

$$\begin{aligned}
\text{(a) } \operatorname{curl} \mathbf{F} &= \nabla \times \mathbf{F} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \partial/\partial x & \partial/\partial y & \partial/\partial z \\ 0 & \sin xz & -\sin xy \end{vmatrix} \\
&= (-x \cos xy + -x \cos xz) \mathbf{i} - (-y \cos xy - 0) \mathbf{j} + (z \cos xz - 0) \mathbf{k} \\
&= x(-\cos xz + -\cos xy) \mathbf{i} + y \cos xy \mathbf{j} + z \cos xz \mathbf{k}
\end{aligned}$$

$$\text{(b) } \operatorname{div} \mathbf{F} = \nabla \cdot \mathbf{F} = \frac{\partial}{\partial x} (0) + \frac{\partial}{\partial y} (\sin xz) + \frac{\partial}{\partial z} (-\sin xy) = 0 + 0 + 0 = 0$$