Reading Assignment # 14

Math 9 - Prof. Orellana

Oct. 31, 2007 -Happy Halloween!

Read Section 13.3 and 13.4 and then answer the following questions.

1. What is the common question answered by Section 13.3 and 13.4?
2. Generalize the definition of dot product to vector in $\mathbb{R}^n$. What other names are used for dot product?
3. What are the properties of the dot product?
4. Read the proof of Theorem 3, now close the book and write a proof yourself.
5. What does it mean for two vectors in $\mathbb{R}^n$ to be orthogonal?
6. What are the direction angles?
7. Define a vector projection and scalar projection and tell how they are related?
8. Write the definition of cross product? Now compare it with the dot product.
9. Based on the definition of 2×2 and 3×3 matrices, how would you generalize the determinant for a 4×4 matrix?
10. Read the proof of Theorem 5 and then close the book and write the proof.
11. State Theorem 6 and tell me in your own words what you understand from it.
12. How can you test if two vectors in $\mathbb{R}^3$ are parallel?
13. If $\mathbf{a}$ and $\mathbf{b}$ are two vectors, what is the length of $\mathbf{a} \times \mathbf{b}$?
14. Explain figure 1, make sure to explain how is it related to the cross product.
15. What is the scalar triple product and what is its geometric significance?
16. What are the properties of the cross product? Is it associative?
17. Can you give a physics interpretation of the cross product? Explain.