

Name: _____

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Circle one: Faudree (F01) | Bueler (F02) | VanSpronsen (UX1)

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

1. [12 points] Differentiate the functions. Write your answer using appropriate derivative notation, but you need not simplify your answers.

a. $g(u) = u^{1/3} - u^{4/3}$

b. $f(x) = \frac{2}{x^3}$

c. $h(x) = x^{e-1} + \frac{1}{e^2}$

d. $s(t) = (4 - t)e^t$

e. $F(t) = \frac{At}{B + Ct^2}$

2. [4 points] Suppose that $f(2) = 5$, $g(2) = 1$, $f'(2) = -3$, and $g'(2) = 4$. Find the following values.

a. $(fg)'(2)$

b. $\left(\frac{f}{g}\right)'(2)$

3. [6 points] The equation of motion of a particle is $s = t^4 - 2t^3 - 3$, where s is in meters and t is in seconds. **Include the units for each answer.**

a. What is the acceleration as a function of t ?

b. Find the velocity at the time $t > 0$ when the acceleration is 0.

4. [3 points] For what value of x does the graph of $f(x) = 2e^x - 5x$ have a horizontal tangent?