Issued: **Nov. 15**      Problem Set # 8      Due: **Nov. 20**

**Problem 1.** $\vec{A} \times (\vec{B} \times \vec{C})$ identity

  a. Do problem 1.11 of Kleppner and Kolenkov using geometry and the properties of the cross product.

  b. By expressing the components of $\vec{A}$, $\vec{B}$, and $\vec{C}$ in Cartesian coordinates prove the trimple cross-product identity

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

    With appropriate use of cyclic permutations you can reduce the number of terms that you have to explicitly calculate.

  c. Show how the result from part a is consistent with the identity in part b.

  d. Consider a special case of the identity, namely $\vec{A} \times (\vec{B} \times \vec{A})$. Justify the result of the identity using geometrical reasoning.

  e. Using your work from part d, try to develop a geometric argument for the form general form of the identity in part b.

**Problem 2.** Kleppner and Kolenkow, problem 8.2

**Problem 3.** Kleppner and Kolenkow, problem 8.5

**Problem 4.** Kleppner and Kolenkow, problem 8.6

**Problem 5.** Kleppner and Kolenkow, problem 8.10

**Problem 6.** Kleppner and Kolenkow, problem 8.12