Quiz 8 25 points Math 200 Name: ____________________________

1. use either Stokes' theorem exactly once or the divergence theorem exactly once to evaluate the following two surface integrals.

   (a) (7 points) $I = \iint\limits_S \langle x^3, y^3, x^2y^2\rangle \cdot d\vec{S}$ and $S$ is the boundary of the solid cylinder $x^2 + y^2 \le 1$ between the planes $z = 0$ and $z = 2$ and is oriented out.

   (b) (6 points) $I = \iint\limits_S \nabla \times \vec{F} \cdot d\vec{S}$ if $\vec{F}(x, y, z) = \left\langle x^2yz, yz^2, z^3e^{xy}\right\rangle$ and if S is the part of $x^2+y^2+z^2 = 5$ that lies above the plane $z = 1$ and is oriented up.

2. (6 points) Use the Divergence Theorem to find $I = \iint\limits_S x^2+2y^2+6z^2\, dS$ if $S$ is the sphere $x^2+y^2+z^2=4$ oriented out.

3. (6 points) Use Stokes Theorem **twice** to compute $I = \iint\limits_S \nabla \times \langle x+y, z^2-4, x\sqrt{y^2+1}\rangle \cdot d\vec{S}$ and S is the wedge-shaped box without a top that is bounded by the planes $x=0$, $y=0$, $z=0$, $x+y=1$, and $z=2$. $S$ is oriented out.