Homework 7

Math 324F
Advanced Multivariable Calculus
Due on 2nd December 2015

Read sections 16.7, 16.8 and 16.9 from the text.

Problem 16.7.9 (10 points) Compute $\iint_S x^2 yz \, dS$, S is part of the plane $z = 1 + 2x + 3y$ that lies above the rectangle $[0,3] \times [0,2]$.

Problem 16.7.32 (10 points) Compute the surface integral $\iint_S \mathbf{F} \cdot \mathbf{dS}$ where $F(x,y,z) = y\mathbf{i} + (z-y)\mathbf{j} + x\mathbf{k}$, where S is the surface of the tetrahedron with vertices $(0,0,0)$, $(1,0,0)$, $(0,1,0)$ and $(0,0,1)$.

Problem 16.8.2 (10 points) Use Stoke's theorem to evaluate $\iint_S curl \, \mathbf{F} \cdot \mathbf{dS}$ where $\mathbf{F}(x,y,z) = 2y \cos z\mathbf{i} + e^x \sin z\mathbf{j} + xe^y\mathbf{k}$, S is the hemisphere $x^2 + y^2 + z^2 \leq 9$, $z \geq 0$, oriented upward.