Math 306, Linear Algebra II, Winter 2014

Homework 10, due Tuesday 2/18

Read sections:
1. Read chapter 4 (for 2/14).
2. Read chapter 5.1 (we might make it there by 2/14)
3. Read chapter 5.1 (for 2/18)

Do the following problems:
1. Let $E$ be an elementary matrix. Prove that $E$ is invertible. Do this by brute force. Write down the three possible things that $E$ could be, and identify the inverse in each instance.

2. Let $E$ be an elementary matrix. Prove that $\text{rank}(EA) = \text{rank}(A)$ where rank refers to rank as a matrix as defined in class . . . the dimension of the column space. Hint: show that the column space of $A$ is isomorphic to the column space of $EA$, and use old theorems to finish (in particular, we know that isomorphic spaces have the same dimension in the finite dimensional case).

3. 4.2.3, 4.2.23
4. 4.3.10, 4.3.15
5. 4.4.15

The grader will carefully consider Problem 1 above and 4.2.23 so you should write these up more carefully.