Name							Total			Section Time
Scores:	1	2	3	4	5	6	7	8	9	

Calculus 10C, Spring 2008, Lecture B, Final Exam

Three hour exam. You will get full credit only if you show all your work clearly. No calculators are allowed.

1. Let $z = \sin(x/y)$ and let $x = \ln u$ and $y = v^4$. Compute the partial derivatives $\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$.

2. Compute the fourth order Taylor polynomial, at $x = 0$, for the function $f(x) = \frac{1}{1+x}$.

3. Let $f(x, y) = \sqrt{2x - y}$. Find the quadratic Taylor approximation to f at the point $(3, 5)$.

4. Compute the directional derivative of the function $f(x, y) = xe^{-4y}$, at the point $(3, 0)$, in the direction of the vector $4i - 3j$.

5. Find the equation of the plane passing through the three points $(2, 1, 0)$, $(0, 1, 3)$ and $(1, 0, 1)$.

6. Find a vector normal to the surface $xy + xz + yz = 11$ at the point $(1, 2, 3)$.

7. Let $f(x, y) = \sqrt{\cos x + \sin y}$. Use the linear approximation to $f(x, y)$ near $(0, 0)$ to approximate $f(0.01, 0.04)$.

8. Let $f(x, y) = x^2 + y^3 - 3xy$. Find the critical points of f and decide whether each is a local maximum, minimum or saddle point.

9. Use the method of Lagrange multipliers to find the maximum value of $f(x, y) = 4x - 3y$ subject to the constraint $x^2 + y^2 = 4$.