

Rational Functions

Goal:

- to be familiar with rule and graph of a rational function
- to identify asymptotes of rational function

What is a rational number?

Any number that can be represented as

$\frac{p}{q}$ where p and q are integers. FRACTIONS

As decimals, they have a repeating number/pattern.

ex: $\frac{3}{4} = 0.75\bar{0}$, $-2 = \frac{-2}{1} = -2.\bar{0}$ $\frac{1}{3} = 0.\bar{3}$

What is an irrational number?

Numbers that cannot be written as a fraction.

As decimals, no repeating pattern.

ex: $\pi = 3.141592654\dots$, $\sqrt{2} = 1.41\dots$, $e = 2.718\dots$,
1.234567.....

What might the rule of a rational function then look like?

$$y = \frac{5x+8}{100} = \frac{1}{20}x + \frac{2}{25} \quad \times$$

$$y = \frac{3}{x} \quad \checkmark$$

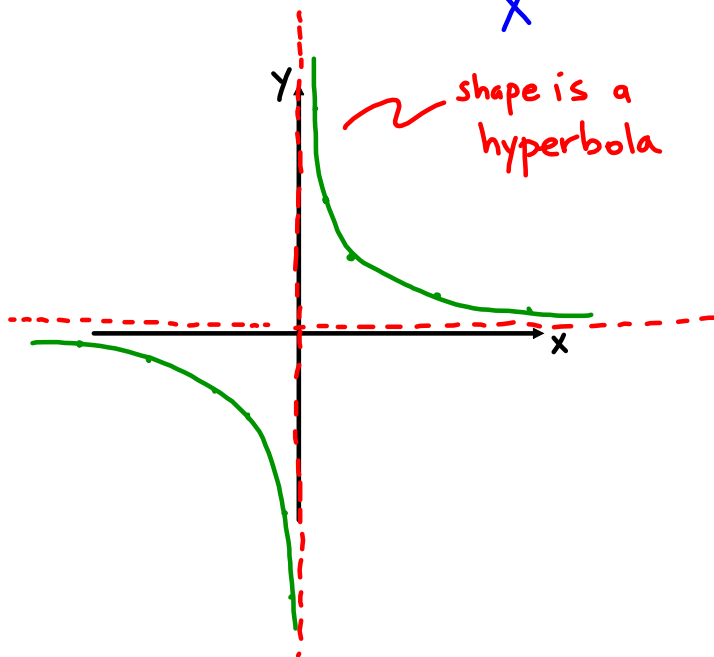
$$y = \frac{1}{5(x-5)} + 3 \quad \checkmark$$

$$y = \frac{5x+8}{100x} \quad \checkmark$$

x in denominator

The basic rational function can be represented by:

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



x	f(x)
-10	$-\frac{1}{10}$
-5	$-\frac{1}{5}$
-1	-1
0	-
$\frac{1}{2}$	2
1	1
5	$\frac{1}{5}$
10	$\frac{1}{10}$

As x gets bigger y gets closer to zero.

graphically represented with an horizontal asymptote.

As x approaches zero y approaches $\pm \infty$.

graphically represented by a vertical asymptote.

The standard form for a transformed rational function is:

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

Characteristics:

asymptotes:

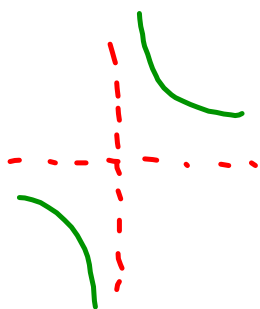
vertical at

$$x = h$$

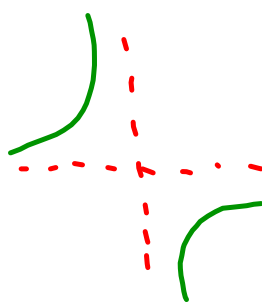
horizontal at

$$y = k$$

$ab > 0$



$ab < 0$



Sketch and list properties for the function

$$f(x) = \frac{-2}{x+3} + 1$$