Quiz 6 25 points Math 200 Name: _____

1. (7 points) Use polar coordinates to evaluate $I = \iint_R e^{-x^2-y^2}\, dA$ if R is the unit disk $x^2 + y^2 \leq 1$.

2. (6 points) Use cylindrical coordinates to find the volume of the solid bounded above by the cone $z = \sqrt{x^2 + y^2}$, below by the xy-plane, and on the sides by the cylinder $x^2 + y^2 = 2x$.

3. (6 points) Use spherical coordinates to find the mass of the solid ball of radius 1 if the density is $\delta(\rho, \theta, \phi) = \dfrac{1}{1+\rho^2}$. Hint: $\dfrac{\rho^2}{1+\rho^2} = 1 - \dfrac{1}{1+\rho^2}$.

4. (6 points) Use Green's Theorem and a double integral to evaluate the work done by the force $\vec{F} = \langle e^y, \sin(\pi x)\rangle$ in moving a particle once around a triangle starting at $(-1, 0)$ moving to $(1, 0)$ and then to $(0, 1)$ before returning to $(-1, 0)$.