

1–8 Find (a) the curl and (b) the divergence of the vector field.

1. $\mathbf{F}(x, y, z) = xyz \mathbf{i} - x^2y \mathbf{k}$

3. $\mathbf{F}(x, y, z) = \mathbf{i} + (x + yz) \mathbf{j} + (xy - \sqrt{z}) \mathbf{k}$

7. $\mathbf{F}(x, y, z) = \langle \ln x, \ln(xy), \ln(xyz) \rangle$

13–18 Determine whether or not the vector field is conservative. If it is conservative, find a function f such that $\mathbf{F} = \nabla f$.

13. $\mathbf{F}(x, y, z) = y^2z^3 \mathbf{i} + 2xyz^3 \mathbf{j} + 3xy^2z^2 \mathbf{k}$

17. $\mathbf{F}(x, y, z) = ye^{-x} \mathbf{i} + e^{-x} \mathbf{j} + 2z \mathbf{k}$