Math 200 Quiz #8 25 points Name:____

1) Find the curl and divergence of $\vec{F} = \left\langle x^2 y, \frac{x^3}{3}, xy \right\rangle$. Label each answer with appropriate notation. (4 points)

2) Use Stokes' Theorem **once** to find I = $\oint_{Bd(S)} x^2 y\, dx + \frac{x^3}{3}\, dy + xy\, dz$ if S is the intersection of $z = y^2 - x^2$ and $x^2 + y^2 \le 1$, and S is oriented up. (4 points)

3) Use Stokes' Theorem **once** to find I=$\iint_S \left(\nabla \times \vec{F}\right) \cdot d\vec{S}$ if $\vec{F} = \left\langle e^z - y, e^z + x, \cos(xz) \right\rangle$ and S is the upper hemisphere, $\rho = 1$ with $z \ge 0$ oriented **down**. (5 points)

4) Use the Divergence Theorem **once** to find I= $\oiint_{Bd(T)} \vec{F} \cdot d\vec{S}$ if $\vec{F} = \langle 2xy, 3y^2, -2zy \rangle$ and T is the solid cube in the first octant with four of its vertices at (0, 0, 0), (2, 0, 0), (0, 2, 0), and (0, 0, 2). (6 points)

5) Use the divergence theorem to find I = $\iint_S 3x^2 + xy + yz \, dS$ if S is $x^2 + y^2 + z^2 = 4$. (6 points)