Peer Questions for Section 10.4

Read this material prior to class on Mon., Nov. 25, attempting to answer the questions below. In your group (**minimum of two people per**), discuss your responses to the following questions. Rotate (again) the role of "group scribe", a person who should submit your group’s responses, using the web form below, by 5 pm, Mon., Nov. 25.

1. Give (at least) two "uses" for the Theorem in Box 6, p. 560.

2. The scalar triple product involves three vectors and both kinds of products, cross and dot.
   - (a) What kinds of vectors are required for the scalar triple product to make sense? Must they each have the same number of components, for instance?
   - (b) What kind of output (scalar or vector) is produced from the scalar triple product?
   - (c) Is it possible for the scalar triple product to be negative?
   - (d) Calculate the scalar triple product $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c})$ when $\mathbf{a} = \langle 1, 2, 3 \rangle$, $\mathbf{b} = \langle -1, 1, 2 \rangle$, and $\mathbf{c} = \langle 2, 1, 4 \rangle$.
   - (e) What does it mean, in general, about the vectors involved, if $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c}) = 0$?
   - (f) **True or False.** The scalar triple product gives the volume of a 3-dimensional region, known as a parallelepiped, formed when the three vectors are placed tail-to-tail.
   - (g) **True or False.** The role played by the vectors $\mathbf{a}, \mathbf{b}, \mathbf{c}$ in the scalar triple product does not matter. That is, you get the same result from all of these:
     
     $\mathbf{a} \cdot (\mathbf{b} \times \mathbf{c}), \quad \mathbf{b} \cdot (\mathbf{a} \times \mathbf{c}), \quad \mathbf{a} \cdot (\mathbf{c} \times \mathbf{b}), \quad \mathbf{c} \cdot (\mathbf{a} \times \mathbf{b}), \quad$ etc.

3. Identify one item (a concept, a step in an example, a statement, etc.) from this reading assignment you found difficult or confusing.