V1

1	2	3	4	5	6

Last Name:_____

First Name:_____

ID:_____   Section:____

Math 250 Midterm #1.   September 12, 2003

Attention! Please, note that this is the closed book test. You are not allowed to use graphing calculator. Simple calculators are allowed. Please, show all important steps in you solution but do not make your solution excessively long.

1. (15pt) Find the center and the radius of the sphere

$$x^2 + y^2 + z^2 - 2x + 6y - 4z = 1.$$

2. (20pt) Check that the cross product of vectors $u = \langle 0, 2, 3 \rangle$ and $v = \langle 1, 3, 0 \rangle$ is perpendicular to vector $w = \langle 1, 1, -3 \rangle$.

3. (15pt) Find the equation of a plane through the point P(-1,3,4) perpendicular to the line

$$\frac{x-1}{3} = \frac{y-2}{1} = \frac{z-1}{-2}.$$

4. (20pt) Find the symmetric equation of the tangent line to the curve

$$\begin{cases} x &=& \sin t, \\ y &=& 1 + t^2, \\ z &=& t^3. \end{cases} \qquad \text{at} \quad t = 0$$

5. (15pt) Position vector of the point P is given

$$P(t) = \langle t \ln t, \sin(\pi t), t^3 \rangle.$$

Find the velocity and acceleration vectors at time $t = 1$.

6. Find the point of intersection of the line

$$\begin{cases} x &=& 1+t, \\ y &=& 2-t, \\ z &=& 1-t \end{cases}$$

and the plane

$$3x + 5y - 4z = 1.$$