Math 273, Written Assignment 1 Name: _____ ID#: _____

I prefer that you submit your answers on a printed copy of this document, like it's a quiz or exam. However, you may instead rewrite the questions by hand before solving them. Staple sheets together, in order. **Be neat**. **Always give enough work and clear explanation so that fellow students could follow what you did (from start to finish) just by reading your paper**. Numbers in [ ] give point values for each question.

1. (a) Complete each formula with an expression involving the angle θ between the vectors. (assume $\mathbf{a}, \mathbf{b} \in \mathbb{R}^3$):

[1] $\mathbf{a} \cdot \mathbf{b} =$ _____

[1] $|\mathbf{a} \times \mathbf{b}| =$ _____

(b) For $\mathbf{u} = \langle\, 1,\, 2,\, 2 \,\rangle$ and $\mathbf{v} = \langle\, 2,\, -1,\, 3 \,\rangle$, find each of the following:

[2] (i) $\text{scal}_{\mathbf{v}}(\mathbf{u})$

[2] (ii) $\text{proj}_{\mathbf{v}}(\mathbf{u})$

[2] (iii) the angle θ between $\mathbf{u}$ and $\mathbf{v}$ (give answer to the nearest 0.1 degrees)

[2] (iv) the area of the parallelogram with $\mathbf{u}$ and $\mathbf{v}$ as adjacent sides (give answer in the form $\sqrt{\text{integer}}$)

2. Given the lines $L_1 : \mathbf{r}_1(t) = \langle -2 + 3t,\ 2t,\ 3t \rangle$ and $L_2 : \mathbf{r}_2(s) = \langle -6 + s,\ -8 + 2s,\ -12 + 3s \rangle$, do the following:

[3] (a) Find the point P where the lines L_1 and L_2 intersect.

[3] (b) Find an equation for line L_3 which also passes through point P and is perpendicular to lines L_1 and L_2.