Math 2401 (D1-D3)
12/01/2014

Worksheet 6 - Stokes' Theorem

1. Find the circulation of the field:

$$\vec{F} = \langle y, xz, x^2 \rangle$$

around the curve C, where C is the boundary of the triangle cut from $4x + y + z = 4$ by the first octant, counterclockwise when viewed from above.

2. Evaluate:

$$\iint_S \bigtriangledown \times (3y\vec{i}) \cdot \vec{n}\, d\sigma,$$

where S is the hemisphere $x^2 + y^2 + z^2 = 1$, $z \geq 0$.

3. Compute the flux of the curl of the field:

$$\vec{F} = \langle 4y, 5 - 5x, z^2 - 2 \rangle$$

across the surface S:

$$S \,:\, \vec{r}(\phi, \theta) = \left\langle \sqrt{5}\sin\phi\cos\theta,\ \sqrt{5}\sin\phi\sin\theta,\ \sqrt{5}\cos\phi \right\rangle,\ 0 \leq \phi \leq \frac{\pi}{2},\ 0 \leq \theta \leq 2\pi,$$

in the direction of the outward unit normal.