Math 4326 **LINEAR ALGEBRA** Spring 2017
Dr. Duval **Homework**
Tuesday, January 24

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.

Span and Linear Independence
Section 2.A

A: Reading questions. Due by 2pm, Mon., 30 Jan.

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 $\mathbf{F}$ (as the text suggests you do).
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.]

B: Warmup exercises. For you to present in class. Due by end of class Tue., 31 Jan.

Exercises 2.A: 6, 12, 13

Bases
Section 2.B

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

1. Verify Example 2.28(b).
2. A note on p. 40 claims that the proof of result 2.29 (Criterion for basis) is "essentially a repetition of the ideas that led us to the definition of linear independence." Compare and contrast the proof of result 2.29 to the the ideas leading to linear independence.
3. Verify that the process in the proof of result 2.31 (Spanning list ...) produces $((1,2),(4,7))$ when applied to the list $((1,2),(3,6),4,7),(5,9))$, as suggested just above the statement of the result, on p. 40.
4. Verify that process in the proof of result 2.33 (Linearly independent list ...) extends the list $((2,3,4),(9,6,8))$ in $\mathbf{F}^3$ the list $((2,3,4),(9,6,8),(0,1,0))$, as stated at the top of p. 42. Why is $(0,1,0)$ used here instead of $(1,0,0)$?

   Then, similarly, verify result 2.34 (Every subspace ...), using the span of $((2,3,4),(9,6,8))$ for U, and using $\mathbf{F}^3$ for V.

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

Exercises 2.B: 2 (except (b)), 3