

1. Let $\mathbf{F} = \langle x^2y, xyz, 2yz \rangle$. Find $\text{curl } \mathbf{F}$ and $\text{div} \mathbf{F}$.

2. Compute $\int_C x e^{yz} ds$ where C is the line segment from $(0,0,0)$ to $(1,2,3)$.

3. Let $\mathbf{F} = \langle 2xy + yz, x^2 + xz - 3y^2, xy + 3z \rangle$.

a) Show $\text{curl } \mathbf{F} = 0$.

b) \mathbf{F} can be written as $\mathbf{F} = \nabla f$. Find f .