Math 1131 Week 4 Worksheet

Name: _____

Discussion Section:_____

Solutions should show all of your work, not just a single final answer.

3.2: The Product and Quotient Rules

1. Compute the derivative of each function below using the methods from Sections 3.1 and 3.2 (**not other methods**).

   (a) $f(x) = \dfrac{x}{x+3}$ (simplify numerator in final answer)

   (b) $f(x) = \dfrac{e^x}{1+e^x}$ (simplify numerator in final answer)

   (c) $f(x) = \sqrt{x}e^x$

(d) $f(x) = \dfrac{e^x}{x^n}$ for constant n, in two ways: (i) quotient rule and (ii) product rule

(e) $f(x) = \dfrac{1}{x} + \dfrac{1}{1-x}$ (in final answer, use a common denominator and simplify numerator)

2. In the function $h(x)$ below, defined in terms of $f(x)$ and $g(x)$, determine $h'(2)$ in each case if $f(2) = 3$, $g(2) = 4$, $f'(2) = 1$, and $g'(2) = -5$.

   (a) $h(x) = 2f(x) + 5g(x)$

   (b) $h(x) = f(x)g(x)$

   (c) $h(x) = \dfrac{f(x)}{g(x)}$

   (d) $h(x) = \dfrac{g(x)}{f(x) + 2}$