

Math 335-002
Homework #13
Due date: March 24, 2008

1. Problems 5.1 - 5.5, p. 90.
2. Verify the divergence theorem $\left(\iiint_V \vec{\nabla} \cdot \vec{u} \, dV = \oiint_S \vec{u} \cdot \vec{n} \, dS \right)$ by calculating both the volume integral and the surface integral, for the vector field given by $\vec{u} = (0, 0, 1-z)$, where volume V is the tetrahedron $z + x + y \leq 1$, $x \geq 0$, $y \geq 0$, $z \geq 0$. When calculating the integral over the closed surface, remember that the normal should point *outside* the volume. (Hint: the surface is composed of four separate pieces; two of those surfaces give a zero contribution to the integral).