

Fysiikan matematiikka: Harjoitus 12

1. a) $\mathbf{A} = -\sin(\phi) \cos(\phi) r \mathbf{e}_r - (1 + \cos^2(\phi)) r \mathbf{e}_\phi$

2. $(\mathbf{A} \cdot \nabla \phi)(1, 0, 1) = 2$

$$(\mathbf{A} \times \nabla \phi)(1, 0, 1) = \hat{\mathbf{i}} - 2\hat{\mathbf{j}} - \hat{\mathbf{k}}$$

3. $(\nabla(F + G))(1, 0, -2) = -4\hat{\mathbf{i}} + 9\hat{\mathbf{j}} + \hat{\mathbf{k}}$

$$(\nabla(FG))(1, 0, -2) = -8\hat{\mathbf{j}}$$

4. $\phi = x^2 y z^3 + 20$

5. $(\nabla_n P)(1, 1, -1) = -\frac{20}{\sqrt{70}}$