Math 3298 Worksheet 43

Group members (2 to 4): _____

(1) Let D be the region in $\mathbb{R}^3$ that is bounded below by the plane $z = 0$, on the sides by the cylinder $r = cos(\theta)$, and on top by the paraboloid $z = 3r^2$. Compute the flux of the vector field $F = (x, y, z)$ through the surface of D using the divergence theorem.

(2) Find a non-zero vector field F such that the flux integral $\int\int_S F \cdot ndS = 0$ where S is the upper unit hemisphere ($x^2 + y^2 + z^2 = 1$, $z \geq 0$).