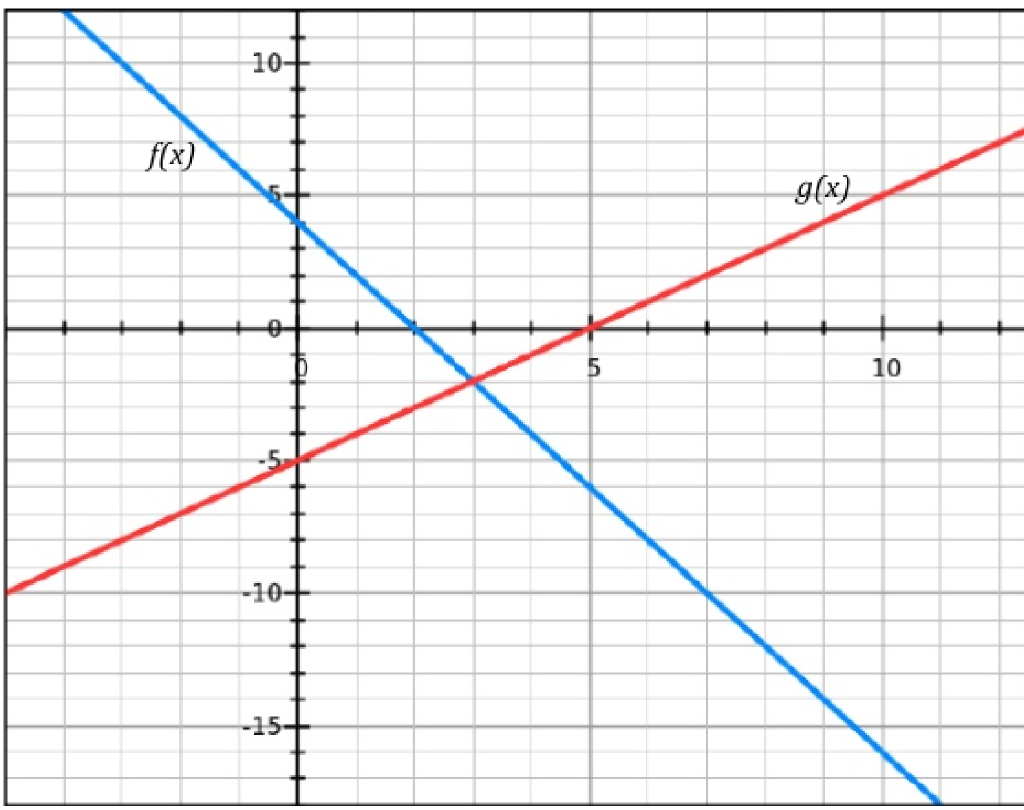
Pre-Calculus **Name** ____________________

Building Rational Functions **Collected/Not Collected**

1. Your favorite way to explain why a number divided by zero is undefined:

2. The graph below shows two linear functions, $f(x)$ and $g(x)$. For values of x shown on the graph, calculate the quotient $\frac{f(x)}{g(x)}$. Complete the table of values and graph the result on the same coordinate plane.



X	$f(x)$	$g(x)$	$\frac{f(x)}{g(x)}$

3. In addition to the points you already plotted, plot the values for $\frac{f(x)}{g(x)}$ at $x = 4.5$ and $x = 5.5$. Try a few other values that approach (get closer to) x = 5. What happens to the values of $\frac{f(x)}{g(x)}$ when the values get closer to x = 5.

4. What is the equation of the new function? $\frac{f(x)}{g(x)} =$ ____________

Graph it on your calculator to check that your equation matches the graph. Change the graphing window, if necessary.

Exactly what are you typing into Y=________________________

5. What are the zeros (roots) of the new function, $\frac{f(x)}{g(x)}$?

6. What about the original graphs $f(x)$ and $g(x)$ determined where the zero of the new graph would be?

7. What is the domain (usable x's) of this function?

8. What about the original graphs $f(x)$ and $g(x)$ restricted the domain (made a certain value of x impossible)?

9. If we only had the equation, and not the graph, how could we find where these impossible values of x are located?

10. Now, it's time to make the jump and apply this new knowledge!

    What values of x make the function undefined? Find them algebraically, and then check by graphing on a calculator.

    (a) $p(x) = \dfrac{4-x}{3x}$ (b) $q(x) = \dfrac{x+1}{2x-5}$ (c) $r(x) = \dfrac{4}{x^2+2x-35}$

11. Now, show me that you really understand all of this… Which line is the numerator and which line is the denominator? Write the equation from the linear functions given that created the rational function.