

RATIONAL FUNCTION GRAPHS

Performance Standard (8D/6A.J)

Analyze rational function graphs to make conclusions and create an equation to fit a set of requirements.

- *Mathematical knowledge:* Determine the equation and graph with correct interval notation;
- *Strategic knowledge:* Provide evidence of correct knowledge of the equation properties that make the graph go up on both sides of the asymptote or down on both sides of the asymptote, and the properties of the equation that causes the graph to go up on one side and down on the other side of the asymptote and what conditions cause the left side to be up and the right side down;
- *Explanation:* Explain completely the conclusions that led to the equation created and the intervals chosen and why.

Procedures

1. Provide students with sufficient learning opportunities to develop the following in order to (8D) use algebraic concepts and procedures to represent and solve problems, and (6A) demonstrate knowledge and use of numbers and their many representations in a broad range of theoretical and practical settings.
 - Solve problems using rational equations and inequalities.
 - Represent numerical intervals using correct notation.
2. The student is given a copy of the task with coordinate axes to sketch graphs. The problem is to create a new equation from the conclusions formed from the initial graphs and answer questions using interval notation and explain his/her reasoning. It is assumed that the students have had experience graphing simple rational equations on the calculator and understand the concept of a vertical asymptote.
3. A 4 in mathematical knowledge would require a correct equation and graph with correct interval notation. A 4 in strategic knowledge would require evidence of correct knowledge of the equation properties that make the graph go up on both sides of the asymptote or down on both sides of the asymptote. The student should provide evidence of the properties of the equation that causes the graph to go up on one side and down on the other side of the asymptote and what conditions cause the left side to be up and the right side down and vice versa. A 4 in explanation would be a complete description of the conclusions that led to the equation created and the intervals chosen.

Examples of Student Work not available

Time Requirements

- One class period

Resources

- Copies of the “Rational Function Graphs” task sheet
- Access to a graphing calculator
- Mathematics Rubric

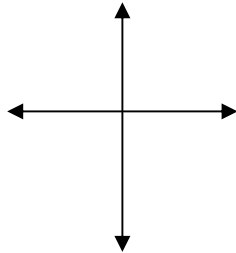
ASSESSMENT (8D/6A.J)

RATIONAL FUNCTION GRAPHS

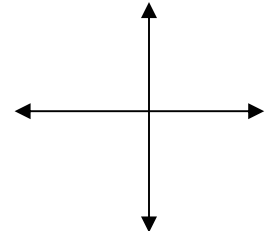
Student Task Sheet

I. Graph and sketch the following functions:

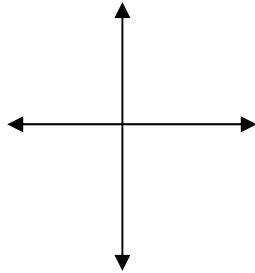
a) $f(x) = \frac{3}{x-3}$



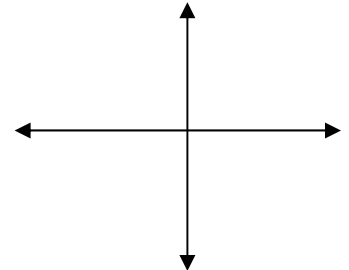
b) $f(x) = \frac{-3}{(x-3)^2}$



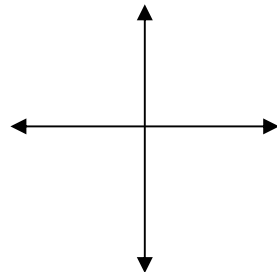
c) $f(x) = \frac{2}{(x-5)^2}$



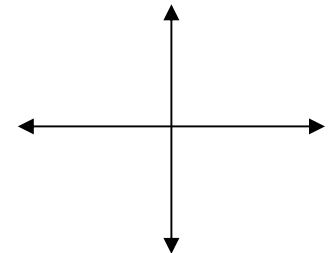
d) $f(x) = \frac{2}{(x-5)^3}$



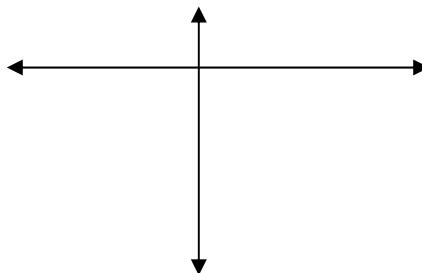
e) $f(x) = \frac{4}{x(x+2)^2}$



f) $f(x) = \frac{4}{x(x+2)^3}$



II. Create and sketch an equation of a rational function that contains at least 2 vertical asymptotes: Near one asymptote, the graph should increase on one side and decrease on the other side. Near the other asymptote, the graph should either increase on both sides or decrease on both sides.



III. Write in interval notation the x values where your graph is increasing and decreasing.

Increasing: _____ Decreasing: _____

- IV. Describe in writing how you could determine the shape of the graph from the equation before actually graphing it.