

**Math 225: Calculus III**  
**Quiz 10 Apr. 19/21, 1994**

Name: \_\_\_\_\_  
Section: \_\_\_\_\_

1. Let  $\mathcal{C}$  be the unit circle in the  $xy$ -plane and let  $\mathbf{n}$  be the outward normal vector at each point of  $\mathcal{C}$ . Compute the flux of  $\mathbf{F} = y^2 \mathbf{i} - xy \mathbf{j}$  through  $\mathcal{C}$ ,  $\int_{\mathcal{C}} \mathbf{F} \cdot \mathbf{n} \, ds$ .

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2. Suppose the temperature at a point  $(x, y, z)$  on the unit upper hemisphere,  $x^2 + y^2 + z^2 = 1$ ,  $z \geq 0$ , is given by  $T(x, y, z) = (x^2 + y^2)z$ . Compute the average temperature over the hemisphere. (The area of the hemisphere is  $2\pi$ .)