Quiz 8 Calc 3 11/28/2005

1. Find the divergence of the vector field $\mathbf{F}(x,y,z) = \langle -z, y^2, x \rangle$.

$$\text{div}\vec{F} = \nabla \cdot \vec{F} = \frac{\partial}{\partial x}(-z) + \frac{\partial}{\partial y}(y^2) + \frac{\partial}{\partial z}(x)$$

$$0 + 2y + 0$$

$$= 2y \quad \blacksquare$$

Great

2. Find the curl of the vector field $\mathbf{F}(x,y,z) = \langle -z, y^2, x \rangle$.

$$\text{curl}\,\vec{F} = \nabla \times \vec{F} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ -z & y^2 & x \end{vmatrix}$$

$$= -\vec{j} - \vec{j} = -2\vec{j}$$

$$\text{Curl}\vec{F} = \langle 0, -2, 0 \rangle$$

Excellent