

# Sec. 8.2 The Reciprocal Function Family

Parent :  $y = \frac{1}{x}$   
 D:  $x \neq 0$

$(h, k) = (0, 0)$

V.A. H.A.

x	y
1	1
2	1/2
3	1/3
1/2	2
1/3	3

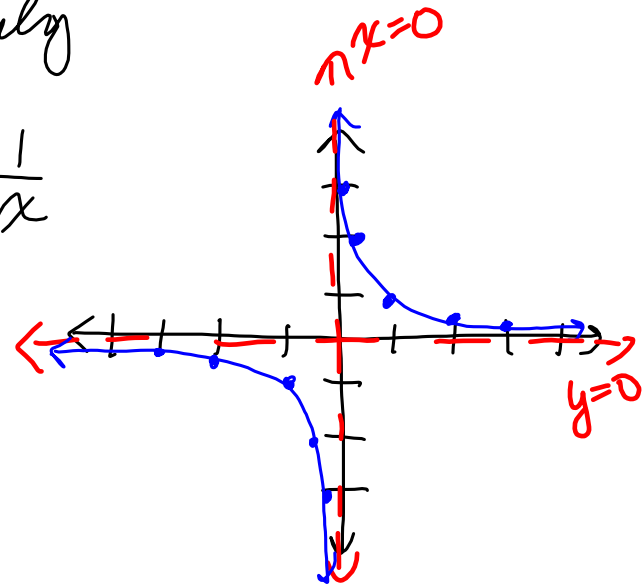
x	y
-1	-1
-2	-1/2
-3	-1/3
-1/2	-2
-1/3	-3

$$y = \frac{a}{x-h} + k$$

$|a| > 1$  V.S.

$|a| < 1$  V.C

$a < 0$  Ref. x-axis



h H.T.  
 k V.T.

\*  $x = h$   
 $y = k$  } asymptotes

Problem 1:

$$y = \frac{128}{x}$$

$(h, k) = (0, 0)$

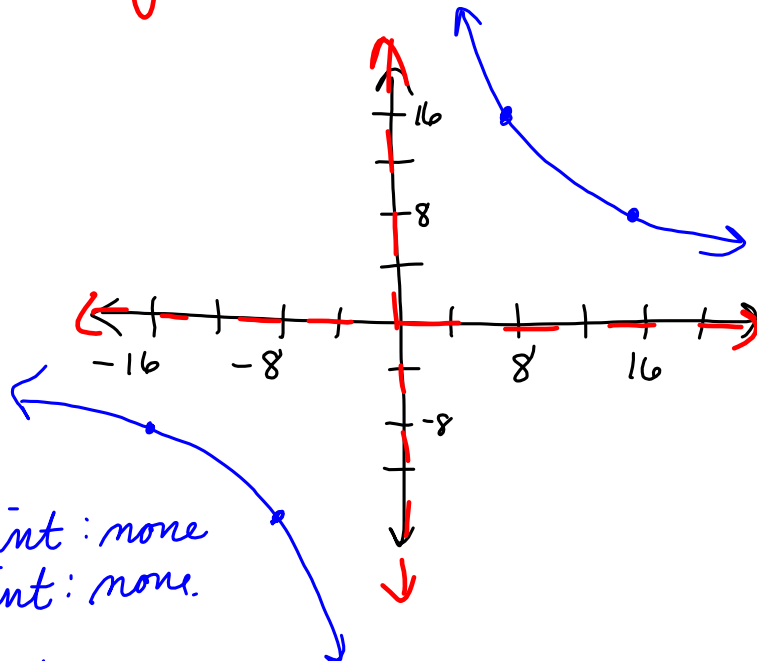
V.A.  $x = 0$

H.A.  $y = 0$

x	y	128
8	16	8
16	8	
-8	-16	
-16	-8	

x-int: none  
 y-int: none

D:  $x \neq 0$   
 R:  $y \neq 0$

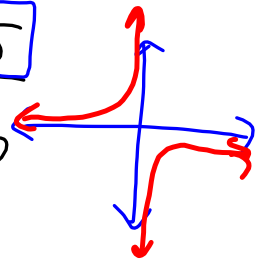


Problem 2:

How does the graph of  $y = \frac{-1.5}{x}$

compare to the graph of  $y = \frac{1}{x}$ ?

- reflected across the  $x$ -axis
- stretched vertically by a factor 1.5



Problem 3: Graph  $y = \frac{1}{x-2} + 3$ .

D:  $x \neq 2$

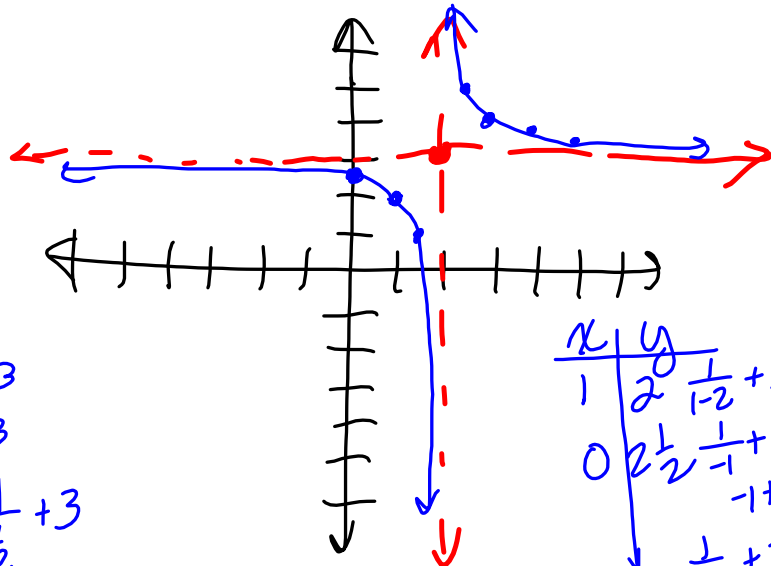
R:  $y \neq 3$

$(h, k) \rightarrow (2, 3)$

V.A.  $x = 2$

H.A.  $y = 3$

$x$	$y$	Calculation
3	4	$\frac{1}{3-2} + 3 = 1 + 3$
5	$3\frac{1}{3}$	$\frac{1}{5-2} + 3 = \frac{1}{3} + 3$
$\frac{5}{2}$	5	$\frac{1}{2\frac{1}{2}-2} + 3 = \frac{1}{\frac{1}{2}} + 3 = 2 + 3$



$x$	$y$	Calculation
1	2	$\frac{1}{1-2} + 3 = -1 + 3$
0	$2\frac{1}{2}$	$\frac{1}{0-2} + 3 = -\frac{1}{2} + 3 = -1 + 3$
$\frac{1}{2}$	1	$\frac{1}{\frac{1}{2}-2} + 3 = \frac{1}{-\frac{3}{2}} + 3 = -\frac{2}{3} + 3 = -2 + 3$

Problem 4:

Write the equation.

$(h, k) \rightarrow (-1, 3)$

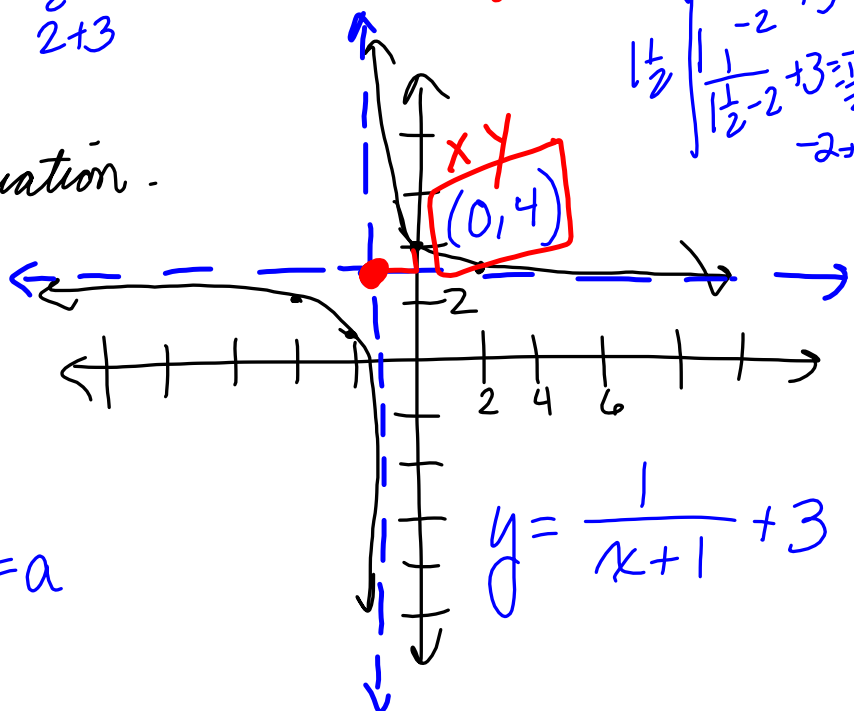
$$y = \frac{a}{x+1} + 3$$

$$4 = \frac{a}{0+1} + 3$$

$$4 = \frac{a}{1} + 3 \quad | -3$$

$$-3 = \frac{a}{1} - 3 \quad | +3$$

$$0 = a$$



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