Name: _____ Math 234 Quiz 1

Section: 328 □ 329 □ Sep. 2014

1. (10 pts) Let

$$\vec{\mathbf{a}} = \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}, \vec{\mathbf{b}} = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \vec{\mathbf{c}} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}.$$

Compute the triple product $\vec{\mathbf{a}} \cdot (\vec{\mathbf{b}} \times \vec{\mathbf{c}})$.

2. (10 pts) Let $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ be as above. Use dot product to find the angle between $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$. (*Hint:* $\cos(60^\circ) = 1/2$.)

Bonus. (5 pts) Let $\vec{\mathbf{a}}$ and $\vec{\mathbf{b}}$ be two vectors (not necessarily the same as above). Use dot product to prove the *parallelogram law*:

$$\|\vec{\mathbf{a}} + \vec{\mathbf{b}}\|^2 + \|\vec{\mathbf{a}} - \vec{\mathbf{b}}\|^2 = 2(\|\vec{\mathbf{a}}\|^2 + \|\vec{\mathbf{b}}\|^2).$$