9.2 Removable Discontinuities

Warm-Up Wednesday

1. Find the domain and all asymptotes of $f(x)=\frac{x^{1}-3}{x^{2}-x-20} = \frac{x-3}{(x-5)(x+4)}$

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

domain: $(-\infty,-4)\cup(-4,5)\cup(5,\infty)$

VA: $x=5, x=-4$

bottom = 0

About Me

1. When you meet someone new, what do you want them to know about you in the first 5 minutes?

2. Would you rather break someone else's heart, or have someone break yours?

questions comments concerns

9.1 Graphing Rational Functions Day 1 Name ____________

For #1-9, find the domain and any vertical or horizontal asymptotes.

1. $f(x)=\dfrac{3}{x-5}$

2. $f(x)=\dfrac{2}{x^2}$

3. $f(x)=\dfrac{1}{x}-\dfrac{6}{1}\cdot\dfrac{x}{x}$

$\dfrac{1}{x}-\dfrac{6x}{x}$

$\dfrac{1-6x}{x}$

$x=0$

HA: $y=-6$

VA: $x=0$

domain: $(-\infty,0)\cup(0,\infty)$

4. $f(x)=\dfrac{3}{4+3x}$

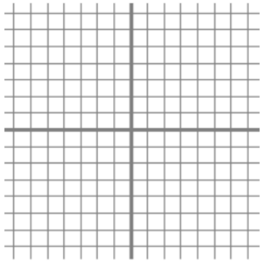
5. $f(x)=\dfrac{3x^2}{4x^2-4}$

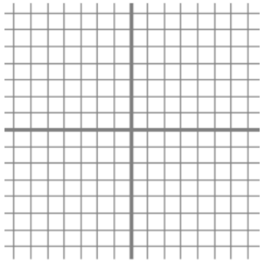
6. $f(x)=\dfrac{10x^2}{x^2-1}$

For #10-11, find the domain, VA, & HA and graph the function with their asymptotes.

10. $f(x)=\dfrac{x-3}{2x+5}$

11. $f(x)=\dfrac{2x-3}{5-3x}$





9.2 Removable Discontinuities

EQ: How do I find removable discontinuities?

A Removable Discontinuity (hole) occurs on the graph of a rational function when...

a factor cancels

Steps to find RD:

1. Factor top & bottom

2. Does any factor cancel?

If yes, there is a hole

3. Set canceled factor = 0

This is the x-coordinate.

4. Plug x into remaining function

This is the y-coordinate

5. Write as ordered pair

(x, y)

9.2 Removable Discontinuities

EQ: How do I find removable discontinuities?

Graph each rational function and find the domain.

EX1. $\dfrac{x^2-4}{x-2} = \dfrac{\cancel{(x-2)}(x+2)}{\cancel{x-2}}$

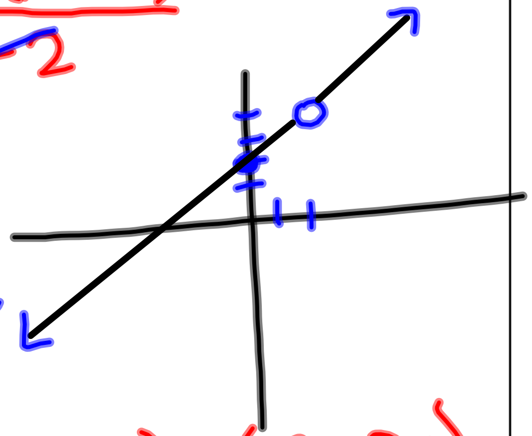
RD: $x-2=0$

$x=2$

$\boxed{(2,4)}$

Remaining Function: $y=x+2 \leftarrow$ line

$y=2+2$



Domain: $(-\infty,2)\cup(2,\infty)$

Steps to find RD:

1. Factor top & bottom

2. Does any factor cancel?

If yes, there is a hole

3. Set canceled factor = 0

This is the x-coordinate.

4. Plug x into remaining function

This is the y-coordinate

5. Write as ordered pair

(x, y)

9.2 Removable Discontinuities

EQ: How do I find removable discontinuities?

Graph each rational function and find the domain.

EX2. $y = \dfrac{\cancel{(x-5)}}{\cancel{(x-5)}(x+2)}$

RD: $x-5=0$

$x=5$

$\boxed{(5, 1/7)}$

Remaining Function: $y = \dfrac{1}{x+2}$ ← Rational

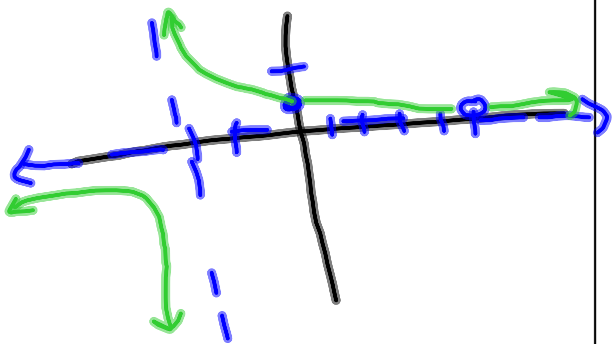
$y = \dfrac{1}{5+2}$

HA: $y=0$

$x+2=0$ VA: $x=-2$

x-int: none

$\dfrac{1}{0+2}$ y-int: $(0, \frac{1}{2})$



Steps to find RD:

1. Factor top & bottom

2. Does any factor cancel?

If yes, there is a hole

3. Set canceled factor = 0

This is the x-coordinate.

4. Plug x into remaining function

This is the y-coordinate

5. Write as ordered pair

(x, y)

9.2 Removable Discontinuities

EQ: How do I find removable discontinuities?

Graph each rational function and find the domain.

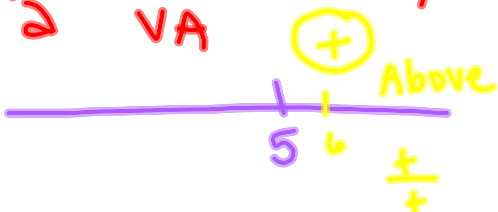
EX3. $y = \dfrac{x^2-4x-5}{x^2-10x+25} = \dfrac{\cancel{(x-5)}(x+1)}{\cancel{(x-5)}(x-5)}$

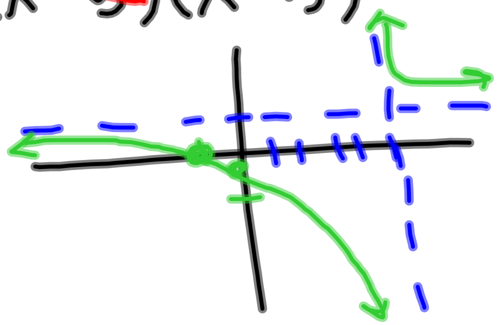
RD: $x-5=0$
$x=5$

$\boxed{y = \dfrac{x+1}{x-5}}$

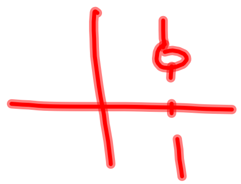
$\dfrac{5+1}{5-5} = \dfrac{6}{0}$ ☹

hole is actually a VA





VA: $x=5$
HA: $y=1$
x-int: $x+1=0$ $(-1,0)$
y-int: $\frac{0+1}{0-5}$ $(0,-1/5)$



Steps to find RD:

1. Factor top & bottom

2. Does any factor cancel?

If yes, there is a hole

3. Set canceled factor = 0

This is the x-coordinate.

4. Plug x into remaining function

This is the y-coordinate

5. Write as ordered pair

(x, y)

9.2 Removable Discontinuities

EQ: How do I find removable discontinuities?

~~Exit Ticket~~

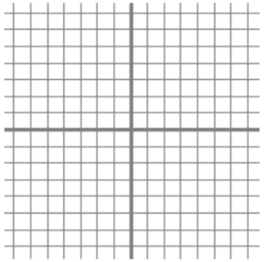
on google classroom...

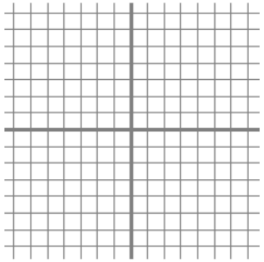
9.2 Graphing Rational Functions Day 2 (Holes) Name ________________

Find the domain, vertical or horizontal asymptotes, removable discontinuities, and graph the function with their asymptotes.

1. $f(x)=\dfrac{x-3}{x^2-x-20}$

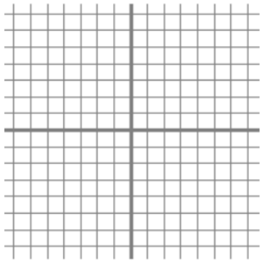
2. $f(x)=\dfrac{x^2-9}{x-3}$

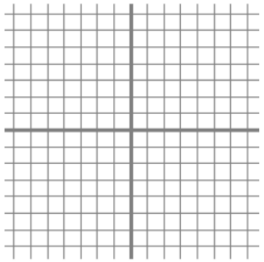




3. $f(x)=\dfrac{3}{x^2-3x-18}$

4. $f(x)=\dfrac{(x-2)(x+4)}{(x+8)(x-2)}$





5. f(x) = $\frac{x-4}{x^2+2x-24}$

6. $f(x)=\frac{2x^2+5x-3}{x^2+x-20}$

7. f(x) = $\frac{x^2+2x-3}{x^2+6x+9}$