Math 4326 **LINEAR ALGEBRA** Spring 2008
Dr. Duval **Homework**

Tuesday, January 15

Follow the separate general guidelines for Parts A,B,C. Be sure to include and label *all four* standard parts (a), (b), (c), (d) of Part A in what you hand in.

Complex Numbers
Definition of Vector Space
pp. 1–10

A: Reading questions. Hand in Thu. 17 Jan., or earlier.

1. Verify, using properties of real numbers, and that $(-i)^2 = -1$, that complex numbers satisfy the distributive property.
2. What does $\mathbf{F}$ stand for?
3. The picture for addition in $\mathbf{F}^n$ on p. 7 is 2-dimensional ($n = 2$), since it is drawn on a 2-dimensional piece of paper. Does this picture work for larger values of n? Why or why not?
4. What gets multiplied in scalar multiplication?
5. Verify associativity in $\mathbf{C}^n$.
6. Verify commutativity in $\mathbf{F}^\infty$.

B: Warmup exercises. For you to present in class. Due in class Thu., 17 Jan.

Verify distributivity in $\mathcal{P}(\mathbf{F})$.

Ch. 1: Exercise 2.

Properties of Vector Spaces
Subspaces
pp. 11–14

A: Reading questions. Due in class Thu., 17 Jan., with an automatic extension to Friday (hardcopy) or Monday (electronic).

1. In the proof of Proposition 1.3, why do we "[s]uppose that w and w' are additive inverses of v"?
2. In Proposition 1.5, identify which properties of vector spaces are used at each step of the proof.
3. What is the difference between Propositions 1.4 and 1.5?
4. In the middle of p. 13, the text claims that to check if a subset U of vector space V is a subspace, we only need to check 3 conditions, instead of all the conditions listed on p. 9. It then gives examples of how the 3 conditions on p. 13 imply some of the other conditions on p. 9. Pick one other condition on p. 9, and show how the conditions on p. 13 lead to it.
5. Check that the second example at the bottom of p. 13 is indeed a subspace, as claimed in the text.

B: Warmup exercises. For you to present in class. Due in class Tue., 22 Jan.

Ch. 1: Exercises 3, 5, 6.