8.3 Graphing Rationals Day 2

Essential Question

How do I identify all removable discontinuities and slant asymptotes of a rational function?

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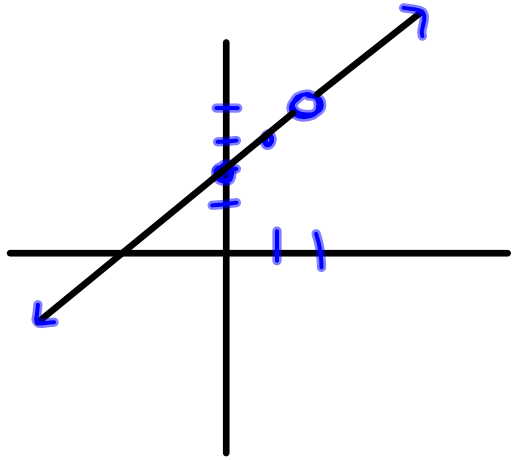
ex. $\frac{x^2-4}{x-2} = \frac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}}$

(hole)

If a factor cancels, then there is a ~~removable discontinuity~~ in the graph of the function.

x-coordinate: zero of canceled factor

y-coordinate: plug in x to remained



RD $x=2$

$y=4$

$(2,4)$

Remaining

$y=x+2$

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ex. $\dfrac{\cancel{(x-5)}}{\cancel{(x-5)}(x+2)}$

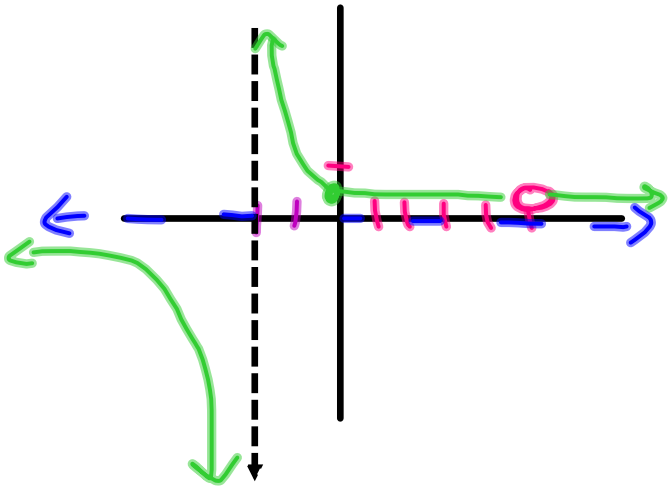
Remaining $\dfrac{1}{x+2}$

RD/hole: $(5, \frac{1}{7})$

VA: $x=-2$

HA: $\frac{\text{low}}{\text{high}}$ $y=0$

xint: none y-int: $(0, \frac{1}{2})$
$x=0$



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Essential Question How do I identify all removable discontinuities and slant asymptotes of a rational function?

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

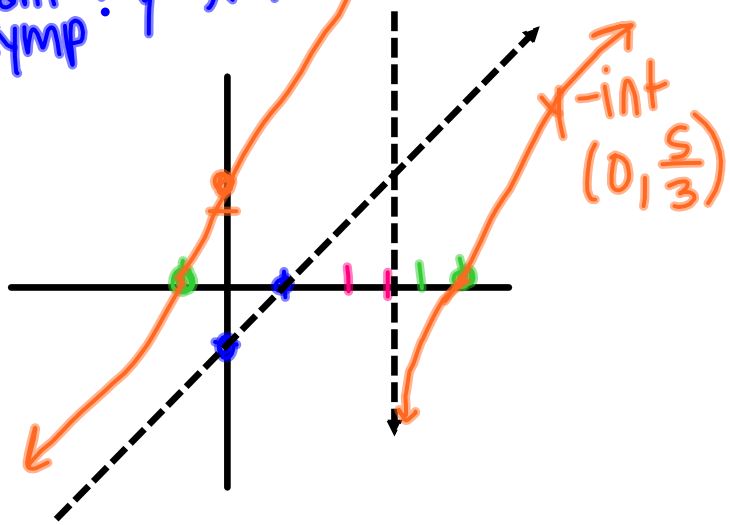
HA: $\frac{\text{high}}{\text{low}}$

No

VA: $x=3$

x-int: $(5,0)$ $(-1,0)$

slant asymp: $y=x-1$



Slant Asymptote: degree on top is ~~exactly one~~ higher than on bottom...use long division to find the equation

$$\begin{array}{r} x-1 \\ x-3\overline{)\,x^2-4x-5} \\ -(x^2-3x) \\ \hline -x-5 \\ -(-x+3) \\ \hline -8 \end{array}$$