

Curve has been calculated and revised grade reports are on the way.

I'm sending you updated grade reports.

Next week, I will announce make-up opportunities for the midterm.

What do you think about weekly short assignments that are written?

graph $f(x) = \frac{x-1}{x+2}$ using calculus.
 Start with college Algebra:

Domain: $\mathbb{R} \setminus \{-2\}$

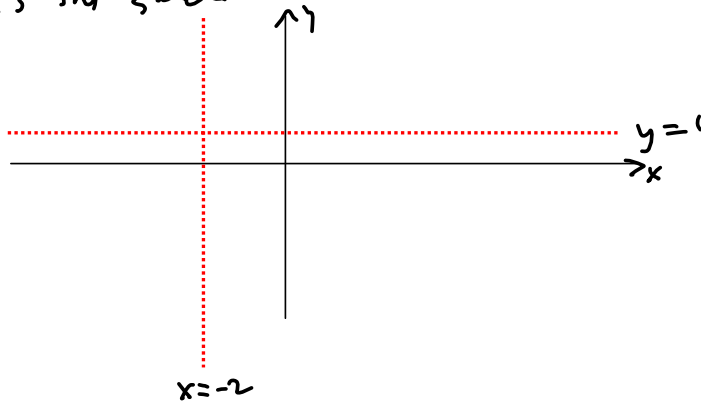
$x = -2$ is vertical asymptote.

End Behavior:

$$\lim_{x \rightarrow \pm\infty} \frac{x-1}{x+2} = \lim_{x \rightarrow \pm\infty} \frac{x(1 - \frac{1}{x})}{x(1 + \frac{2}{x})} = \lim_{x \rightarrow \pm\infty} \frac{1 - \frac{1}{x}}{1 + \frac{2}{x}} = \frac{1}{1} = 1 = y$$

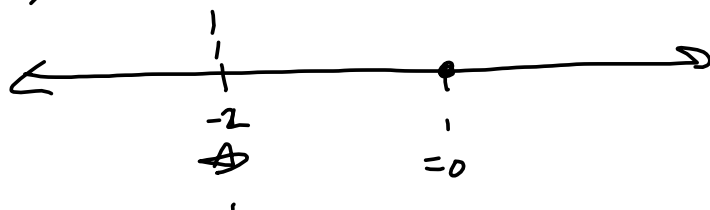
is horizontal asymptote, so

here's the skeleton?



zeros: $f(x) = 0 \Rightarrow \frac{x-1}{x+2} = 0 \Rightarrow x-1 = 0 \Rightarrow x=1 \rightarrow (1, 0)$ x-int

Sign Pattern uses zeros & vert. Asymp:



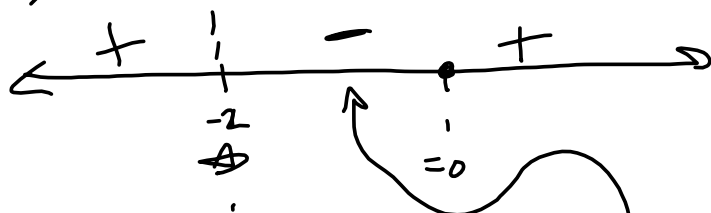
$(-\infty, -2)$

$(-2, 0)$

$(0, \infty)$

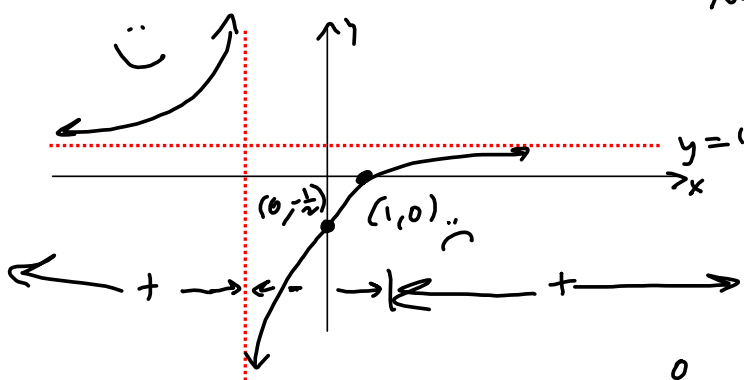
I use Hor. As. to get "+" far left & far right

Sign Pattern uses zeros & vert. Asymp:



Really only need one test?

$$(-2, 1) : x=0 : \frac{0-1}{0+2} = -\frac{1}{2} < 0 \text{ " - "}$$



Now inject calculus

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

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

Never = 0. Blows up at $x = -2$. Is "+" wherever it's defined. Agrees with college Algebra.

$$f''(x) = \frac{d}{dx} \left[\frac{3}{(x+2)^2} \right]$$

$$= \frac{d}{dx} [3(x+2)^{-2}] = 3(-2)(x+2)^{-3}(1) = \frac{-6}{(x+2)^3} - \text{Blows up at } x = -2$$



Agrees w/ college algebra.