Math 4326   **LINEAR ALGEBRA**   Spring 2015
Dr. Duval   **Homework**

Monday, January 26

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.

Subspaces
Section 1.C

A: Reading questions. Due by 2pm, Sun., 1 Feb.

1. Verify Example 1.35 parts (a) and (d).
2. Verify Example 1.37.
3. Fill in the details of the first paragraph of the proof of results 1.39 (Sum of subspaces is the smallest containing subspace).
4. Does $U + W$ exist for *any* pair of subspaces U and W? Does $U \oplus W$ exist for *any* pair of subspaces U and W? Justify your answer in each case.
5. Verify Example 1.41.
6. In the proof of result 1.44 (Condition for a direct sum), where do we use the assumption that the U_i's are subspaces? [Note: This may be at just one point in the proof, or at more than one point.]

B: Warmup exercises. For you to present in class. Due by the end of class Mon., 2 Feb..

Exercises 1.C: 1, 4, 15, 20

Span and Linear Independence
Section 2.A

A: Reading questions. Due by 2pm, Tue., 3 Feb.

1. Verify the last part of Example 2.4 (as the text suggests you do).
2. Why should the span of an empty list be $\{0\}$ [the vector space whose only vector is the 0 vector], as in Definition 2.5 (span)?
3. Verify $\mathcal{P}(\mathbf{F})$ is a subspace of the vector space of functions from $\mathbf{F}$ to $\mathbf{F}$.
4. Verify Example 2.18 part (c)
5. Verify that, if some vectors are removed from a linearly independent list, then the remaining list is also linearly independent.
6. Demonstrate Lemma 2.21 (Linear Dependence Lemma) on the linearly dependent list from the first bullet of Example 2.20, $((2, 3, 1), (1, -1, 2), (7, 3, 8))$. In other words, find the v_j that makes (a) and (b) true, and show why (a) and (b) are in fact true in this case. [Hint: Use the proof.]
7. Demonstrate the multistep process described in the proof of results 2.23 on the linearly independent list $((1, 1, 1), (1, 2, 0))$ and the linearly dependent list $((2, 3, 1), (1, -1, 2), (7, 3, 8))$.

B: Warmup exercises. For you to present in class. Due by end of class Wed., 4 Feb.

Exercises 2.A: 1, 6, 12, 13