(10) 1. Find the maximum rate of change of f at the given point and the direction in which it occurs.

$$f(x,y) = xe^{-y} + 3y, \quad (1,0)$$

12.6, #17

(14) 2. Find the local maximum and minimum values and saddle points of the function.

$$f(x,y) = x^2 + y^2 + x^2y + 4$$

12.7, #5

(12) 3. Use Lagrange multipliers to find the maximum and minimum values of the function subject to the given constraint.

$$f(x,y) = xy, \quad 9x^2 + y^2 = 4$$

12.8, #3

(10) 4. Evaluate the iterated integral.

$$\int_0^1 \int_0^x \sin(x^2)\, dy\, dx$$

13.3, #5

(12) 5. Sketch the region of integration and change the order of integration.

$$\int_0^4 \int_{y/2}^2 f(x,y)\, dx\, dy$$

13.3, #37

(12) 6. Evaluate the given integral by changing to polar coordinates.

$\iint_R xy\, dA$, where R is the region in the first quadrant that lies between the circles $x^2+y^2=4$ and $x^2+y^2=25$.

13.4, #3

(16) 7. Evaluate the triple integral.

$\iiint_E z\, dV$, where E is bounded by the planes $x=0$, $y=0$, $z=0$, $y+z=1$, and $x+z=1$.

13.7, #13

(14) 8. Evaluate the line integral, where C is the given curve.

$\int_C xy\, dx + (x-y)\, dy$, C consists of the line segments from $(0,0)$ to $(2,0)$ and from $(2,0)$ to $(3,2)$.

14.2, #7

EXAM 2 for MATH 251, sections 19 and 20

November 22, 1996

NAME (*please print*): ____________________

SIGNATURE: ____________________

Do all problems, in any order.

Show all your work. Full credit may not be given for an answer alone.

You may use both sides of one sheet of notes and
any standard calculator without a QWERTY keypad on this exam.
You may use no other materials.

Problem Number	Possible Points	Points Earned:
1	10	
2	14	
3	12	
4	10	
5	12	
6	12	
7	16	
8	14	
Total Points Earned:		