

1. Use index notation, the Einstein sum convention, the Kronecker delta, and the the Levi-Civita symbol to prove the following identities:

(a)

$$\nabla \cdot (f \mathbf{A}) = f(\nabla \cdot \mathbf{A}) + \mathbf{A} \cdot (\nabla f)$$

(b)

$$\nabla \times (\nabla \times \mathbf{A}) = \nabla(\nabla \cdot \mathbf{A}) - \nabla^2 \mathbf{A}$$