Quiz #3 - Extended Standards - Rationals

[redacted]

PreCalculus

Name Student 3

Date 3/3/23 Per. 4

Rubric for Scoring: Rational Functions

The following quiz has three sections each dedicated to the standards listed below. Each section will be scored separately using the following rubric:

Standard	Points: 3	2	1
A-APR.7: Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression.	Student shows full/acceptable mastery of this standard, justifying their answers fully and with evidence using proper mathematical language and symbols.	Student shows partial mastery of this standard by providing inconsistent or incorrect justification, or failing to use proper mathematical language and symbols.	Student shows little mastery of this standard, providing little to no justification for their answers or by leaving this answer blank.
F-IF.7d: Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, showing end behavior.	Student shows full/acceptable mastery of this standard, justifying their answers fully and with evidence using proper mathematical language and symbols.	Student shows partial mastery of this standard by providing inconsistent or incorrect justification, or failing to use proper mathematical language and symbols.	Student shows little mastery of this standard, providing little to no justification for their answers or by leaving this answer blank.
F-IF.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	Student shows full/acceptable mastery of this standard, justifying their answers fully and with evidence using proper mathematical language and symbols.	Student shows partial mastery of this standard by providing inconsistent or incorrect justification, or failing to use proper mathematical language and symbols.	Student shows little mastery of this standard, providing little to no justification for their answers or by leaving this answer blank.

Great job Student 3! You were able to show that you ~~understood~~ understood rational functions, the effects of their graphs, and how to build equations of ~~model~~ rational functions when solving problems.

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PreCalculus

Student 3

Nam

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1) Determine if the equation $f(x) = x^2 - 1$ is a polynomial or a rational function. State your answer.

f(x) is a polynomial function ✓

2) Determine if the equation $g(x) = \dfrac{(x^2-1)x}{x}$ is a polynomial or a rational function. State your answer.

g(x) is a rational function ✓

3) Provide a justification for your answers above using the mathematical definitions for polynomial and rational functions. Compare and contrast $f(x)$ and $g(x)$, describing their graphical properties and what makes them similar and different.

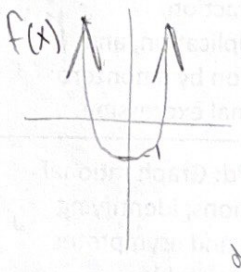
#1 is a polynomial function as f(x) = a polynomial, while #2 is a rational function as it is a ratio of one polynomial to another, otherwise stated as a polynomial divided by a polynomial. Although both graphs are visually similar, f(x) is a parabola, while g(x) follows a parabolic trajectory, with a hole at (0,0).

↓

Yes!

Score: 3

Standard: A-APR.7: Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression.



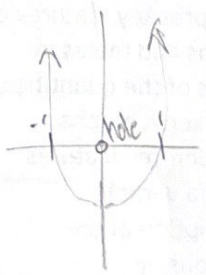
D/2 don't grade these graphs

$g(x) = \dfrac{(x-1)(x+1)x}{x}$ degrees 3

zeros: (1,0)(-1,0)

hole: (0,0)

asymptotes: N/A - think



$\dfrac{(-.25)(1.75)}{.25}$ .75

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PreCalculus

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4) Sketch a rough graph of the function $h(x) = \frac{x}{(x-2)(x+4)}$ by performing the following:

a. Find the zeros (x-intercepts).

(0,0) ✓

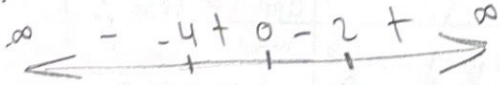
b. Find the vertical asymptotes.

x=2, x=-4 ✓

c. Find the holes in the graph (if any).

N/A ✓

d. Find the intervals where $h(x)$ is positive and where $h(x)$ is negative.



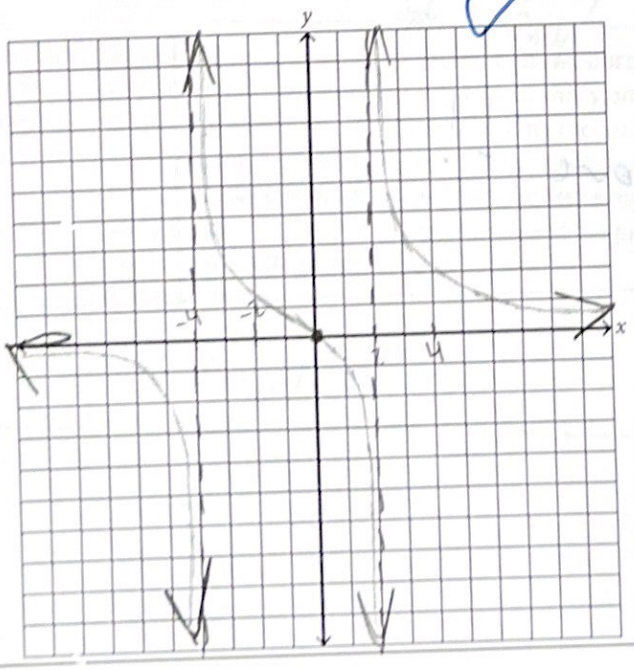
✓

e. Determine the end behavior.

h(x) will continue to go closer to 0, never reaching it, forever. ✓

y=0

f. Sketch a rough graph:



✓

Score: 3

Standard: F-IF.7d: Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, showing end behavior.

-5
(-3)(9)
3
(1)(1)
1
(-1)(1)
-2
(-4)(2)

10000
(9998)(10,004)

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PreCalculus

Name Student 3

Date_____ Per._____

3) Mr. me is planning a field trip to local company a local computing company that does a lot of real-world mathematics. The cost to rent a bus for the trip is $800, and company is charging $12 per student to cover meals and snacks. One student in your class, Margaret, knows someone who works at company and so will get her meals and snacks for free.

Write an equation for a rational function that can be used to model the costs of the field trip for each student, assuming the total costs for the trip are divided evenly between each student attending. Remember: Mr. me is currently planning this trip, so he does not know yet how many students will be attending. Margaret has confirmed she will be going.

cost of bus

meal cost per S

friction Margaret and her free lunch

$$y = \frac{800 + 12(x-1)}{x}$$

x is all integers ≥ 0

numStudents

Love it!

Score: 3

Standard: F-IF.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

# of S	cost per S
0	undefined
Margaret 1	

$$y = \frac{800 + (12(x-1))}{x}$$