Math 037 **Review for Midterm 1. Oct 15, 2004**

1. Find the $u_x(1,1), u_y(1,1)$ if $x\ \sin u(x,y)+y(u(x,y))^2 = x^2-1$ and $u(1,1)=0$.

2. Plot level curves for the function $z = f(x,y) = 4x^2 - y^2$. Plot the level surfaces of the function $f(x,y,z) = x^2+y^2+4z^2$.

3. If a kid blows a balloon at 2 in^3 per second. Find the rate of change of the volume if you assume the balloon always assume the shape of a ball.

4.Find the directional derivative of $f(x,y,z) = x^2+2xy+4yz$ in the direction of $i+j+k$.

What is physical meaning of this derivative?

5. Give a function so that it is continuos at $(0,0)$ by not differentiable. Give a function so that it isn't continuous at $(0,0)$.

6.Find the tangent plane of $x^2+y^2+2z^2=4$ at $(1,1,1)$.

7. Find the direction in which the function $z = 2x + \sin(2y-x)$
increases and decreases the most from the point $(0,0)$.

8.Find the gradient of $z = f(x,y) = 4x^2+y^2$. Find its directional derivative in the direction of i+j at the point $(1,1)$.

9. Compute: $(x^y)_{xy.}$

10. Approximate $\sqrt{99}$ and $\sin(46^o)$. You have to show the formula. An answer from calculate will yield 0 point.

11. Find the maximum of xyz if $x+y+z = \dot{1}$ and positive.

12.Find maxima and maximal value of the function $2x-y$ inside the unit circle.

13. Find the integral $\int\int\int_D x^2 dvol$, where D is the upper half unit ball
$x^2+y^2+z^2 \le 1$, $z \ge 0$.

14. Find maxima and maximal value of the function x^2+2y in the triangle
$x+3y=1, y=0$ and $x=0$.

15. Find the integral $\int\int\int_D x dvol$, where D is the part of the unit ball
$x^2+y^2+z^2 \le 1$ and $x \ge 0, y \ge 0, z \ge 0$.

16. Find the extrema of the function x^2y in the triangle bounded by the $x-axis$ and $y-axis$ and the line $x+y=1$.

17. Compute $\int\int_D x^2 y dxdy$, where D is the upper half disk.