Free Response Practice #22
Calculator NOT Permitted

Consider the rational functions $f(x) = \frac{2}{x-3}$ and $g(x) = \frac{x-2}{x^2-9}$ to answer the following questions.

a. At what value(s) of x will the graphs of $f(x)$ and $g(x)$ have discontinuities? Explain your reasoning.

b. If $h(x) = f(x) \cdot g(x)$, find an equation for h in standard form and then determine at what value of y will the graph of h have a horizontal asymptote? If no such value exists, state so. Give a reason for your answer.

c. On what intervals will $f(x) \geq g(x)$? Show the complete algebraic and sign analysis that leads to your answer.

Free Response Practice #24
Calculator Permitted

The table below shows function values for a rational function, $G(x)$. The equation of $G(x)$ is such that $(x + 2)$ and $(x - 1)$ are the only factors in the denominator of the function.

x	–1000	–2.001	–2	–1.999	0	0.999	1	1.001	1000
$G(x)$	0.998	0.333	Undefined	0.333	–1	–1999	Undefined	2001	1.002

a. Does either factor in the denominator also exist in the numerator? If so, which factor? Give a reason for your answer.

b. Does either factor of the denominator not exist in the numerator? If so, which factor? Give a reason for your answer.

c. Based on the end behavior, where does $G(x)$ have a horizontal asymptote? Give a reason for your answer.

d. Sketch a possible graph of the function $G(x)$. Then, state the domain and range of $G(x)$.

Domain:_____

Range:_____