Today's Plan:

Learning Target (standard): I will graph piecewise functions & step functions using transformations. 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.

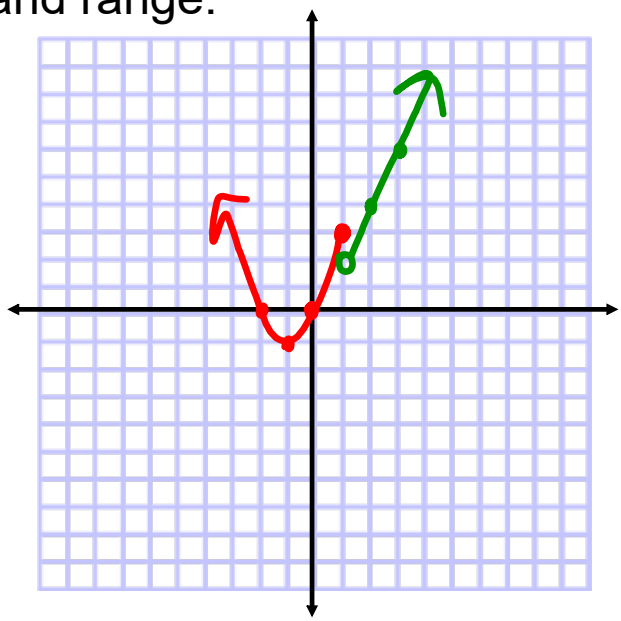
Assessment: Board work, homework check and homework assignment

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.

Graph and find the domain and range.

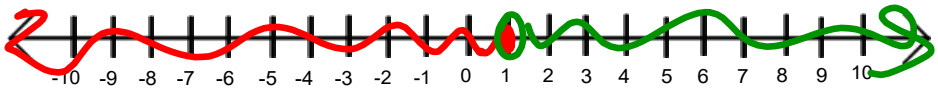
$x=-\frac{b}{2a}=-\frac{2}{2}=-1$

$$f(x)=\begin{cases} x^2+2x, & x\le 1 \\ 2x, & x>1 \end{cases}$$



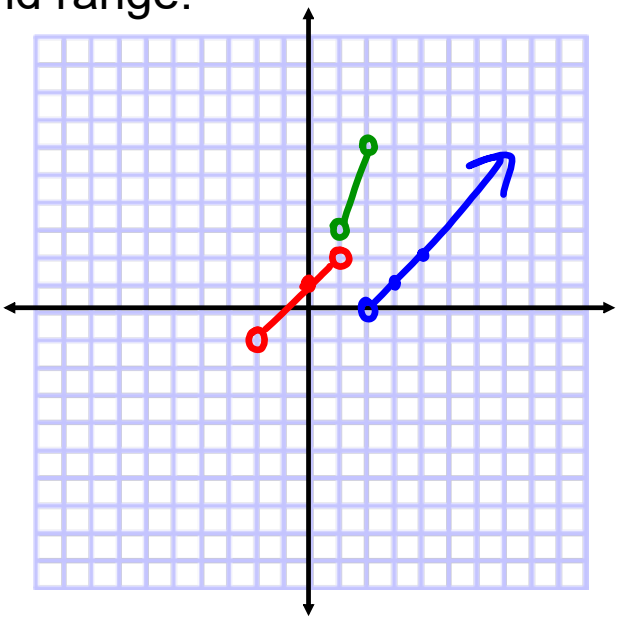
D: $\mathbb{R}$

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



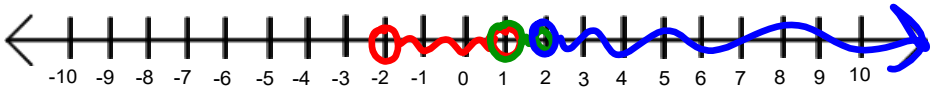
Graph and find the domain and range.

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



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

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



Greatest Integer Function: (parent function) "round down" → floor function

$f(x)=[x]$ $f(x)=\lfloor x \rfloor$ $f(x)=\text{int}(x)$

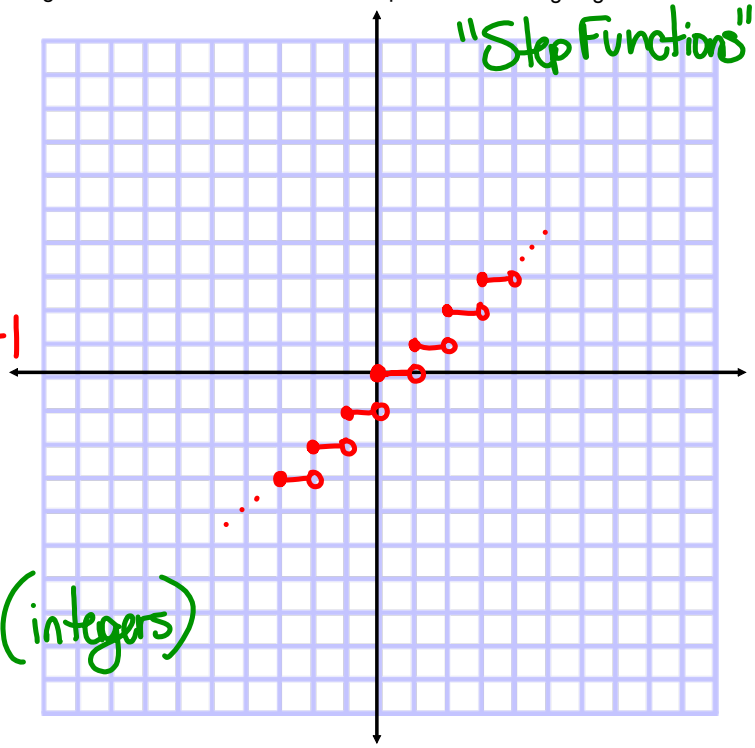
* the greatest integer value closest to a number or equal to it without going over it

"Step Functions"

$f\left(\frac{1}{2}\right)=0$

$f(1)=1$

$f\left(-\frac{3}{4}\right)=-1$



D: $\mathbb{R}$

R: $\mathbb{Z}$ (integers)

Ceiling Function: (parent function)

$f(x) = \lceil x \rceil$ "round up"

* the closest integer value that is greater than or equal to the number

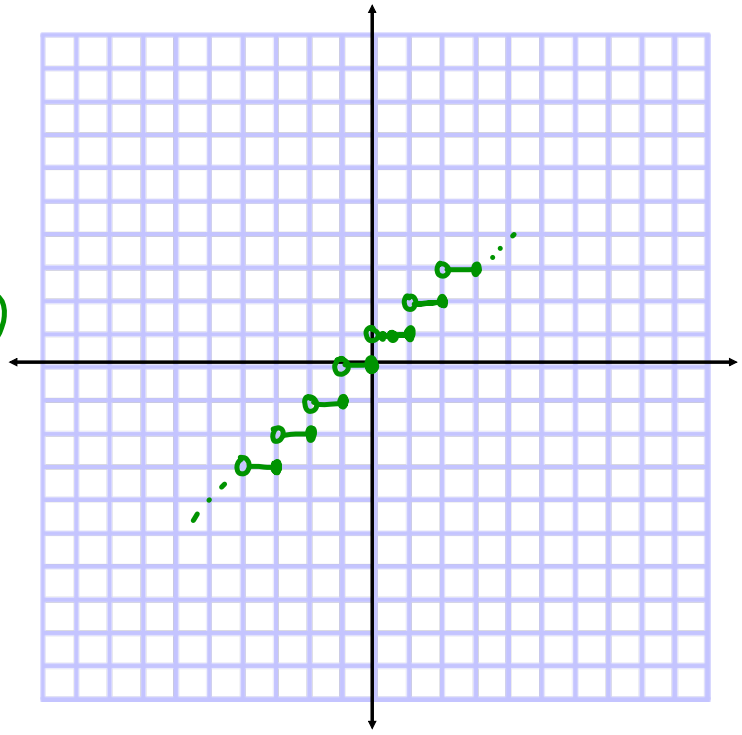
$f\left(\frac{1}{2}\right) = 1$

$f(1) = 1$

$f\left(-\frac{3}{4}\right) = 0$

D: $\mathbb{R}$

R: $\mathbb{Z}$



Graph. Find domain and range.

$f(x) = 2\lceil x-1 \rceil + 1$

parent: $f(x)=\lceil x \rceil$

1) $f(x)=2\lceil x \rceil$ v.s. by 2

2) $f(x)=2\lceil x-1 \rceil$

shift right 1

3) $f(x)=2\lceil x-1 \rceil+1$

shift up 1

Graph. Find the domain and range (only #1-3) of each.

$$1)\ f(x)=\begin{cases}-2x+3, -4<x<1\\ x-1, 1\le x<5\\ 4-x, x\ge 5\end{cases}$$

$$2)\ f(x)=\begin{cases}-x^2+2, -3\le x<2\\ 2x+1, 2\le x\le 4\\ 9, x>4\end{cases}$$

$$3)\ f(x)=\begin{cases}3x+5, -2\le x<1\\ x-2, 3<x<6\\ \frac{1}{2}x, 6\le x<10\end{cases}$$

$$4)\ f(x)=\lfloor x+3.5\rfloor-2$$

$$5)\ f(x)=\left[x-2\right]+3$$

$$6)\ f(x)=\lceil 3-x\rceil-1$$

* use transformations on #4-6