In The Name Of God

Assignment number 1 of Electromagnetics 1

Spring 2020

Dr.A.Langari

1. Please answer the following questions from "Introduction to Electrodynamics" by D.J.Griffiths (forth edition) :

    - 1.10
    - 1.14
    - 1.20
    - 1.36
    - 1.48
    - 1.49
    - 1.63

2. Verify the following two vector identities:

$$\nabla \times (\mathbf{A} \times \mathbf{B}) = (\mathbf{B} \cdot \nabla)\mathbf{A} - (\mathbf{A} \cdot \nabla)\mathbf{B} - \mathbf{B}(\nabla \cdot \mathbf{A}) + \mathbf{A}(\nabla \cdot \mathbf{B}).$$

$$\nabla(\mathbf{A} \cdot \mathbf{B}) = (\mathbf{A} \times \nabla) \times \mathbf{B} + (\mathbf{B} \times \nabla) \times \mathbf{A} + \mathbf{A}(\nabla \cdot \mathbf{B}) + \mathbf{B}(\nabla \cdot \mathbf{A}).$$

3. Prove that:

$$\oint u\nabla v \cdot d\lambda = \int_{S} (\nabla u) \times (\nabla v) \cdot d\sigma.$$

For further readings on this chapter (which is really important!) you may use:
"MATHEMATICAL METHODS FOR PHYSICISTS" by G.B.Arfkrn, ed 7, chapter 3 : Vector Analysis