Exam #2, Math 8, Dr. M. Bohner, Oct 9, 00.

Name:

Nicely show all your work on this page. No books, notes, calculators!

1. Use **the definition** of the derivative to differentiate $f(x) = 2x^2 - 3x$ and $g(x) = \frac{1}{\sqrt{x}}$.

2. Given are two differentiable functions f and g with $f(2) = 1$, $g(3) = 2$, $f'(2) = 3$, $g'(3) = 4$, $f(3) = 5$, and $f'(3) = 6$. Find $(2f)'(2)$, $(f+g)'(3)$, $(f \cdot g)'(3)$, $(f/g)'(3)$, $f'(g(3))$, and $(f \circ g)'(3)$.

3. Find the tangent line to the graph of $y^4 + 3y - 4x^3 = 5x + 1$ at the point $(1, -2)$.

4. Gravel is being dumped from a conveyor belt at a rate of 30 ft^3/min and its coarseness is such that it forms a pile in the shape of a cone whose base diameter and height are always equal. How fast is the height of the pile increasing when the pile is 10 ft high?