

## Homework 6

Due Friday, October 7th at 5pm

Reading: Read Boas Ch. 3, section 11, section 12 and reread section 9 if needed. All Boas problems are from Ch. 3.

1. Consider Example 2. in Boas' Ch. 3, section 14. In this example she does not explicitly identify all of the vector space structures, that is, the set of vectors, the set of scalars, the sum, and the scalar product. (a) Identify these structures explicitly. [Hint: Some of the things that she says in the example will not be true unless you pick the right structures.]  
  
(b) Confirm all of the vector space axioms for this example. Show proofs for the three that you find to be hardest, the rest you can do using check marks as we did in class.  
  
(c) Prove that both of bases that she gives truly are bases for this vector space.
2. Boas 14.8. Again, if it is a vector space, feel free to use check marks on all but three of the axioms.
3. Boas 15.11.
4. Boas 13.1 and 13.4.
5. Boas 13.5.
6. Boas 13.3.
7. We haven't used index notation yet. We will be using it more and more and it is a good thing to practice a little yourself before we start using it in class. Reread the beginning of section 9 through up to the section on the Kronecker  $\delta$ . Do Boas 9.1 and 9.2.