Name: _____ Math 234 Quiz 11

Section: 328 ☐ 329 ☐ Dec 11, 2014

Solve one of the following two problems. Problem 2 on the back.

1. Let S be the boundary of the region

$$R = \{(x, y, z) : \sqrt{x^2 + y^2} \leq z \leq 1\}.$$

Compute the flux integral

$$\iint_S \overrightarrow{v} \cdot \overrightarrow{N} dA$$

where $\overrightarrow{v} = x^2 \overrightarrow{i} + y^2 \overrightarrow{j} + z \overrightarrow{k}$ and $\overrightarrow{N}$ is the outward normal.

2. Consider the surface patch

$$S = \{(x, y, z) : z = x^2 + y^2,\ x^2 + y^2 \leq 1\}.$$

Evaluate the flux integral

$$\iint_S (\mathbf{curl}\,\overrightarrow{F}) \cdot \overrightarrow{N}\, dA$$

where $\overrightarrow{F} = -y\,\overrightarrow{i} + x\,\overrightarrow{j} + z^2\,\overrightarrow{k}$ and $\overrightarrow{N}$ is the upward normal.