

Vector Calculus
Grad, Div and Curl

Question

Calculate **div** $\underline{\mathbf{F}}$ and **curl** $\underline{\mathbf{F}}$ for the vector field

$$\underline{\mathbf{F}} = x\underline{i} + y\underline{j}$$

Answer

$$\operatorname{div}\underline{\mathbf{F}} = \frac{\partial}{\partial x}(x) + \frac{\partial}{\partial y}(y) + \frac{\partial}{\partial z}(0) = 1 + 1 = 2$$

$$\operatorname{curl}\underline{\mathbf{F}} = \begin{vmatrix} \underline{i} & \underline{j} & \underline{k} \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ x & y & 0 \end{vmatrix} = \underline{0}$$