Math 215: Linear Algebra

WRITING ASSIGNMENT 5 : DUE DECEMBER 15

Make sure you are familiar with the Academic Honesty policies for this class, as detailed on the syllabus. All work is due on the given day by the 3 PM or by 7 PM if you LATEX it, submit it on PWeb.

This is a writing assignment. You should treat this like you would a writing assignment in an English or Philosophy or History course, except you don't have to type it. Everything you write should be part of a complete sentence and part of a larger paragraph which serves a clear purpose, your grammar and spelling should be accurate, and you should not have crossed out sections where you change your mind about what you want say. For each problem you should plan out how you want to write it in an outline or draft, and then write a polished, final product to be submitted.

Your audience should be classmates for the first problem and a general mathematical audience for the second. There is no page or paragraph limits for this assignment but you should be (1) thorough and complete and (2) concise and exact.

1. For this problem, you will thoroughly recap and summarize one of the key topics from the class. I highly recommend you choose the topic you are least comfortable with, as this will help prepare you for the final. You may choose a topic from this list:

   vector spaces, linear transformations, coordinate change, mathematical reasoning, bases

   (a) Start by writing down everything you can think of without looking at any sources. Spend about 15 minutes just thinking about the concept and writing anything you can recall about it. For those topics covered early in the semester for $\mathbb{R}^2$, and then later for arbitrary vector spaces, you must comment on material in both settings.

   (b) Then spend about 20 minutes looking through the textbook, comparing your results. Rewrite your answer from (a) adding in additional information or correcting errors.

   (c) Finally formulate three questions about the topic. They could be questions about something we covered that you do not understand, or about something we have not yet covered.

   Your final write up should include separate answers to each part. So I want to see what you wrote for (a) even if there are errors or inaccuracies, and then I want to see your final, revised and cleaned up version for (b) after you look at the book.

2. In class we discussed, but did not prove several results on linear transformations which are almost identical to proofs from our work on linear transformations from $\mathbb{R}^2$ to $\mathbb{R}^2$: Propositions 5.1.4, 5.1.5, and 5.1.12, as well as Theorem 5.1.6. For this problem, you should prove Theorem 5.1.6 and one of the other three. For each one:

   (1) Try to prove these results first without looking at the proofs in Chapter 2.

(2) Then look at the results from Chapter 2 and compare your proof to then, if you need to, modify your proof accordingly. The proofs should be written in your own words and not directly copied from the book.

You should only turn in one final proof for Theorem 5.1.6 and one final proof for the other one you choose.