

## Today's Plan:

**Learning Target (standard):** I will evaluate and graph piecewise functions. I will determine their domain and range.

**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.

LIFE IS A MATH EQUATION.  
IN ORDER TO GAIN THE MOST,  
YOU HAVE TO KNOW HOW TO  
CONVERT THE NEGATIVES  
INTO POSITIVES.

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\* Go over your graphs at  
your tables. \*

Evaluate.  $f(x) = -2x^2 + 3x - 5$

$$\frac{f(x+h) - f(x)}{h} =$$

$$f(x) = -2x^2 + 3x - 5$$

$$f(x+h) = -2(x+h)^2 + 3(x+h) - 5$$

$$= -2(x^2 + 2xh + h^2) + 3x + 3h - 5$$

$$f(x+h) = -2x^2 - 4xh - 2h^2 + 3x + 3h - 5$$

$$\frac{f(x+h) - f(x)}{h} = \frac{-2x^2 - 4xh - 2h^2 + 3x + 3h - 5 - (-2x^2 + 3x - 5)}{h}$$

$$= \frac{-\cancel{2x^2} - 4xh - 2h^2 + \cancel{3x} + 3h - \cancel{5} + \cancel{2x^2} - \cancel{3x} + \cancel{5}}{h}$$

$$= \frac{-4xh - 2h^2 + 3h}{h}$$

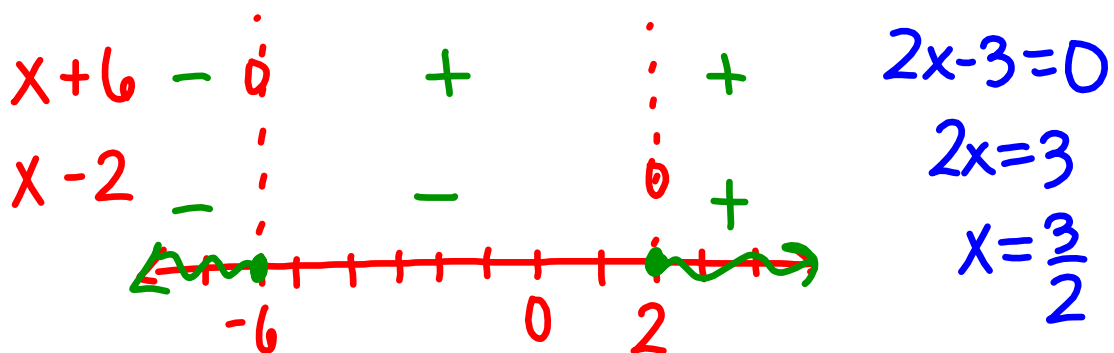
$$\frac{f(x+h) - f(x)}{h} = -4x - 2h + 3$$

Find the domain.

$$f(x) = \frac{\sqrt{x^2 + 4x - 12}}{2x - 3}$$

$$x^2 + 4x - 12 \geq 0$$

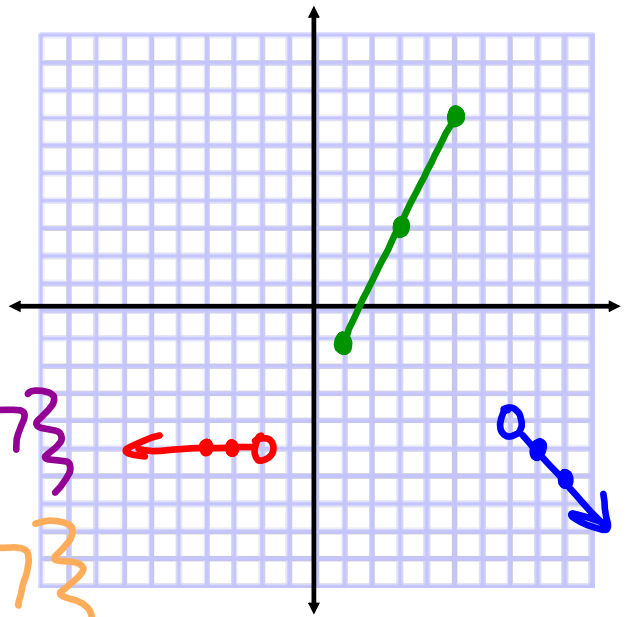
$$(x+6)(x-2) \geq 0$$



$$D: \left\{ x \mid x \leq -6, x \geq 2 \right\}$$

Graph:

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



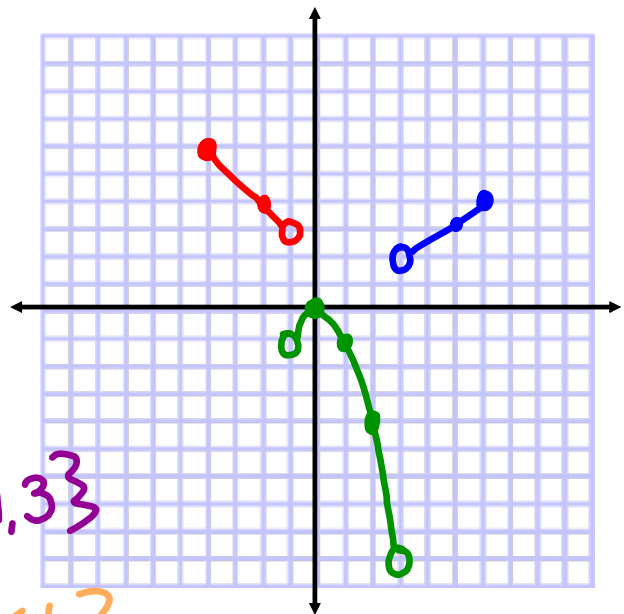
D:  $\{x \mid x < -2, 1 \leq x \leq 5, x > 7\}$

R:  $\{y \mid y < -4, 1 \leq y \leq 7\}$



Graph:

$$f(x) = \begin{cases} 2 - x, & -4 \leq x < -1 \\ -x^2, & -1 < x < 3 \\ \frac{2}{3}x, & 3 < x \leq 6 \end{cases}$$



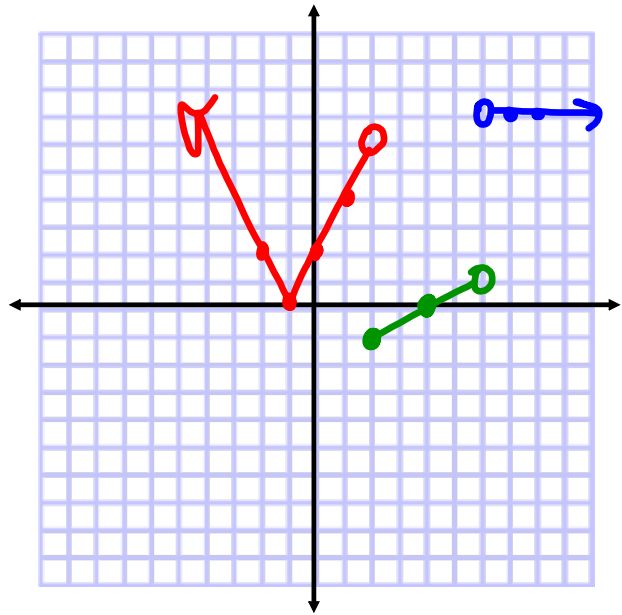
D:  $\{x \mid -4 \leq x \leq 6, x \neq -1, 3\}$

R:  $\{y \mid -9 < y \leq 0, 2 < y \leq 6\}$



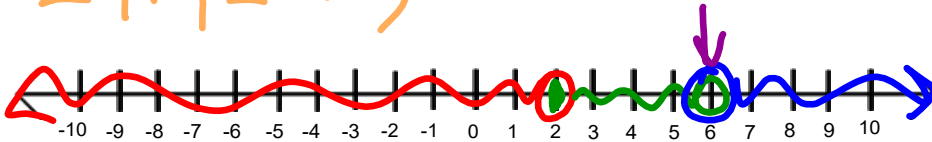
Graph:  $x+1=0 \quad x=-1$

$$f(x) = \begin{cases} 2|x+1| & x < 2 \\ \frac{1}{2}x - 2 & 2 \leq x < 6 \\ 7 & x > 6 \end{cases}$$

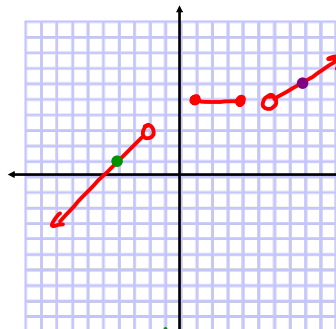


D:  $\{x \mid x \neq 6\}$

R:  $\{y \mid y \geq -1\}$



Define as a piecewise function:



$$f(x) = \begin{cases} x+5, & x < -2 \\ 5, & -2 \leq x \leq 4 \\ \frac{1}{2}x+2, & x > 6 \end{cases}$$

$(6, 5), (8, 6)$

$$m = \frac{6-5}{8-6} = \frac{1}{2}$$

①  $y = mx + b$   
 $(-4, 1), (-2, 3)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-1}{-2-(-4)} = \frac{2}{2} = 1$$

$$y = mx + b$$

$$6 = \frac{1}{2}(8) + b$$

$$6 = 4 + b$$

$$b = 2$$

$$1 = 1(-4) + b$$

$$1 = -4 + b$$

$$b = 5$$

## Assignment:

1) Create 3 piecewise functions that have at least 5 pieces and a domain that is **NOT** the set of real numbers.

At least one piece must be non-linear.

- Graph the function
- Determine the range of the function

2) Draw a piecewise function that has at least 4 pieces and a domain that is **NOT** the set of real numbers.

- Define the function
- Determine the range of the function