

# Domain and Range Part 2

**Homework** - Complete the Homework Handout

Nov 4-10:28 AM

**Warm Up:**  
Determine the domain and range

$$y = 3x - 4 \quad D = \{x \in \mathbb{R}\}$$

$$R = \{y \in \mathbb{R}\}$$

$$y = 3(x - 2)^3 + 1 \quad D = \{x \in \mathbb{R}\}$$

$$R = \{y \in \mathbb{R}\}$$

$$y = -2(x - 1)^2 + 4 \quad D = \{x \in \mathbb{R}\}$$

$$R = \{y \in \mathbb{R} \mid y \leq 4\}$$



Mar 19-7:45 AM

## Rational Functions Investigation

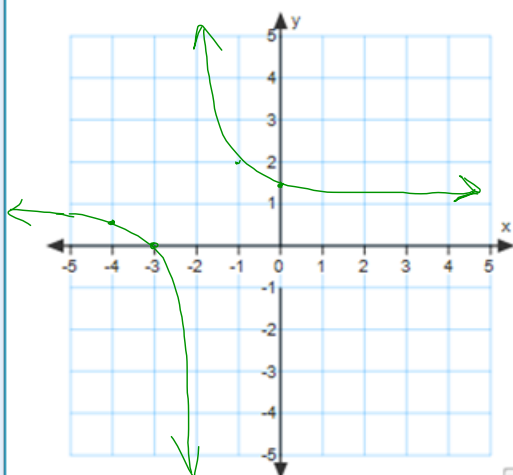
Complete the handout with the help of desmos.



Mar 19-7:45 AM

### Example 1

$$y = \frac{1}{x+2} + 1$$



x	y
-4	0.5
-3	0
-2	X
-1	2
0	1.5

What happens when  $x = -2$ ? Why?

Get no real answer.  
Can't divide by zero.

Domain:

$$\{x \in \mathbb{R} \mid x \neq -2\}$$

Range:

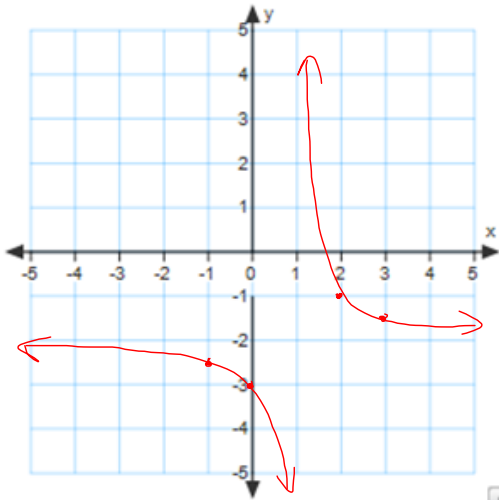
$$\{y \in \mathbb{R} \mid y \neq 1\}$$



Mar 19-7:45 AM

## Example 2

$$y = \frac{1}{x-1} - 2$$



x	y
-1	-2.5
0	-3
1	X
2	-1
3	-1.5

What happens when  $x = 1$ ? Why?

Get no real answer.  
It is undefined

Domain:

$$\{x \in \mathbb{R} \mid x \neq 1\}$$

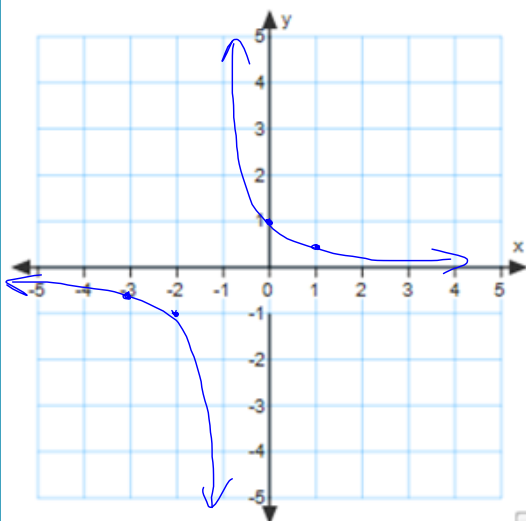
Range:

$$\{y \in \mathbb{R} \mid y \neq -2\}$$

Mar 19-7:45 AM

## Example 3

$$y = \frac{1}{x+1}$$



x	y
-3	-0.5
-2	-1
-1	X
0	1
1	0.5

What happens when  $x = -1$ ? Why?

Get no real answer.  
It is undefined. Can't  
divide by zero

Domain:

$$\{x \in \mathbb{R} \mid x \neq -1\}$$

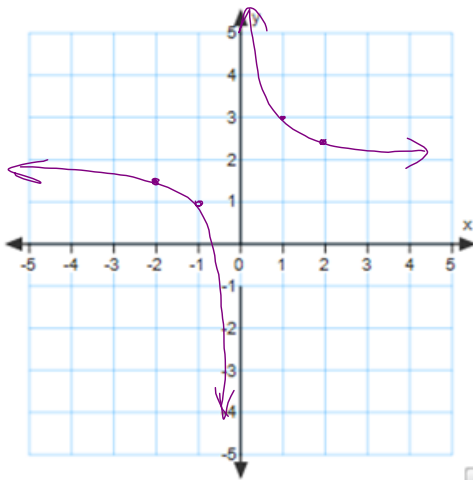
Range:

$$\{y \in \mathbb{R} \mid y \neq 0\}$$

Mar 19-7:45 AM

### Example 4

$$y = \frac{1}{x} + 2$$



x	y
-2	1.5
-1	1
0	X
1	3
2	2.5

What happens when  $x = 0$ ? Why?  
 Get no real answer.  
 Can't divide by zero

Domain:  
 $\{x \in \mathbb{R} \mid x \neq 0\}$

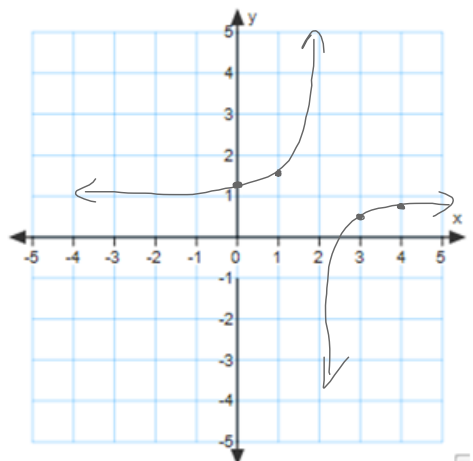
Range:  
 $\{y \in \mathbb{R} \mid y \neq 2\}$



Mar 19-7:45 AM

### Example 5

$$y = \frac{-0.5}{x - 2} + 1$$



x	y
0	1.25
1	1.5
2	X
3	0.5
4	0.75

What happens when  $x = 2$ ? Why?  
 Get no real answer (undefined)  
 Can't divide by zero.

Domain:  
 $\{x \in \mathbb{R} \mid x \neq 2\}$

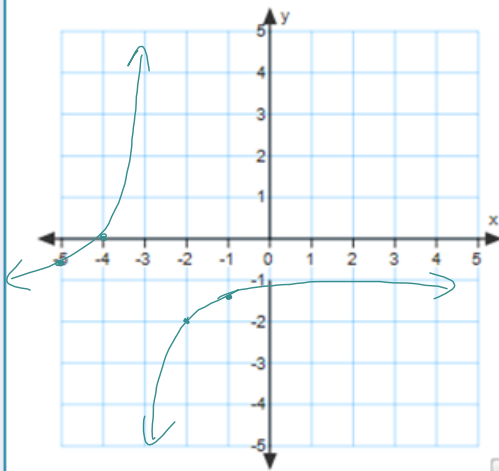
Range:  
 $\{y \in \mathbb{R} \mid y \neq 1\}$



Mar 19-7:45 AM

## Example 6

$$y = \frac{1}{-(x+3)} - 1$$



x	y
-5	-0.5
-4	0
-3	X
-2	-2
-1	-1.5

What happens when  $x = -3$ ? Why?

It's undefined.  
Can't divide by zero.

Domain:

$$\{x \in \mathbb{R} \mid x \neq -3\}$$

Range:

$$\{y \in \mathbb{R} \mid y \neq -1\}$$

Mar 19-7:45 AM

## Asymptotes

### Horizontal Asymptote:

- Is a horizontal line that a graph will never touch or cross
- It is caused by a value that can not be calculated
- On a graph we draw it as a dotted line

### Vertical Asymptote:

- Is a vertical line that a graph will never touch or cross
- It is caused by an x-value that produces an undefined y-value
- On a graph we draw it as a dotted line

## Domain and Range of a Reciprocal

The domain and range of a reciprocal each have one restricted value, which comes from the horizontal and vertical transformations

Jan 21-17:01