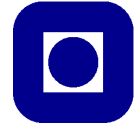


TFY4240

Problemset 1 Autumn 2014

NTNU

Institutt for
fysikk**Problem 1.**

Do all the examples of chapter 2 of Griffith. This is intended for helping you to recapitulate what you already should know from previous classes.

Problem 2.

By using the index notation (and the Levi-Civita symbol) introduced in the lectures, show the following vector identities:

a) $\mathbf{A} \times (\mathbf{B} \times \mathbf{C}) = \mathbf{B}(\mathbf{A} \cdot \mathbf{C}) - \mathbf{C}(\mathbf{A} \cdot \mathbf{B})$

b) $\nabla \cdot (\nabla \times \mathbf{A}) = 0$

c) $\nabla \times (\nabla \psi) = 0$

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

e) $\nabla \times \left(\frac{\mathbf{A}}{g} \right) = \frac{g(\nabla \times \mathbf{A}) + \mathbf{A} \times (\nabla g)}{g^2}$