

Physics 209
Fall 2002
Homework 3
Due Friday September 20 at 5:00pm.

Reading Assignment: In the next week we will finish what we are going to do with Chapter 5. We will cover most of Chapter 6 through section 6.6, afterwards we will move onto Chapter 11 (relativity). Read Jackson to keep up with the lectures.

1. Jackson, problem 4.10.
 2. Jackson, problem 4.12.
 3. Jackson, problem 4.13.
 4. Jackson, problem 5.13.
5. (a) Use the properties of the Levi-Civita tensor to derive the standard vector identity for $\nabla \times (\mathbf{A} \times \mathbf{B})$.
- (b) Express $[\mathbf{A} \cdot (\mathbf{B} \times \mathbf{C})]^2$ entirely in terms of dot products.
- (c) Let M_{ij} be a 3×3 matrix. Express the coefficients of the secular polynomial, $\det(M - \lambda I)$, in terms of traces of powers of M ($\text{tr } M$, $\text{tr}(M^2)$, etc.).