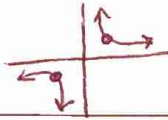


8.6 Rational Functions – Transformations Cheat Sheet  
Algebra 2

Name: \_\_\_\_\_  
Dates: \_\_\_\_\_ Period: \_\_\_\_\_

Translations:



Parent Function =  $y = \frac{1}{x}$


Function	What is happening?	What do the key points become?	What are the asymptotes?
$y = \frac{1}{x} + b$ 	up b ex. $\frac{1}{x} + 3$ U3	$(-1, -1) \rightarrow (-1, -1 + b)$ $(-1, 2)$ $(1, 1) \rightarrow (1, 1 + b)$ $(1, 4)$	$x = 0$ <del><math>y = 0</math></del> $x = 0$ $y = b$ $y = 3$
$y = \frac{1}{x} - b$	down b ex. $\frac{1}{x} - 4$ D4	$(-1, -1) \rightarrow (-1, -1 - b)$ $(-1, -5)$ $(1, 1) \rightarrow (1, 1 - b)$ $(1, -3)$	$x = 0$ $x = 0$ $y = -b$ $y = -4$
$y = \frac{1}{x + a}$	left a ex. $\frac{1}{x + 2}$ L2	$(-1, -1) \rightarrow (-1 - a, -1)$ $(-3, -1)$ $(1, 1) \rightarrow (1 - a, 1)$ $(-1, 1)$	$x = -a$ $x = -2$ ★ $y = 0$ $y = 0$
$y = \frac{1}{x - a}$	right a ex. $\frac{1}{x - 3}$ R3	$(-1, -1) \rightarrow (-1 + a, -1)$ $(2, -1)$ $(1, 1) \rightarrow (1 + a, 1)$ $(4, 1)$	$x = a$ $x = 3$ ★ $y = 0$ $y = 0$


Parent Function =  $y = \frac{1}{x^2}$

Function	What is happening?	What do the key points become?	What are the asymptotes?
$y = \frac{1}{x^2} + b$	up b ex. $\frac{1}{x^2} + 3$ U3	$(-1, 1) \rightarrow (-1, 1 + b)$ $(-1, 4)$ $(1, 1) \rightarrow (1, 1 + b)$ $(1, 4)$	$x = 0$ $x = 0$ $y = b$ $y = 3$
$y = \frac{1}{x^2} - b$	down b ex. $\frac{1}{x^2} - 2$ D2	$(-1, 1) \rightarrow (-1, 1 - b)$ $(-1, -1)$ $(1, 1) \rightarrow (1, 1 - b)$ $(1, -1)$	$x = 0$ $x = 0$ $y = -b$ $y = -2$
$y = \frac{1}{(x + a)^2}$	left a ex. $\frac{1}{(x + 1)^2}$ L1	$(-1, 1) \rightarrow (-1 - a, 1)$ $(-2, 1)$ $(1, 1) \rightarrow (1 - a, 1)$ $(0, 1)$	$x = -a$ $x = -1$ ★ $y = 0$ $y = 0$
$y = \frac{1}{(x - a)^2}$	right a ex. $\frac{1}{(x - 2)^2}$ R2	$(-1, 1) \rightarrow (-1 + a, 1)$ $(1, 1)$ $(1, 1) \rightarrow (1 + a, 1)$ $(3, 1)$	$x = a$ $x = 2$ ★ $y = 0$ $y = 0$

ex  $y = \frac{1}{(x + 1)^2} - 2$   
 D:  $(-\infty, -1) \cup (-1, \infty)$   
 R:  $(-\infty, -2) \cup (-2, \infty)$

## Reflections: over x-axis

Parent Function = $y = \frac{1}{x}$			
Function	What is happening?	What do the key points become?	What are the asymptotes?
$y = -\frac{1}{x}$ 	reflection	$(-1, -1) \rightarrow (-1, 1)$ $(1, 1) \rightarrow (1, -1)$	$x = 0$ $y = 0$

Parent Function = $y = \frac{1}{x^2}$			
Function	What is happening?	What do the key points become?	What are the asymptotes?
$y = -\frac{1}{x^2}$ 	reflected	$(-1, 1) \rightarrow (-1, -1)$ $(1, 1) \rightarrow (1, -1)$	$x = 0$ $y = 0$

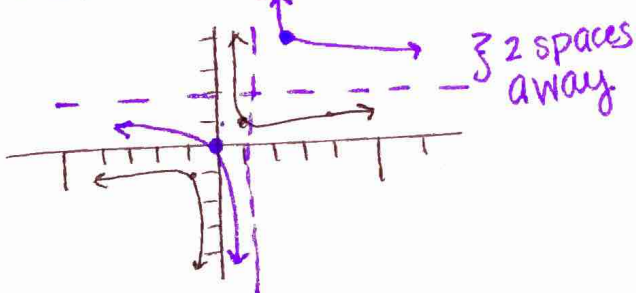
## Vertical Dilation:

Parent Function = $y = \frac{1}{x}$			
Function	What is happening?	What do the key points become?	What are the asymptotes?
$y = \frac{a}{x}$ ex. $\frac{2}{x}$ <small>VD by 2</small>	VD by a	$(-1, -1) \rightarrow (-1, -a)$ $(-1, -2)$ $(1, 1) \rightarrow (1, a)$ $(1, 2)$	$x = 0$ $y = 0$

Parent Function = $y = \frac{1}{x^2}$			
Function	What is happening?	What do the key points become?	What are the asymptotes?
$y = \frac{a}{x^2}$ ex. $\frac{3}{x^2}$ <small>VD by 3</small>	VD by a	$(-1, 1) \rightarrow (-1, a)$ $(-1, 3)$ $(1, 1) \rightarrow (1, a)$ $(1, 3)$	$x = 0$ $y = 0$

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

U2, R1, VD by 2



(1, 3)

