Name: _____ _____ **/ 25**

Circle one: Rhodes (F01) | Bueler (F02)

25 points possible. No aids (book, calculator, etc.) are permitted. Show all work for full credit.

1. [15 points] Compute the derivatives of the following functions. Write your answer using appropriate derivative notation, but you need not simplify your answers.

a. $f(x) = 2e^x - x^e + e^2$

b. $r(x) = \dfrac{3}{x^2}$

c. $g(u) = u^{1/3} - u^{7/3}$

d. $s(t) = \left(\sqrt{t} + 1\right) e^t$

e. $y = \dfrac{5x^2}{1 - 2x^3}$

2. [3 points] Find an equation of the tangent line to the curve $y = 2x - x^2$ at $x = -1$.

3. [4 points] Suppose that $f(4) = 2$, $g(4) = 4$, $f'(4) = -1$, and $g'(4) = 3$. Find the following values.

a. $(fg)'(4)$

b. $\left(\frac{f}{g}\right)'(4)$

4. [3 points] At what x value is the tangent line to the curve $y = e^x - 3x - 2$ parallel to $y = 2x - \frac{3}{2}$?