Math 210 **First Hour Exam** Fall 2005

NAME: _____

You must hand this sheet in with your exam in order to receive a grade.

1. (20 points) Consider the triangle with vertices

$$A = (1, -3, -2),\ B = (2, 0, -4),\ C = (6, -2, -5).$$

(a) Find the area of this triangle.

(b) Determine whether or not it is a right triangle.

2. (15 points) Find an equation for the plane which contains the point (2,-1,5) and the line

$$\frac{x+1}{4} = \frac{y-4}{2} = z - 1.$$

3. (15 points) For the position function $\mathbf{r}(t) = \langle t, t^2, t^3 \rangle$, find the velocity $\mathbf{v}(t)$, the speed $v(t)$, and the acceleration $\mathbf{a}(t)$.

4. (15 points) Sketch the level sets for the function $f(x, y) = 4x^2 + 4y^2 + 2$ which correspond to the function values 2, 4, and 10.

5. (10 points) Evaluate the following limit, or show it does not exist:

$$\lim_{(x,y)\to(0,0)} \frac{xy}{x^2 + y^2}$$

6. (15 points) For the function $f(x, y) = e^{2x}cos(y)$, find the partial derivatives f_y, f_{xy}, and f_{yy}.

7. (10 points) Points A, B and C are marked on the curve shown below. At which of these points is the curvature greatest?