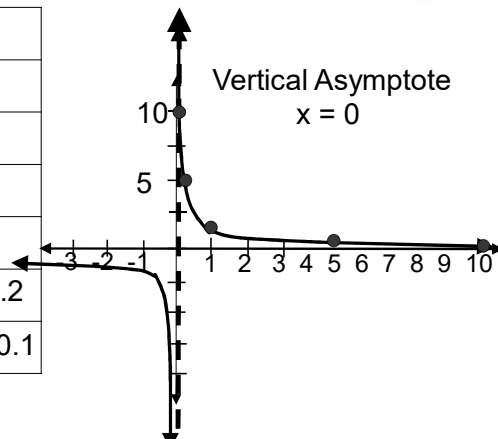


SM3-A HANDOUT 4-5 (Reciprocal Function)

$$f(x) = \frac{1}{x}$$

x	f(x)
0	??
1/10 = 0.1	10
1/5 = 0.2	5
1	1
5	1/5 = 0.2
10	1/10 = 0.1

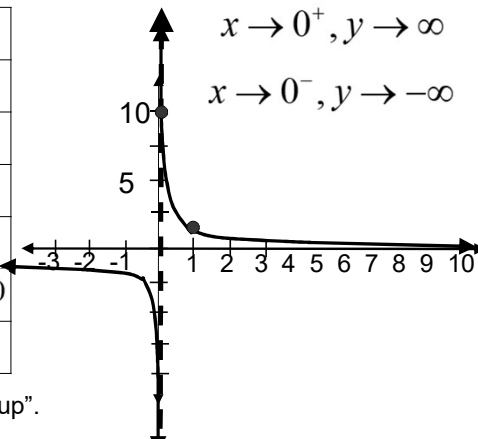


$$f(x) = \frac{1}{x}$$

Why is there a vertical asymptote?

What is the output when we "approach" $x = 0$ from the "+" side?

x	f(x)
1	1
0.1	10
0.01	100
0.001	1000
10^{-4}	$10^4 = 10,000$
10^{-12}	10^{12}



The outputs "blow up".

Why is there a horizontal asymptote?

$$f(x) = \frac{1}{x}$$

Can the denominator EVER make the value of the fraction equal to zero?

What part of the fraction makes it equal to zero? $\frac{0}{3}$

$$f(x) = \frac{1}{x}$$

Is there any input that will make the numerator = 0?

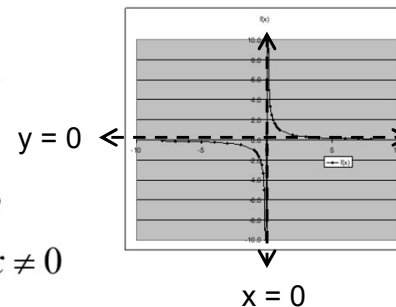
The output of this function will never equal zero.

$$y \neq 0$$

Horizontal asymptote at: $y = 0$.

The Reciprocal Function

$$f(x) = \frac{1}{x}$$



Domain?

Domain: $x \neq 0$

Range?

Range: $y \neq 0$

How is the graph of the parent function $f(x) = \frac{1}{x}$ is transformed by each of the following equations?

$$g(x) = \frac{1}{x} + 7 \quad \text{Up 7}$$

$$h(x) = \frac{5}{(x-2)} = 5 * \frac{1}{(x-2)} \quad \text{VSF = 5, Right 2}$$

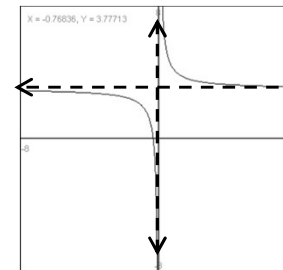
$$f(x) = \frac{-3}{(x+3)} + 5 \quad \begin{array}{l} \text{Reflected across the x-axis,} \\ \text{VSF = 3} \\ \text{Left 3} \\ \text{Up 5} \end{array}$$

$$f(x) = \frac{1}{x}$$

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

Domain?

Domain: $x \neq 0$



$y = 3$

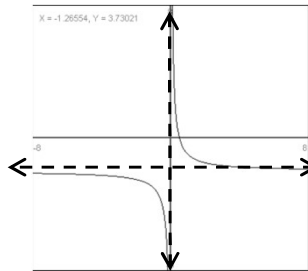
Range?

Range: $y \neq 3$

$x = 0$

$$f(x) = \frac{1}{x}$$

$$g(x) = \frac{1}{x} - 2$$



$y = -2$

Range?

Range: $y \neq -2$

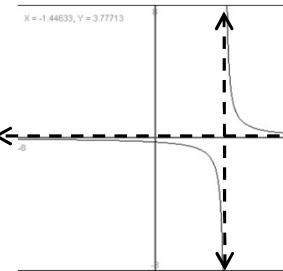
$x = 0$

Domain?

Domain: $x \neq 0$

$$f(x) = \frac{1}{x}$$

$$g(x) = \frac{1}{(x-4)}$$



$y = 0$

Range?

Range: $y \neq 0$

$x = 4$

Domain?

Domain: $x \neq 4$

