QUOTIENT RULE

Quotient Rule is a rule of differentiation. For this, one simply follows the general form to differentiate two terms that are separated by a divisor bar. Power Rule is used to differentiate as appropriate for general form.

USE QUOTIENT RULE TO DIFFERENTIATE

$$f' = \frac{g'(x)h(x) - h'(x)g(x)}{(g(x))^2}$$

Let's say the following was what we had to differentiate. The g(x) term is the numerator and the h(x) term is the denominator. Differentiate the terms separately to plug them into quotient rule as appropriate. Use sum and power rule.

$$f(x) = \frac{5x^3}{2x^7 + 15x}$$

$$g'(x) = 15x^2$$
$$h'(x) = 14x^6 + 15$$

Now to one simply writes the derivative of g(x) first, multiplied by h(x) as is, then a subtract symbol and the g(x) as is with the derivative of the h(x) as a product. Remember to watch for double negatives when doing this.

Lastly, this will all be over the denominator as it was before, however this time it will be raised to the power of two. If you are still having difficulty, recap on the sum and power rule, and notice that $15x^1$ will result in a derivative of $15x^0$ and anything raised to the power of zero is of course 1, hence why the second term in h'(x) is 15.

$$f(x) = \frac{15x^2(2x^7 + 15x) - (14x^6 + 15)(5x^3)}{(2x^7 + 15x)^2}$$