Math 208 **Test II** **March 27, 2003**

Name:____ Score:______________

Instructions: You must show supporting work to receive full and partial credits. No books or class notes.

1(18 pts) Find the local maxima, minima, and saddle points of the function

$$f(x,y) = \frac{1}{3}(x+y)^3 + 4xy.$$

2(16 pts) Find the shortest distance from the origin to the plane $x + 2y + 3z = 14$. (*Hint*: using Lagrange Multiplier Method.)

3(15 pts) Sketch the region and change the order of integration to $dydx$ for $\int_0^9 \int_{-\sqrt{y}}^0 f(x,y)dxdy$.

4(15 pts) Use a polar coordinate setup to evaluate the integral $\int\int_R \frac{1}{\sqrt{x^2+y^2}}dA$ where the region R is the triangle bounded by $x = 0, x = 1, y = 0, y = x$. (Recall $\int \sec\theta d\theta = \ln|\tan\theta + \sec\theta| + C$.)

5(20 pts) Let G be the solid bounded by these surfaces $x = 0, z = 4, z = y, z = x^2$. Set up an iterated triple integral for $\int\int\int_G f(x,y,z)dV$ in the order of $dydzdx$.

6(16 pts) Sketch the region of integration and change the triple integral

$$\int_0^1 \int_0^{\sqrt{1-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{2-x^2-y^2}} (x+y)dzdydx$$

to an iterated triple integral in the spherical coordinates.(**DO NOT EVALUATE.**)

Bonus(2 pts) Bo's office is on the ____ of ____________ Hall.

The End