Fall 2019 Linear Algebra Test #1 Study Guide Dr. Day's section 002

The test covers chapters 1 and 2 of the book. You need to be proficient with the following algorithms:

- Row reduction: using elementary row operations to put a matrix in reduced row echelon form. See pages 7, 13, and 16.
- Solving linear systems in reduced row echelon form. Know how to parametrize and describe all possible solutions to a linear system. Writing solution sets in set builder notation is recommended, but writing a sentence to say which variables are parameters and solving all variables in terms of parameters is also acceptable. See examples on pages 16 and 17.
- Performing addition and multiplication of matrices. See pages 29 and 35.
- Computing matrix inverses using row reduction. Set up an augmented matrix (A|I), and row reduce it. If the reduced form is (I|B), then $A^{-1}=B$. Otherwise, A is not invertible. See example 4 on page 65.
- Computing determinants using cofactor expansion. See pages 90-92.
- Computing determinants using row reduction. Understand how row operations change a determinant. See the summary on page 97.

It is useful to know the formulas for the determinants of 2x2 and 3x3 matrices, and for the inverse of a 2x2 matrix.

You should review the theorem statements in chapters 1 and 2. They may come up in the True/False section of the test. Important concepts to review include:

- equivalent linear systems
- elementary row operations
- row echelon form and reduced row echelon form
- algebraic rules for matrix operations
- elementary matrices
- row equivalence of matrices
- partitioned matrices and block multiplication
- properties of determinants
- the relationship between determinants and matrix inversion
- the formula for the inverse of a matrix in terms of determinants (only memorize the 2x2 case, but know about the existence of the formula in general)
- Cramer's rule (don't memorize it, but know it exists)

You do not need to know anything from chapter 3 for this test!

I recommend studying this material until you think you are ready, and then trying the practice test. Take the practice test as if it were there real test: follow the rules and time yourself. After you are done, grade yourself. If you are happy with the results, you can feel confident going into the test. If you have trouble with the practice test, then study more.

Good luck!