Math 241 X8 **Name:**

Quiz # 2

September 17, 2013 No electronic devices or interpersonal communication allowed. Show work to get credit.

1) [5pts.] Compute $\langle 1, 2, 3\rangle \times \langle 3, 2, -1\rangle$.

2) [5pts.] Are the planes $3x-2y+5z = 7$ and $-6x+4y+10z = 30$ parallel, perpendicular, or neither? If they intersect, find an equation of the line of their intersection; otherwise, find the (minimum) distance between them.

3) A closed curve in the plane is parametrized by $\langle x(t), y(t)\rangle$ and is traced out counter-clockwise as t advances from 0 to 8. In terms of $x(t)$ and $y(t)$, find each of the following for each t (i.e., as functions of t):

(a) [2pts.] a tangent vector to the curve;

(b) [4pts.] a unit tangent vector to the curve;

(c) [4pts.] an outward-pointing normal vector to the curve.

(The curve is "nice enough": no self-intersections, continuous, no corners, etc. "Closed" means it starts and ends at the same point.)