Extra Review & Practice
Day 8

See binder….my lesson for this day for Spring ’19 and Fall ’18 differs some from this lesson

Warm-Up

Grab a small whiteboard for later. ☺

- Handout: Graphing, Continuity, and Limits for Rational Functions

  Complete this one that you got on the way in today

- Find this handout from Quiz 1 Day – we'll use it later ☺

Unit 4 – ICM
Rational Functions Practice

Name _____

1. Use g(x) for questions a – d and round to 3 decimal places. $g(x)=\frac{2x^2-8}{x-3}$

Maximum:

Minimum:

c. Increasing:

d. Decreasing:

2. Analyze each function and fill in the chart below. Use a separate piece of paper to show work.

	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
Vertical				

HW Questions??

Tonight's HW:

- Packet p. 9 (Quiz 2 Review)
- Finish In-Class Review Handout Parts 1 and 2

- Finish Quiz 1 Corrections

Announcements ☺

Unit 2 Test corrections

- Due on Mon 3/11 and Required if earned <80% on test
- Mastery Test for Unit 2 on Wed 3/13 during tutorials
  7 am or 2nd lunch if earned <60% on test

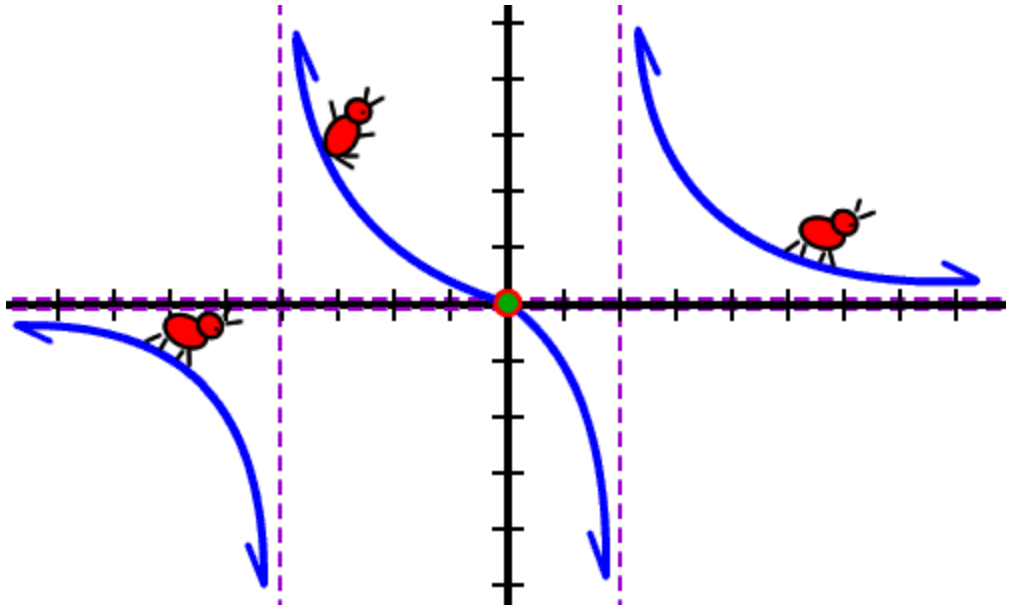
Unit 4 Quiz 1 corrections

- Due on Tues 3/12 (NO Late ones accepted)
- If done completely, your Unit 4 Test grade can replace this quiz grade

Tutorials for credit due Wednesday 3/20!

- Tutorials are
  - Most mornings at 7 AM
  - Monday & Wednesday 2nd half lunch

Rational Functions Handout – with Whiteboards



Rational Functions Handout - make the RED updates shown below!

1. Use g(x) for questions a – ~~d~~ f and round to 3 decimal places.

$$g(x) = \frac{2x^2 - 8}{x - 3}$$

a. Local Maximum:

b. Local Minimum:

c. Increasing:

d. Decreasing:

e. Domain:

f. Range:

Rational Functions Handout - ANSWERS

1. Use g(x) for questions a – ~~d~~ f and round to 3 decimal places.

$$g(x) = \frac{2x^2 - 8}{x - 3}$$

a. Local Maximum:

Local max is 3.056
at x = .764

b. Local Minimum:

Local min of 20.944
occurs at x = 5.236

c. Increasing:

$(-\infty, 0.764] \cup [5.236, \infty)$

d. Decreasing:

$[0.764, 3) \cup (3, 5.236]$

e. Domain:

$(-\infty, 3) \cup (3, \infty)$

f. Range:

$(-\infty, 3.056] \cup [20.944, \infty)$

Rational Functions Handout

	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
Find the following limits for the functions above.	$\lim_{x\to 7^-} f(x)$	$\lim_{x\to -5} g(x)$	Increasing:	$\lim_{x\to -\infty} f(x)$
	Decreasing:	$\lim_{x\to -2^+} g(x)$	$\lim_{x\to 3} h(x)$	$\lim_{x\to -3} f(x)$

Rational Functions Handout ANSWERS

	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
Find the following limits for the functions above.	$\lim_{x\to 7^-} f(x)$ $-\infty$	$\lim_{x\to -5} g(x)$ $\frac{5}{3}$	Increasing: $(-\infty,-3)\cup(-3,3)$ $\cup(3,\infty)$	$\lim_{x\to -\infty} f(x)$ $-\infty$
	Decreasing: $(-\infty,7)\cup$ $(7,\infty)$	$\lim_{x\to -2^+} g(x)$ $-\infty$	$\lim_{x\to 3} h(x)$ $-\frac{1}{6}$	$\lim_{x\to -3} f(x)$ -7

Rational Functions Handout ANSWERS

	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
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	Decreasing: $(-\infty,7)\cup(7,\infty)$	$\lim_{x\to -2^+} g(x)$ $-\infty$	$\lim_{x\to 3} h(x)$ $-\frac{1}{6}$	$\lim_{x\to -3} f(x)$ -7

Rational Functions Handout ANSWERS

	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
Vertical Asymptote(s) Analyze Denominator	$x=7$	$x=-2$	$x=-3$	*none*
Horizontal Asymptote(s) Analyze Degrees of Polynomial	$y=2$	$y=1$	$y=1$	*none*
HOLES or Removable Point(s) of Discontinuity Simplify rational by factoring	*none*	$(-5,\frac{5}{3})$	$(3,-\frac{1}{6})$	$(-3,-7)$

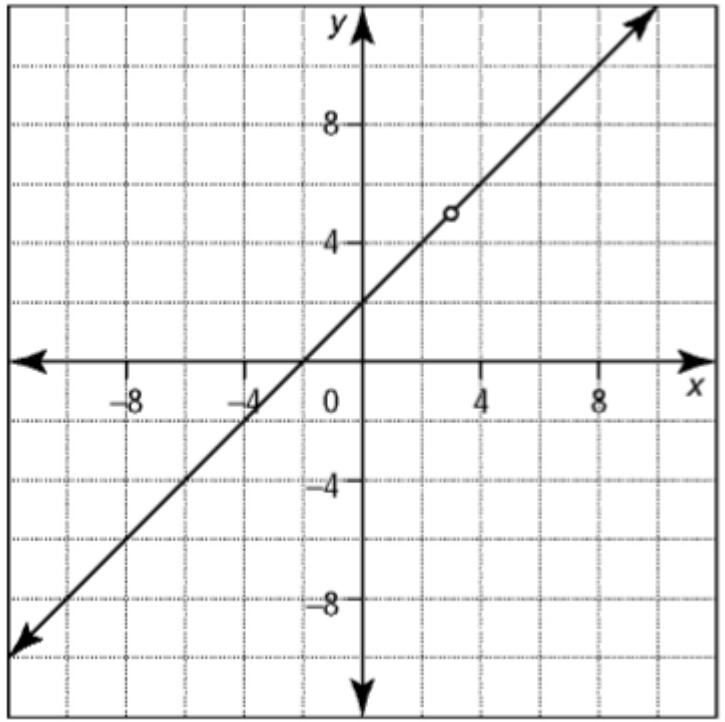
	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
x-intercepts set y = 0	$(\frac{1}{2},0)$	$(0,0)$	$(4,0)$	$(\frac{1}{2},0)$
y-intercepts set x = 0	$(0,\frac{1}{7})$	$(0,0)$	$(0,-\frac{4}{3})$	$(0,-1)$
Domain (consider vertical asymptotes and x-value of hole)	$(-\infty,7)\cup(7,\infty)$	$(-\infty,-2)\cup(-2,-5)\cup(-5,\infty)$	$(-\infty,-3)\cup(-3,3)\cup(3,\infty)$	$(-\infty,-3)\cup(-3,\infty)$
Range (consider horizontal asymptote and y-value of hole)	$(-\infty,2)\cup(2,\infty)$	$(-\infty,1)\cup(1,\frac{5}{3})\cup(\frac{5}{3},\infty)$	$(-\infty,-\frac{1}{6})\cup(-\frac{1}{6},1)\cup(1,\infty)$	$(-\infty,-7)\cup(-7,\infty)$

	$f(x)=\frac{2x-1}{x-7}$	$g(x)=\frac{x^2+5x}{x^2+7x+10}$	$h(x)=\frac{x^2-7x+12}{x^2-9}$	$f(x)=\frac{2x^2+5x-3}{x+3}$
Find the following limits for the functions above.	$\lim_{x\to 7^-} f(x)$ $-\infty$	$\lim_{x\to -5} g(x)$ $\frac{5}{3}$	Increasing: $(-\infty,-3)\cup(-3,3)$ $\cup(3,\infty)$	$\lim_{x\to -\infty} f(x)$ $-\infty$
	Decreasing: $(-\infty,7)\cup(7,\infty)$	$\lim_{x\to -2^+} g(x)$ $-\infty$	$\lim_{x\to 3} h(x)$ $-\frac{1}{6}$	$\lim_{x\to -3} f(x)$ -7

Notes: Write Equation from Graph

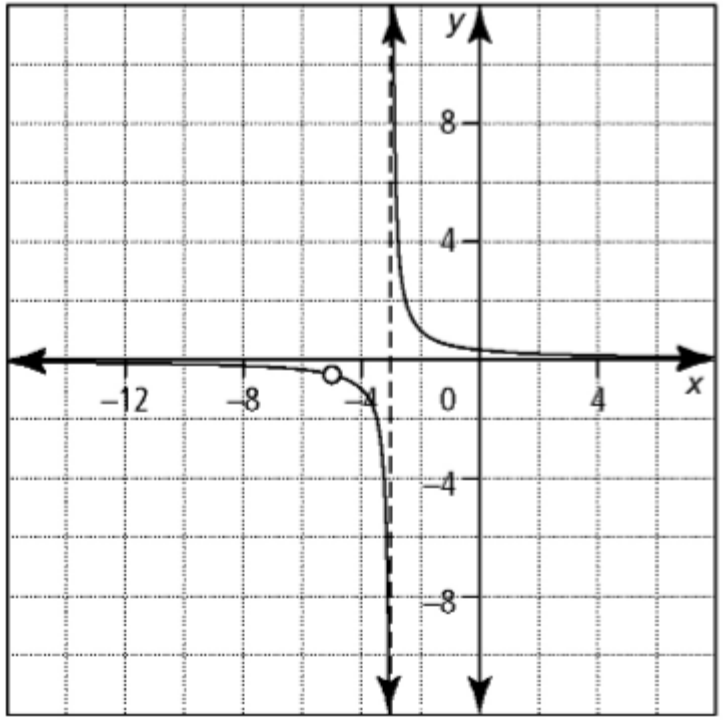
Write an equation for the graphed rational function.

a.



Hole (3, 5)

b.

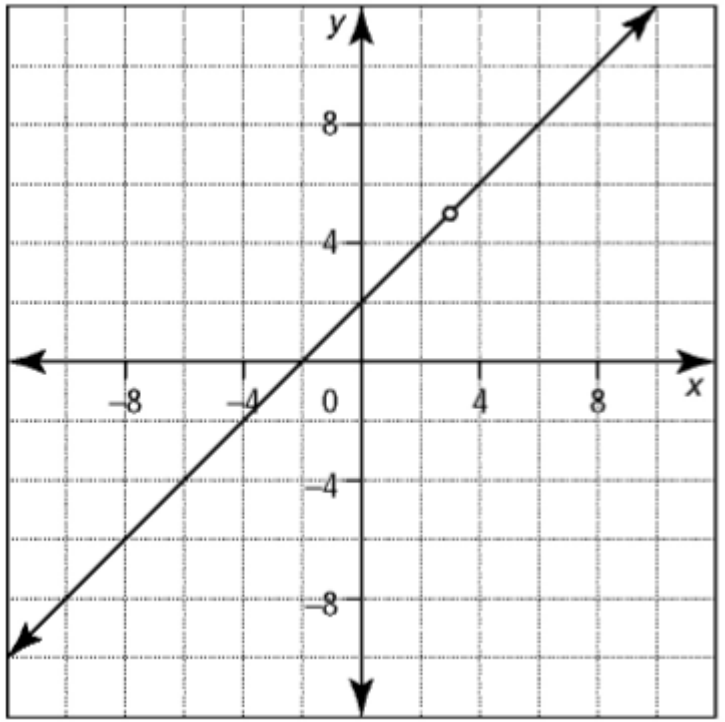


Hole (-5, -1/2)

More Practice for Quiz #2: ANSWERS

Write an equation for the graphed rational function.

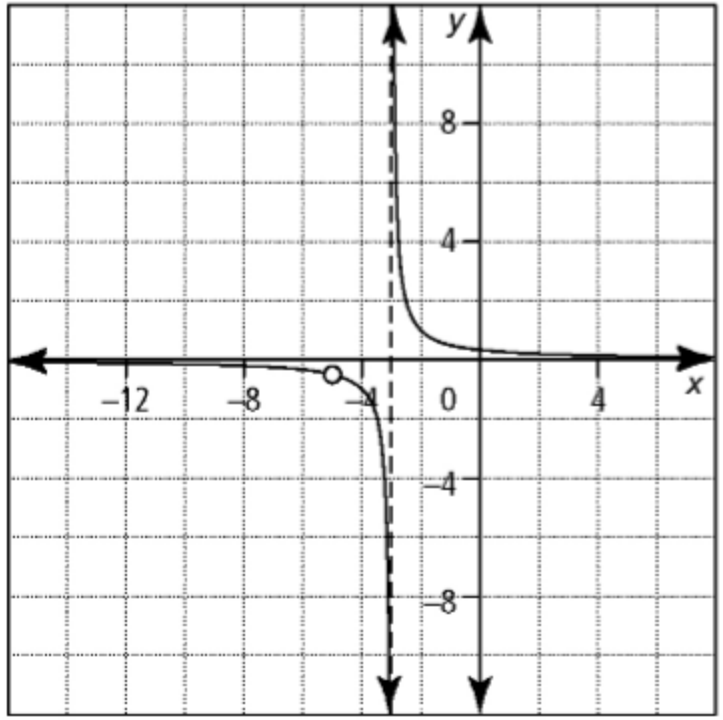
7.



Hole (3, 5)

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

8.



Hole (-5, -1/2)

$$y = \frac{(x+5)}{(x+5)(x+3)}$$

Compositions

Let *f* & *g* be two functions such that the domain of *f* intersects the range of *g*.

$(f \circ g)(x) = f(g(x))$

Domain of $(f \circ g)(x)$ =

- Intersection of the domain of g(x) with the domain of f(g(x)).

$(g \circ f)(x) = g(f(x))$

Domain of $(g \circ f)(x)$=

- Intersection of the domain of f(x) with the domain of g(f(x)).

Compositions

$f(x) = x^2$

$g(x) = 4 - 3x$

(f∘g)(x) = f(g(x))

(g∘f)(x) = g(f(x))

Domain:

Domain:

Compositions

$f(x) = x^2$

$g(x) = 4 - 3x$

(f∘g)(x) = f(g(x))

(g∘f)(x) = g(f(x))

$f(g(x)) = (4-3x)^2$

$g(f(x)) = 4 - 3x^2$

Domain:

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

Domain:

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

Find the domain of g(f(x))?

$$f(x) = \sqrt{x+5} \qquad g(x) = x^2 - 3$$

What numbers can't you substitute in to g(f(x))?
Does your domain agree?

Find the domain of g(f(x))?

$$f(x)=\sqrt{x+5} \qquad g(x)=x^2-3$$

$$g(f(x))=(\sqrt{x+5})^2-3$$

$$D:[-5,\infty)$$

$$Evaluate:\ g(f(-9))$$

What numbers can't you substitute in to g(f(x))?
Does your domain agree?

Compositions

$$f(x) = x^2 - 1$$

$$g(x) = \frac{1}{x-1}$$

$$(f \circ g)(x) = f\left(g(x)\right)$$

$$(g \circ f)(x) = g\left(f(x)\right)$$

Domain:

Domain:

Compositions

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

$$(f \circ g)(x) = f\big(g(x)\big) \qquad (g \circ f)(x) = g\big(f(x)\big)$$

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

Domain:

$$D : (-\infty, 1) \cup (1, \infty)$$

Domain:

$$D : (-\infty, -\sqrt{2}) \cup (-\sqrt{2}, \sqrt{2}) \cup (\sqrt{2}, \infty)$$

$$f(x)=\sqrt{x+5} \qquad g(x)=x^2-3$$

Evaluate:

$$f(g(2)+g(-1))=$$

$$f(g(h+1))=$$

$$f(x)=\sqrt{x+5} \qquad g(x)=x^2-3$$

Evaluate:

$$f(g(2)+g(-1))= \quad 2$$

$$f(g(h+1))= \quad \sqrt{h^2+2h+3}$$

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