

## Today's Plan:

**Learning Target (standard):** I will graph piecewise functions & step functions using transformations. I will understand the concept of a limit.

**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, watch a video and derive the meaning of *limit* as it applies to specific x-values of a function.

**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.

Go over your graphs at your tables. Make sure to ask any questions you may have!

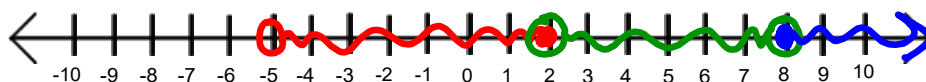
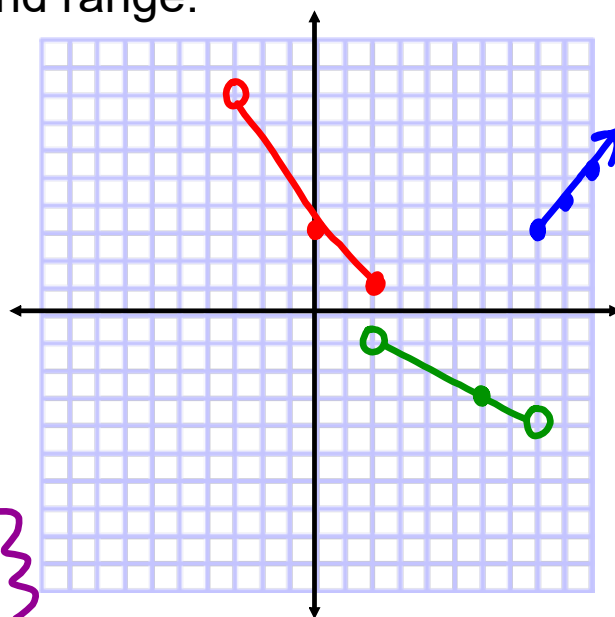


Graph and find the domain and range.

$$f(x) = \begin{cases} 3-x, & -5 < x \leq 2 \\ -\frac{1}{2}x, & 2 < x < 8 \\ x-5, & x \geq 8 \end{cases}$$

$$D: \{x \mid x > -5\}$$

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

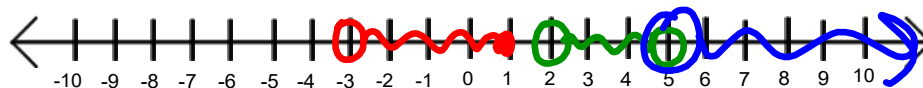
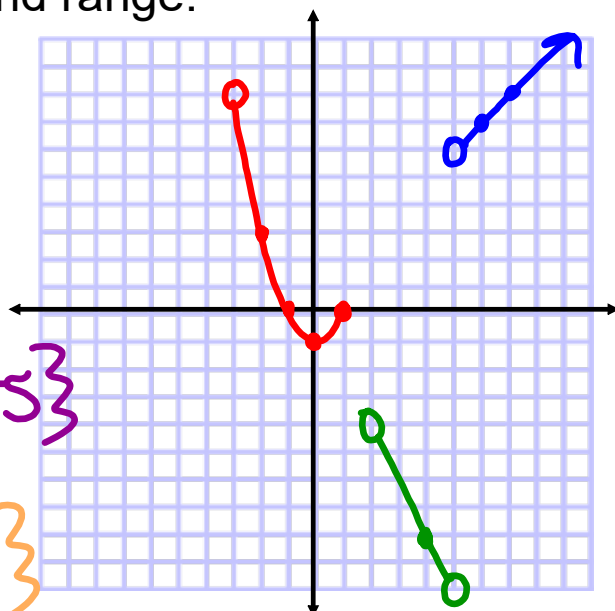


Graph and find the domain and range.

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

$$D: \{x \mid -3 < x \leq 1, x > 2, x \neq 5\}$$

$$R: \{y \mid -10 < y < -4, y \geq -1\}$$



Graph. Find domain.

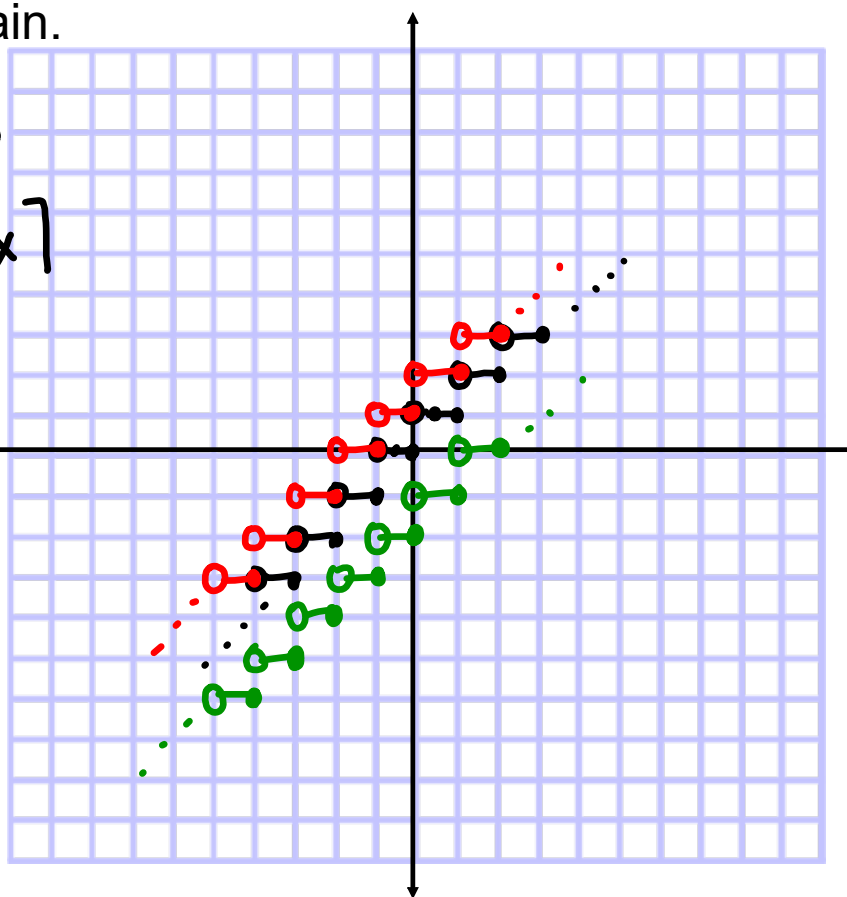
$$f(x) = \lceil x+1 \rceil - 3$$

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

1)  $f(x) = \lceil x+1 \rceil$   
Shift left 1

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

D:  $\mathbb{R}$



Graph. Find domain.

$$f(x) = 2\lfloor x-3 \rfloor + 1$$

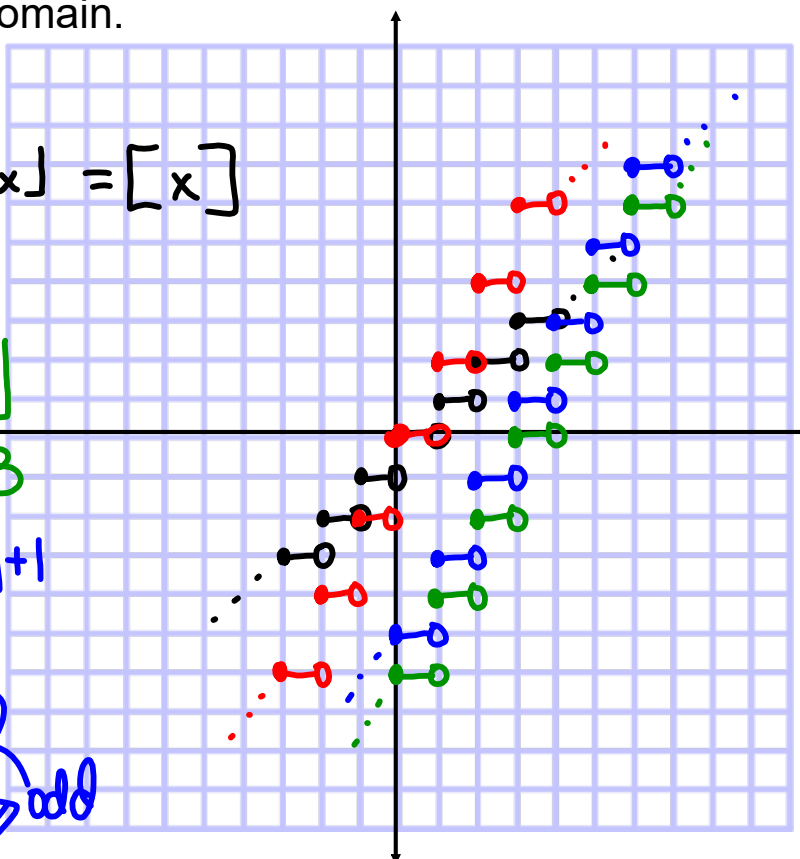
parent:  $f(x) = \lfloor x \rfloor = \lfloor x \rfloor$

1)  $f(x) = 2\lfloor x \rfloor$

2)  $f(x) = 2\lfloor x-3 \rfloor$   
Shift right 3

3)  $f(x) = 2\lfloor x-3 \rfloor + 1$   
Shift up 1

D:  $\mathbb{R}$   
R:  $\mathbb{Z}_{\text{odd}}$





2. Substitute 3 for  $x$  in the equation for  $f(x)$ . What form does the answer take? What name is given to an expression of this form?

"Hole"

3. The graph of  $f$  has a removable discontinuity at  $x = 3$ . The  $y$ -value at this discontinuity is the **limit** of  $f(x)$  as  $x$  approaches 3. What number does this limit equal?

4. Make a table of values of  $f(x)$  for each 0.1 unit change in  $x$ -value from 2.5 through 3.5.

$x$	$f(x)$
2.5	
2.6	
2.7	
2.8	
2.9	
3.0	2
3.1	
3.2	
3.3	
3.4	
3.5	

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

8. For the state  
3 (but not eq  
2," write the

9. Write the def

10. Problem 8 giv  
 $L$ ,  $c$ ,  $\epsilon$ ,  $\delta$   
Which is whic

11. What did you k  
Exploration the

## Examples of Limits:

### Introduction

<https://www.khanacademy.org/math/calculus-all-old/limits-and-continuity-calc/limits-introduction-calc/v/introduction-to-limits-hd>



<http://www.khanacademy.org/math/calculus/v/introduction-to-limits>



## Assignment:

- Write **your** definition of a limit based on video.
- Graph 3 functions that have a limit and tell what the limit is for the function. Describe individually why each one of these has the stated limit.
- Graph 3 functions that do **NOT** have a limit and explain why individually each of these does not have a limit.

\* You do not need equations for the functions, only graphs