Mathematics 2934-010 Name (please print) _____

Quiz 2

September 8, 2011

Instructions: Give concise answers, but clearly indicate your reasoning.

I. (3) Find the cosine of the angle (you don't need to find the angle itself) between the diagonal of a cube and one of its edges.

II. (3) In the standard xyz-coordinate system, suppose that $\vec{v}$ is a vector in the xy-plane, that starts at the origin and points into quadrant III (where $x < 0$ and $y < 0$), and $\vec{w}$ is a vector in the xy-plane that starts at the origin and points into quadrant II (where $x < 0$ and $y > 0$). Draw a picture of the coordinate system, showing such a $\vec{v}$ and $\vec{w}$. Does $\vec{v} \times \vec{w}$ point in the positive or negative z-direction?

III. (6) Let ℓ be the line through the points $(1, 3, 2)$ and $(-4, 3, 0)$.

(a) Write ℓ as a vector-valued function $\vec{r}(t)$.

(b) Write ℓ as parametric equations for x, y, and z in terms of t.

(c) Write an equation for the plane through $(1, 3, 2)$ that is perpendicular to ℓ.

IV. (3) Find the point at which the line $x = 1 + t$, $y = 2t$, $z = 2 - t$ intersects the plane $x - 3y + z = 9$.