Linear Algebra - LaTeX HW 1

Mark McClure

This 20 point homework is due Monday, October 21. I expect you to type your soluiton in LaTeX print it out and turn in the hard copy.

Problem 1:

Let V be a vector space and let $\vec{u}, \vec{v}, \vec{w} \in V$. Use the axioms and basic properties of vector spaces to show that if

$$\vec{u} + \vec{w} = \vec{w} + \vec{v},$$

then $\vec{u} = \vec{v}$.

Comment: After restating the assumptions, try to structure your proof as a string equalities that are justified by specific statements, as the text does on pages 203-205 in its proofs of the vector space properties.

Problem 2:

Let V denote the set of all polynomials whose degree is at most n. Find a basis for V and *prove* that your basis is, in fact, a basis.

Comment: I think there's a natural choice for the basis. Given that natural choice, it's pretty easy to show that the set spans V. It's a bit trickier to show that the set is linearly independent. You may assume the fact that a polynomial of degree n has at most n roots.