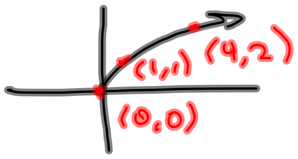
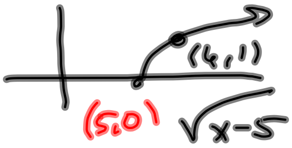
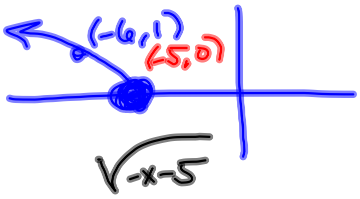
$\sqrt{x}$

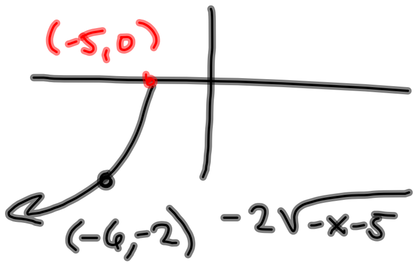


$\mathcal{D} = [0, \infty)$

$\mathcal{R} = [0, \infty)$







$g(x) = -2\sqrt{-x-5} - 3$ (1,1) goes...

1. HORIZ. SHIFT $\sqrt{x-5}$ (6,1)
2. " FLIP/STRETCH $\sqrt{-x-5}$ (-6,1)
3. VERT. FLIP/STRETCH $-2\sqrt{-x-5}$ (-6,-2)
4. " SHIFT $-2\sqrt{-x-5} - 3$ (-6,-5)

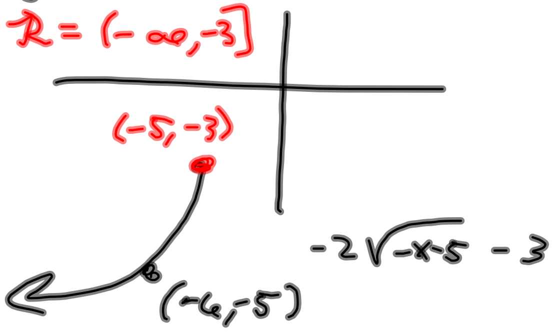
$\underset{(1,1)}{\sqrt{x}} \longrightarrow \underset{(-1,1)}{\sqrt{-x}} \longrightarrow \underset{(-4,1)\ !?}{\sqrt{-x-5}}$

This is why $\sqrt{-(x+5)}$
I want horizontal Left 5
shift, 1st

$\sqrt{x} \longrightarrow \sqrt{x-5} \longrightarrow \sqrt{-x-5}$

$\mathcal{D} = (-\infty, -5]$

$\mathcal{R} = (-\infty, -3]$



Oct 11-7:50 AM

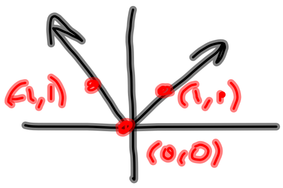
FRIDAY MIDTERM

$f(x) = |x|$, $g(x) = -2|x-3|-7$

Teacher's solutions:

7 rhymes with 11.

Boo-Boo.



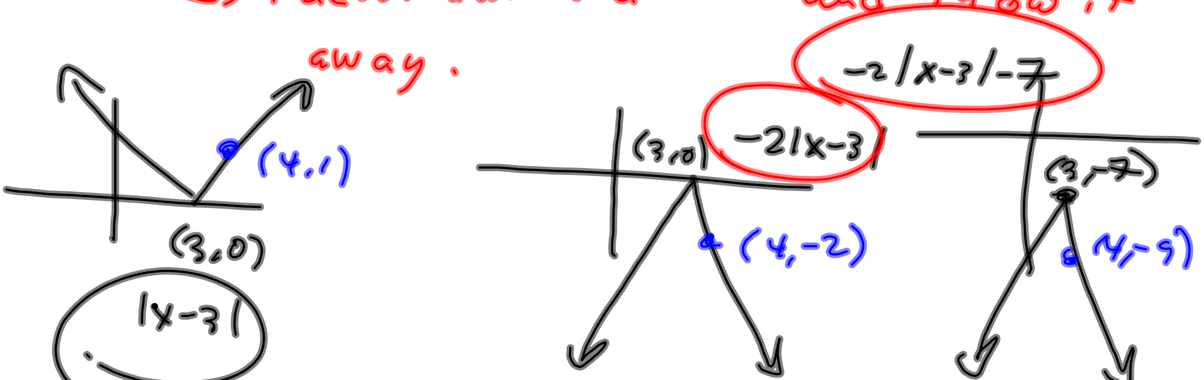
$D = (-\infty, \infty)$

$R = [0, \infty)$

1. $|x-3|$
2. $-2|x-3|$
3. $-2|x-3|-7$

$|-x-3| = |(-1)(x+3)| = |-1|\,|x+3| = |x+3|$

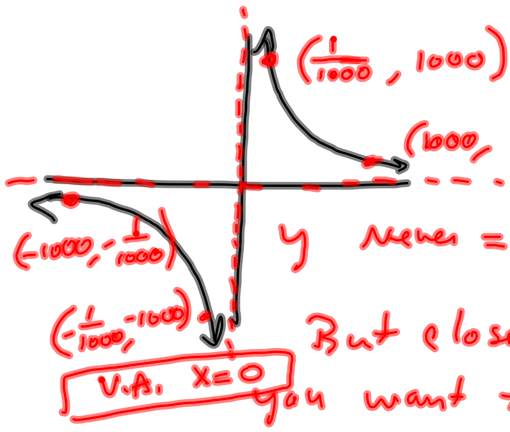
Factor out the "−" and throw it away.



$|x-3|$

Tell me what you're graphing

$f(x) = \frac{1}{x}$ $\qquad\qquad$ $f(x) = \frac{1}{x^2}$



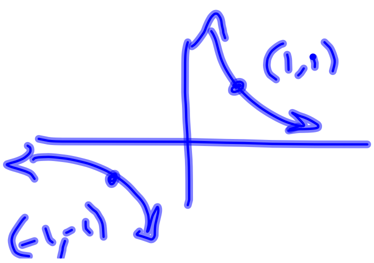
y Never = 0, b/c $\frac{1}{x} = 0$ Nevah!

$\left.\begin{array}{l} \frac{1}{x} \cdot x = 0 \cdot x \\ 1 = 0 \end{array}\right\}$ Legit.

Absurd!

But close as you want to $y=0$.

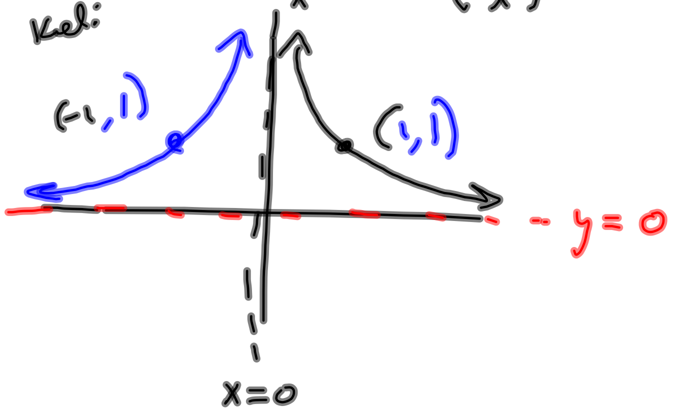
Want it smaller? Let x get bigger



$\boxed{\frac{1}{100000000} \text{ is small, like a hobbit.}}$

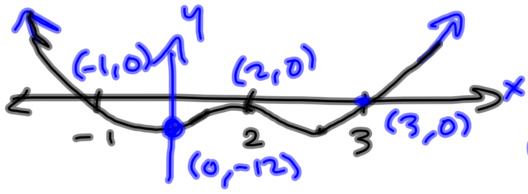
$f(x) = \frac{1}{x^2} = \left(\frac{1}{x}\right)^2$

Kel:



Graph $f(x) = (x-3)^1(x+1)^1(x-2)^2$

Rough sketch



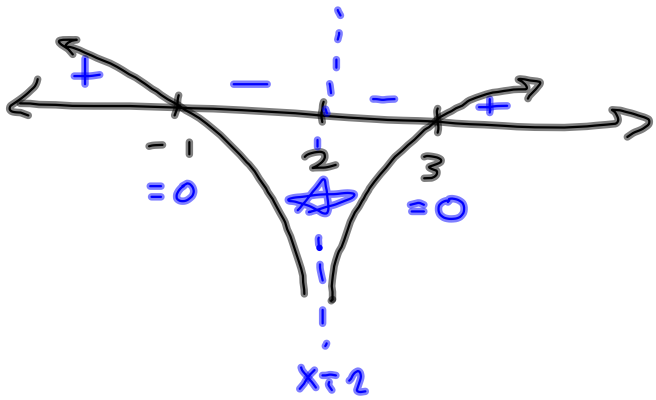
$(-3)(1)(-2)^2$

End Behavior:

$(x)(x)(x)^2 = x^4$

S3.6 virtually everything applies.

Graph $f(x) = \frac{(x-3)(x+1)}{(x-2)^2}$ HAS IDENTICAL SIGN PATTERN TO PREVIOUS.



E.B.

$\frac{(x-3)(x+1)}{(x-2)^2}$ Factored form is a little tricky on these, for E.B.

$$\frac{x^2-2x-3}{x^2-4x+4}$$ Degree same, top & bottom

E.B. $y = \frac{x^2}{x^2} = 1$

Biggest stuff prevails.

Quick 'n' dirty: End Behavior.

$$\frac{(x-3)(x+1)}{(x-2)^2} = \frac{x^2+\text{smaller}}{x^2+\text{smaller}}$$

$$\frac{(x\cancel{-3})(x\cancel{+1})}{(x\cancel{-2})^2} \xrightarrow{x\to\text{BIG}} \frac{(x)(x)}{(x)^2} = \boxed{1 = y \text{ HA}}$$

Oct 11-9:04 AM

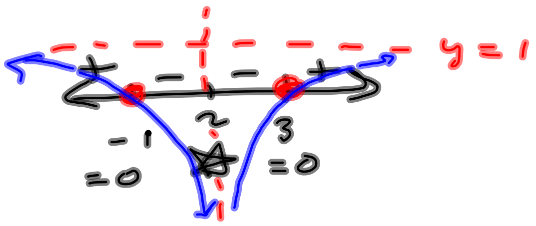
Sketch the graph of

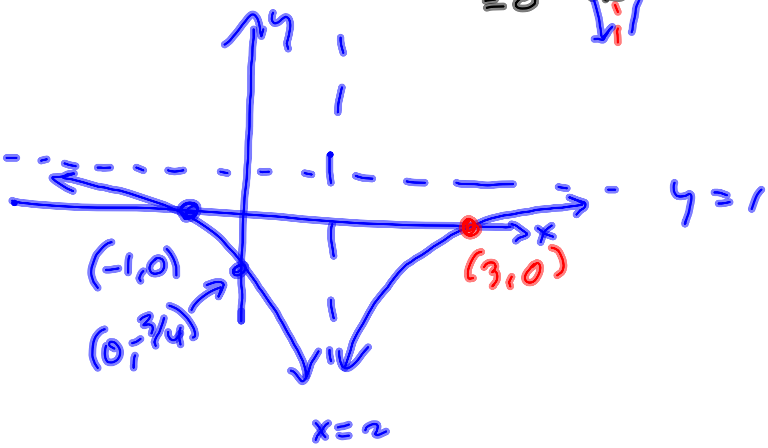
$$f(x) = \frac{(x+1)(x-3)}{(x-2)^2} = \frac{x^2-2x-3}{x^2-4x+4}$$

Domain: $\{x \mid x \neq 2\} = (-\infty, 2) \cup (2, \infty)$

V.A.: $x = 2$

H.A.: $y = 1$





$$f(x) = \frac{(x+1)(x-3)}{(x-2)^2} = \frac{x^2-2x-3}{x^2-4x+4}$$

Lowest Terms version of

Graph
$$f(x) = \frac{x^3-6x^2+5x+12}{x^3-8x^2+20x-16} = \frac{(x+1)(x-3)(x-4)}{(x-2)^2(x-4)}$$

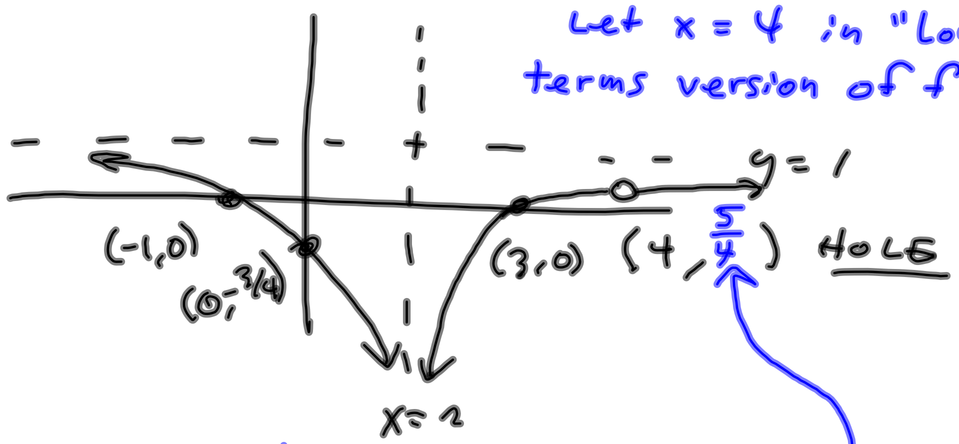
This is EXACTLY THE SAME as the previous $f(x)$, with a HOLE @ $x=4$.

$\mathcal{D} = \{x \mid x \neq 2, 4\}$

Intuition: $x=4$, $x=2$ are V.A.

BUT, we see $x-4$ factor in numerator that cancels $x-4$ in denominator.

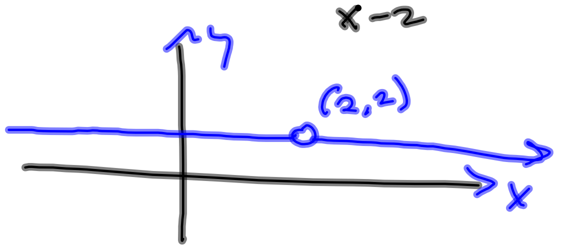
Let $x=4$ in "Lowest terms version of $f(x)$."



Let $x=4$: $\dfrac{(4+1)(4-3)}{(4-2)^2} = \dfrac{(5)(1)}{2^2} = \dfrac{5}{4}$

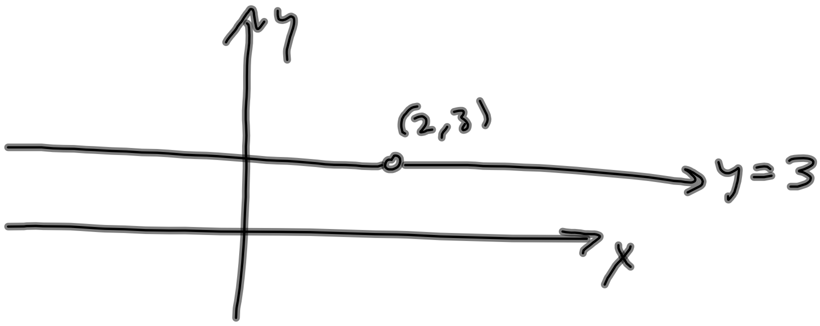
We say "$x=4$ is a removable discontinuity."

$$f(x) = \frac{2x-4}{x-2} = \frac{2(x-2)}{x-2} = 2 \quad (x \neq 2)$$



$y=2$ w/ hole @ $x=2$

$$y = \frac{3x-6}{x-2} = \frac{3(x-2)}{x-2} = 3, \quad (x \neq 2)$$



$$\frac{3x-7}{x-2}$$