MTh 495.595 Homework Topic 11

1. Find the derivative of each of the following using the Product or Quotient Rules as appropriate. Show your work. Don't simplify unless you are asked to.

   a. $y = (1+3x)(1+5x)$

   b. $y = (1+2x+3x^3)(1+4x+8x^2)$

   c. $y = \sin(x)\left(7x^3 - \frac{1}{x}\right)$

   d. $y = \frac{8x}{e^x}$

   e. $y = (1+3x)(x^3+5x)(2+3x-2x^7)$ Hint: You will need to apply the Product Rule twice.

   f. $y = \frac{1+3x}{1+5x}$; simplify the numerator of the derivative.

   g. $y = \frac{x^3}{1+5x}$; simplify the numerator of the derivative.

2. For $n \in R$, find the derivative of $y = \frac{1}{x^n}$ by 1) using the Quotient Rule (simplify completely) and by 2) using the Power Rule. Which way is easier?

3. Find the derivative of $y = \frac{1+5x}{x^3}$ by 1) using the Quotient Rule (simplify completely) and by 2) simplifying the function first into two fractions and then using the Power Rule on each fraction. Which way is easier?