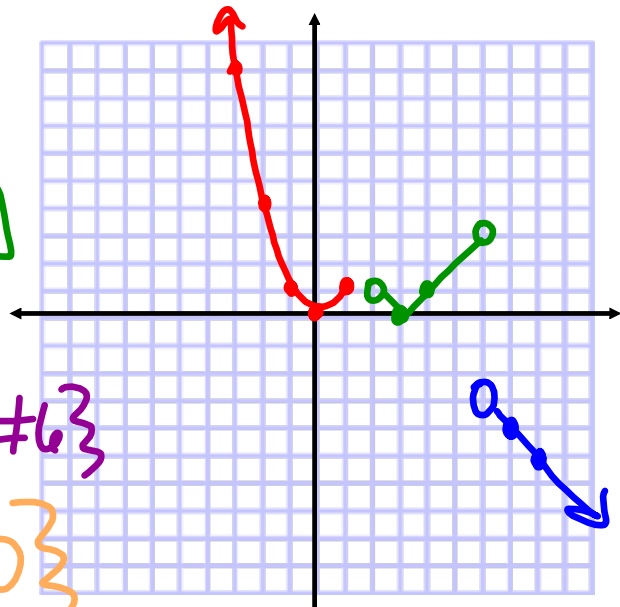
$$R: \{y \mid y = 3, y \geq 5\}$$



Graph:

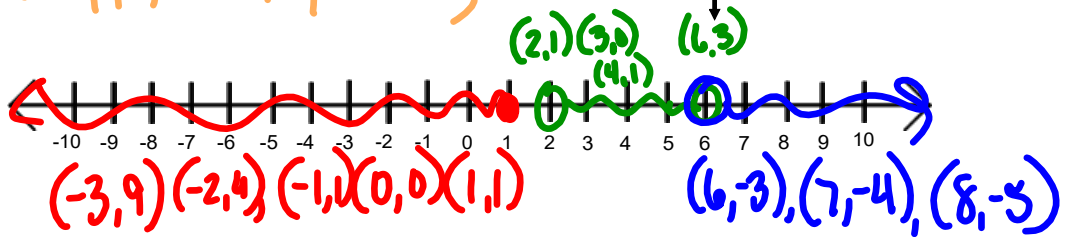
$$f(x) = \begin{cases} x^2 & x \leq 1 \\ |x-3| & 2 < x < 6 \\ 3-x & x > 6 \end{cases}$$

$x-3=0$   
 $x=3$

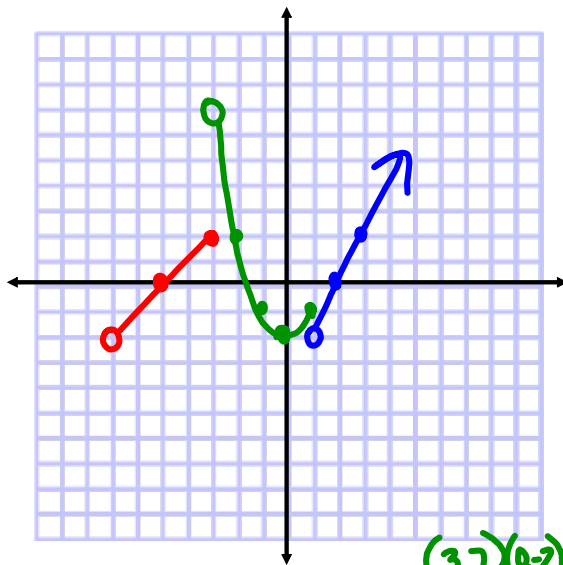


D:  $\{x \mid x \leq 1, x > 2, x \neq 6\}$

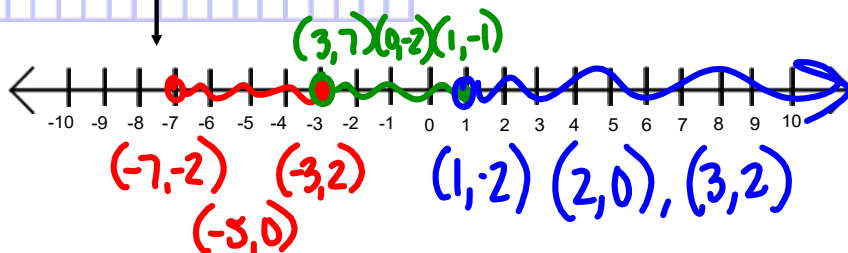
R:  $\{y \mid y < -3, y \geq 0\}$



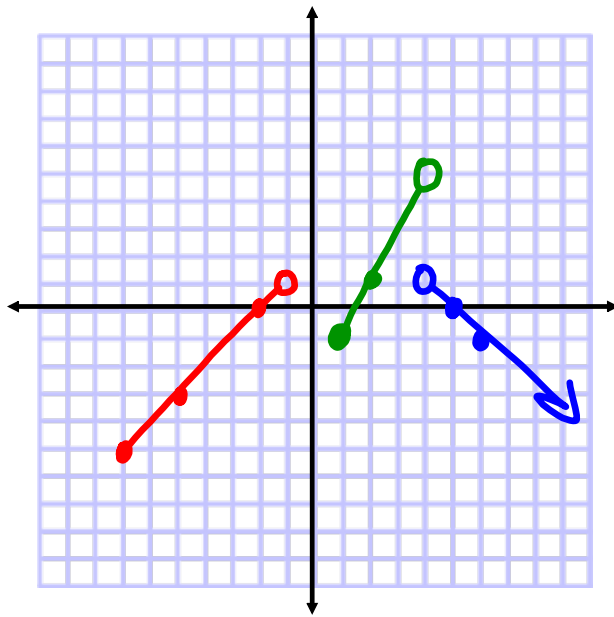
Create a *function* with 3 pieces. The domain cannot be the set of real numbers.



$$f(x) = \begin{cases} x+5 & -7 < x \leq -3 \\ x^2-2 & -3 < x \leq 1 \\ 2x-4 & x > 1 \end{cases}$$



Create a *function* with 3 pieces. The domain cannot be the set of real numbers.

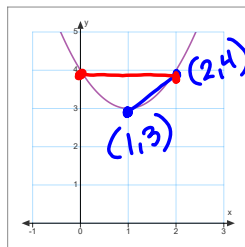


$$f(x) = \begin{cases} x+2, & -7 \leq x < -1 \\ 2x-3, & 1 \leq x < 4 \\ 5-x, & x > 4 \end{cases}$$



### Properties of Functions:

- the **average rate of change (AROC)** of a function is defined as the slope of the line segment between two values on the function



$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{AROC} = \frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

Find the AROC between  $x = 1$  and  $x = 2$ .

$$\text{AROC} = \frac{f(2) - f(1)}{2 - 1} = \frac{4 - 3}{2 - 1} = \frac{1}{1}$$

$$\text{AROC} = 1$$

Find the AROC between  $x = 0$  and  $x = 2$ .

$$\text{AROC} = \frac{f(2) - f(0)}{2 - 0} = \frac{4 - 4}{2}$$

$$\text{AROC} = 0$$

Find the AROC between 4 and 6.

$$f(x) = \frac{3x}{x-2}$$

$$\bar{x}_1 \quad \bar{x}_2$$

$$f(6) = \frac{3(6)}{6-2}$$

$$= \frac{18}{4}$$

$$f(6) = \frac{9}{2}$$

$$\text{AROC} = \frac{f(6) - f(4)}{6 - 4}$$

$$= \frac{\frac{9}{2} - 6}{2}$$

$$= \frac{-\frac{3}{2}}{2}$$

$$= -\frac{3}{2} \cdot \frac{1}{2}$$

$$\text{AROC} = -\frac{3}{4}$$

$$f(4) = \frac{3(4)}{4-2}$$

$$= \frac{12}{2}$$

$$f(4) = 6$$

## Assignment:

p.136 #28-38 even

\* Be sure to write the problem & show ALL steps