Name_____ ID_____

MATH 251   Quiz 4   Fall 2006

Sections 507   P. Yasskin

   Multiple Choice & Work Out: (5 points each)

1-3	/15
4	/ 5
5	/ 5
Total	/25

1. Compute $\vec{\nabla} \times \vec{F}$ if $\vec{F} = (x + y + z, yz + xz + xy, xyz)$.

   a. 0

   b. $1 + x + z + xy$

   c. $(1, x + z, xy)$

   d. $(1, -x - z, xy)$

   e. $(xz - x - y, 1 - yz, y + z - 1)$

2. Compute $\vec{\nabla} \cdot \vec{F}$ if $\vec{F} = (x + y + z, yz + xz + xy, xyz)$.

   a. 0

   b. $1 + x + z + xy$

   c. $(1, x + z, xy)$

   d. $(1, -x - z, xy)$

   e. $(xz - x - y, 1 - yz, y + z - 1)$

3. Compute $\vec{\nabla} \cdot \vec{\nabla} \times \vec{F}$ if $\vec{F} = (x + y + z, yz + xz + xy, xyz)$.

   a. 0

   b. $1 + x + z + xy$

   c. $(1, x + z, xy)$

   d. $(1, -x - z, xy)$

   e. $(xz - x - y, 1 - yz, y + z - 1)$

4. A rectangular box sits on the xy-plane with its upper vertices on the elliptic paraboloid $z = 16 - x^2 - 4y^2$. Find the dimensions and volume of the largest such box.

5. Find a scalar potential for $\vec{F} = (3x^2y^2 + 2xz + 1, 2x^3y - z^2, x^2 + 2z - 2yz)$ or explain why it does not exist.