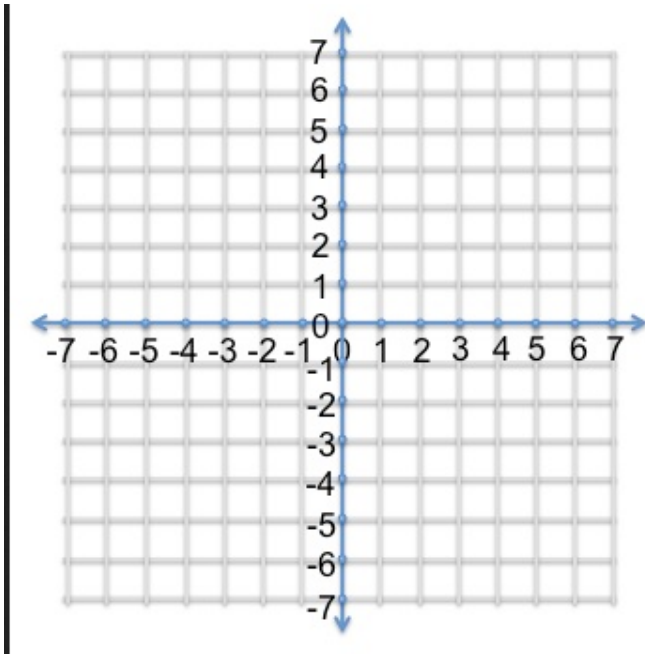


Rational Functions
L12
Warm-up

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



X	Y
-4	
-2	
-1	
-.5	
0	
.5	
1	
2	
4	

Rational Functions

A ***Rational Function*** is a function whose rule can be written as a ratio of two polynomials.

Rational Functions have Asymptotes.

Asymptotes are lines that the graph approaches as x becomes very large or small.

What were the Asymptotes for $y = \frac{1}{x}$?

Consider this to be a parent function. Our goal is to find out what the transformations are

Describe the transformations. State the domain and range. Identify the asymptotes.

As $x \rightarrow \infty, y \rightarrow$

As $x \rightarrow -\infty, y \rightarrow$

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

$$2) y = \frac{1}{x} - 3$$

$$3) y = \frac{1}{x+2} + 1$$

$$4) y = \frac{3}{x}$$

$$5) y = \frac{-1}{x}$$

$|a|$ → vertical stretch or compression factor
 $a < 0$ → reflection across the x -axis

k → vertical translation
down for $k < 0$; up for $k > 0$

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

h → horizontal translation
left for $h < 0$; right for $h > 0$

I Try:

Describe the transformations. State the domain and range. Identify the asymptotes.

As $x \rightarrow \infty$, $y \rightarrow$

As $x \rightarrow -\infty$, $y \rightarrow$

$$1) \quad y = \frac{1}{x-5} + 6$$

	$y = \frac{1}{x-5} + 6$
Identify transformations	Right 5 Up 6
Identify domain and range	D: All real #s, $x \neq$ 5 R: All real #s $y \neq$ 6
Identify Asymptote	Vertical $x=$ 5 Horizontal $y=$ 6
End Behavior	As $x \rightarrow \infty, y \rightarrow$ 6 As $x \rightarrow -\infty, y \rightarrow$ 6

We Try:

$$2) y = \frac{-1}{x} - 4$$

	$y = \frac{-1}{x} - 4$
Identify transformations	
Identify domain and range	D: All real #s, $x \neq$ R: All real #s $y \neq$
Identify Asymptote	Vertical $x =$ Horizontal $y =$
	As $x \rightarrow \infty, y \rightarrow$ As $x \rightarrow -\infty, y \rightarrow$

$$3) y = \frac{4}{x-3} + 2$$

	$y = \frac{4}{x-3} + 2$
Identify transformations	
Identify domain and range	D: All real #s, $x \neq$ R: All real #s $y \neq$
Identify Asymptote	Vertical $x =$ Horizontal $y =$
	As $x \rightarrow \infty, y \rightarrow$ As $x \rightarrow -\infty, y \rightarrow$

You try:

Describe the transformations. State the domain and range. Identify the asymptotes.

As $x \rightarrow \infty, y \rightarrow$

As $x \rightarrow -\infty, y \rightarrow$

You do with your partner write on whiteboard

Describe the transformations. State the domain and range. Identify the asymptotes.

$$2) y = \frac{-2}{x-1} - 3$$

$$2) y = \frac{3}{x+2} + 1$$

Tear out pgs 431-442

Do #s 438#15,16

Pg. 440 #20-23

Pg 441 #6-10

Exit Slip

Describe the transformations. State the domain and range. Identify the asymptotes.

$$1) y = \frac{-1}{x-2} + 4$$