Physics 475, Spring 2010
Problem Set 5
Due Tuesday, March 2.

Problems from Boas:

Chapter 3:
11.33, 11.57, 12.14

Chapter 10:
5.6, 5.7

Additional Problems

1. Using tensor notation, the Kronecker delta and the Levi-Civita symbol, prove Lagrange's identity:

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

2. Expressing the determinant of a 3×3 matrix M in terms of the components of M and the Levi-Civita symbol, prove that:

a) If two rows of M are interchanged, the value of the determinant changes sign.

b) $\det(M^T)$=$\det(M)$.

c) $\det(M^\dagger)$=$\overline{\det(M)}$.