Rational Functions

$\frac{\text{Polynomial}}{\text{Polynomial}}$

F

Step 1: FACTOR

Step 2: Look for any factors that cancel → If a factor cancels out, it creates removable discontinuity _____ or hole _____ → x-coordinate: set canceled factor = 0 y-coordinate: Plug x into remaining _____ → After this point, just use the remaining function _____

(x, y)

A

Step 3: Find the vertical asymptote(s) → Set the *bottom* of the fraction = 0

x = #

E

Step 4: Find the horizontal asymptote → *Bottom heavy degree*: y = 0 → *Equal degree*: y = LC/LC → *Top heavy degree*: No HA, maybe slant → Top *1 higher degree* than bottom: SA, divide, ignore r

low/high same/same high/low

y=

R

Step 5: Find the x-intercept(s) → Set the *top* of the fraction = 0

(#, 0)

y

Step 6: Find the y-intercept → Plug in 0 for x

(0, #)

use sign chart (VA, x-int)

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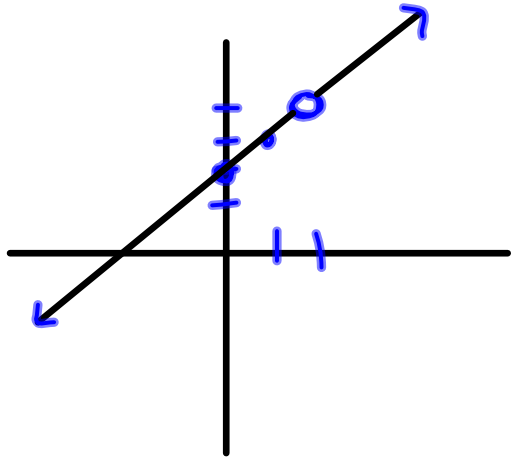
ex. $\dfrac{x^2-4}{x-2} = \dfrac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}}$

(hole)

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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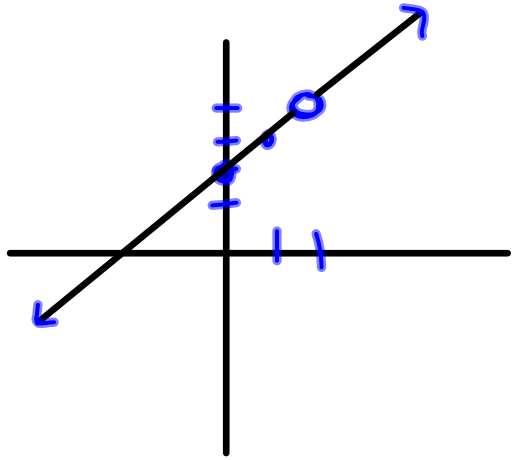

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Essential Question How do I identify all removable discontinuities and slant asymptotes of a rational function?

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

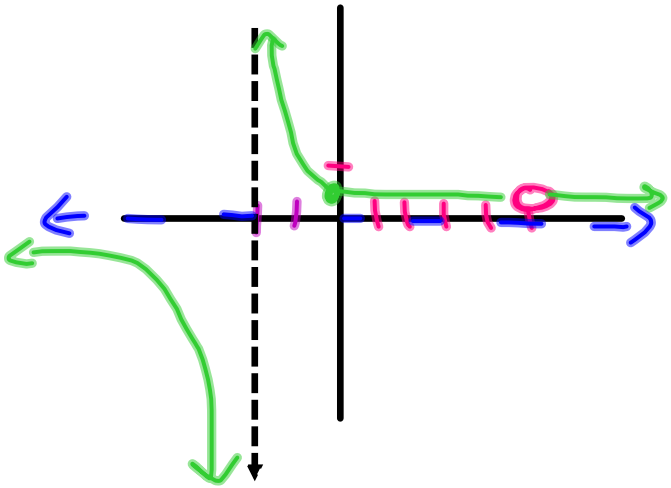
Remaining $\dfrac{1}{x+2}$

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

VA : $x=-2$

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

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



8.3 Graphing Rationals Day 2

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

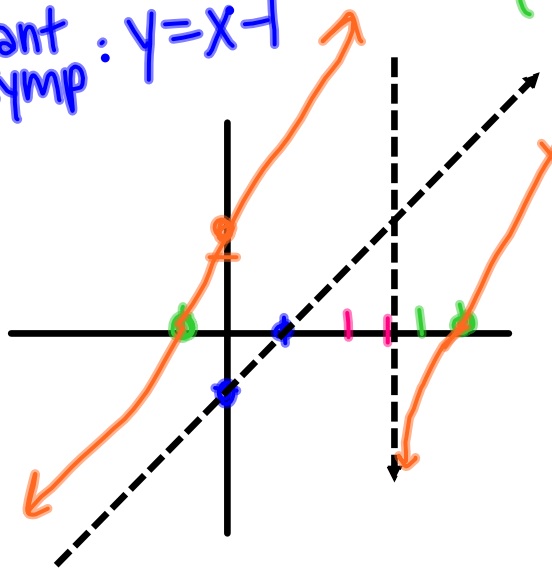
No

slant asymp: $y=x-1$

VA: $x=3$

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

y-int $(0,\frac{5}{3})$



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