Math 241 C8 **Name:**

Quiz # 7

April 17, 2013

No electronic devices, notes, or interpersonal communication allowed.

Show work to get credit.

Find the flow of $\mathbf{F}(x, y, z) = \langle e^{yz}, \cos z, x^2 \rangle$ across the top hemisphere of the unit sphere. Which direction is it? (The surface has equation $z = \sqrt{1 - x^2 - y^2}$, or $x^2 + y^2 + z^2 = 1$ with $z \geq 0$.) Big Hint: that surface isn't too bad, but it behaves badly with the field; can you replace it? Remember $\sin^2 t = (1 - \cos(2t))/2$ and $\cos^2 t = (1 + \cos(2t))/2$.