MAT 203 MIDTERM I

PRACTICE PROBLEMS

1. (a) (5 pts) Let $\vec{u} = \langle 1, 2, 3 \rangle$ and $\vec{v} = \langle 4, 5, 6 \rangle$. Compute $5\vec{u} - \vec{v}$.

(b) (5 pts) Let $\vec{u} = \langle -1, 2, 3 \rangle$ and $\vec{v} = \langle 0, 2, 1 \rangle$. Compute the vector $\frac{\vec{u} \cdot \vec{v}}{||\vec{v}||} \vec{v}$.

2. (a) (5 pts) Find a parametrization of the line passing through the points $(0, 4)$ and $(-1, -2)$.

(b) (5 pts) Find a parametrization of the plane in space that passes through the point $(1, 0, -1)$ and has normal vector $\vec{n} = \langle 1, -1, -1 \rangle$.

3. (10 pts) Rewrite the following hyperbolic paraboloid into standard form, and determine its center

$$3x^2 - 6x - 4y^2 - 8y - 1 - 12z + 24 = 0.$$

4. Consider the following parametrization of a curve C in space:

$$\vec{r}(t) = \left\langle \sqrt{t}, 2t + 5, t \right\rangle.$$

(a) (5 pts) Find the vector $\vec{v}\,''(t)$.

(b) (5 pts) Compute $\int \vec{r}(t) \cdot \vec{r}\,'(t)\, dt$.