Math 4326/5322 **LINEAR ALGEBRA** Spring 2019
Dr. Duval **Homework**
Monday, February 4

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.

Bases
Section 2.B

A: Reading questions. Due by 2pm, Sun., 10 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 Mon., 11 Feb.

Exercises 2.B: 2acde, 3

Dimension
Section 2.C

A: Reading questions. Due by 2pm, Tue., 12 Feb.

1. What is the significance of result 2.35 (Basis length ...)? Why must it be the first result of this section? [Hint: What is the name of this section?]
2. Find the definition of "finite-dimensional" vector space in the text. [Hint: Believe it or not, it is **not** in this section!] How does it compare to the definition of "dimension" in this section? Why are these two definitions compatible?
3. Which do you think will prove to be more useful, Proposition result 2.39 (Linearly independent list ...), or result 2.42 (Spanning list ...)? Why?
4. Which parts of Example 2.41 would not work if we replaced $(x-5)^2$ by $(x-5)$, and why?
5. Verify that result 2.43 (Dimension of a sum) works when U_1 is the xy-plane, and U_2 is the yz-plane, in $\mathbf{R}^3$.

B: Warmup exercises. For you to present in class. Due by end of class Wed., 13 Feb.

Exercises 2.C: 1, 4, 11