mpc2prob9.tex

PROBLEMS 9. 7.12.2011

Q1. Show that

$$\mathbf{a} \times (\mathbf{b} \times \mathbf{c}) = (\mathbf{a}.\mathbf{c})\mathbf{b} - (\mathbf{a}.\mathbf{b})\mathbf{c}.$$

Q2. Show that

$$curl\ curl = grad\ div - \nabla^2,$$

where

$$\nabla^2\mathbf{a} := (\nabla^2 a_x)\mathbf{i} + (\nabla^2 a_y)\mathbf{j} + (\nabla^2 a_z)\mathbf{k}.$$

Q3. Show that

$$div(\phi\mathbf{a}) = \phi div\mathbf{a} + (grad\phi).\mathbf{a}.$$

Q4. Show that

$$curl\ grad\ \phi = 0.$$

Q5. Show that

$$curl(\phi\mathbf{a}) = \phi curl\mathbf{a} + (grad\phi) \times \mathbf{a}.$$

NHB