

8.2 Graph Simple Rational Functions

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

KEY CONCEPT For Your Notebook

Parent Function for Simple Rational Functions

The graph of the parent function $f(x) = \frac{1}{x}$ is a hyperbola, which consists of two symmetrical parts called *branches*. The domain and range are all nonzero real numbers.

Any function of the form $g(x) = \frac{a}{x}$ ($a \neq 0$) has the same asymptotes, domain, and range as the function $f(x) = \frac{1}{x}$.

Feb 3-9:19 AM

Guess who's back? Let form of rational functions

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

- 1st Draw Asymptotes
VA: $x = h$ HA: $y = k$
- 2nd Plot 1 point either left or right of V.A. choose wisely
- 3rd Draw arms/branches across from one another.

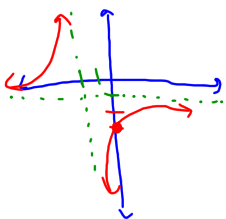
Special Note: if there is no "h" or "k" value the asymptotes are 0.

1	$\frac{4}{x}$	VA: $x=0$	HA: $y=0$
2	$\frac{4}{x-1}$	VA: $x=1$	HA: $y=0$
3	$\frac{4}{x} - 1$	VA: $x=0$	HA: $y=-1$

Jan 5-2:46 PM

Graph. State Domain, Range, Vertical and Horizontal Asymptotes

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



1st VA: $x = -2$
H.A. $y = -1$

2nd $\begin{array}{c|c} x & y \\ \hline 0 & -3 \end{array}$ choose pt

Domain: $\mathbb{R} x \neq -2$
Range: $\mathbb{R} y \neq -1$

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2nd form of rational functions...ITS DIFFERENT how?

$$y = \frac{ax + b}{cx + d}$$

Vertical Asymptote is the line $x = -d/c$. WHY???

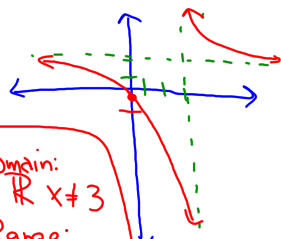
Horizontal Asymptote is the line $y = a/c$.

$cx + d = 0$
 $cx = -d$
 $x = \frac{-d}{c}$
VA

Jan 5-2:46 PM

GRAPH and State Domain, Range, Vertical and Horizontal Asymptotes.

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



Domain: $\mathbb{R} x \neq 3$
Range: $\mathbb{R} y \neq 2$

1st Find
VA $x-3=0$
 $x=3$

HA $y=2$

2nd Plot Points
 $\begin{array}{c|c} x & y \\ \hline 0 & -1/3 \end{array}$

Jan 5-3:04 PM

Try...first decide which type of expression it is...

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

1st VA $x = -1$ HA $y = -4$

2nd choose pt $\begin{array}{c|c} x & y \\ \hline 0 & -6 \end{array}$

Domain: $\mathbb{R} x \neq -1$
Range: $\mathbb{R} y \neq -4$

2.) $y = \frac{3x-4}{2x+1}$

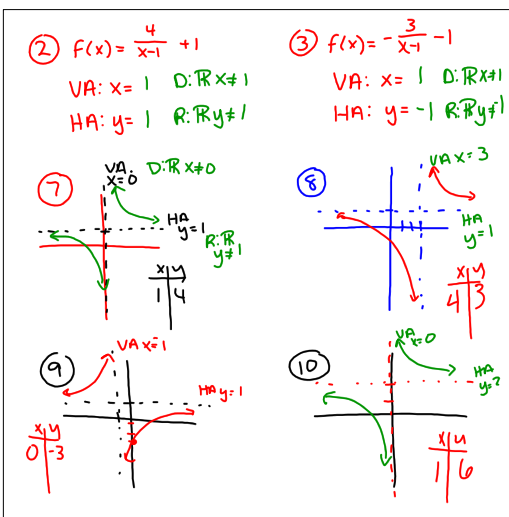
1st VA $2x+1=0$
 $2x=-1$
VA $x = -1/2$

HA $y = 3/2$

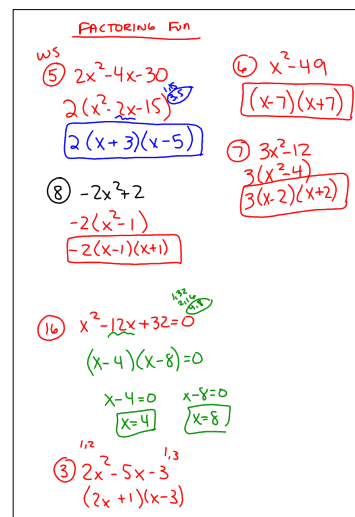
2nd choose pt $\begin{array}{c|c} x & y \\ \hline 0 & -4 \end{array}$

Domain: $\mathbb{R} x \neq -1/2$
Range: $\mathbb{R} y \neq 3/2$

Apr 10-8:58 AM



Apr 20-8:33 AM



Apr 30-12:40 PM

Hw. Pg 561, #16-19, 24,26, 28-31

May 4-2:12 PM