

This Week in SM311P:1001: Homework, etc.

Homework must be submitted stapled in assignment groupings.

Always attempt to complete the readings before class. You are responsible for reading 10 pages past the current lecture. You may not understand the material completely, but you must read it prior to lecture.

**** Problems to submit on the date listed: ****

Week of 20 Oct

Monday

Wednesday: Submit A7, VC: 1,2

Friday: EXAM

Week of 20 Oct HOUR EXAM II on Friday 24 Oct

A7. Identify xyz with 123, then the cross product $\vec{C} = \vec{A} \times \vec{B}$ can be represented by the expression for the i^{th} component of \vec{C} . $C_i = \sum_{j,k=1}^3 \epsilon_{ijk} A_j B_k$. Similarly, the inner product of two vectors can be represented as $\vec{A} \cdot \vec{B} = \sum_{j,k=1}^3 \delta_{jk} A_j B_k$

Product Identity : A powerful identity follows from the definition of ϵ_{ijk} .

$$\epsilon_{ijk} \epsilon_{ist} = \delta_{js} \delta_{kt} - \delta_{jt} \delta_{ks} \quad (\text{where the sum over } i = 1,2,3 \text{ is understood.})$$

Use this identity and the definition above to show that

$$(\vec{A} \times \vec{B}) \cdot (\vec{A} \times \vec{B}) = A^2 B^2 - (\vec{A} \cdot \vec{B})^2 = A^2 B^2 [1 - \cos^2 \theta] = A^2 B^2 [\sin^2 \theta]$$

TERMS & PRINCIPLES TO TREASURE:

MD: Introduction to Matrices and Determinants

VC: => Vector Calc Handout Problem

Hints: