Math 200: Linear Algebra
Exam 2 Review

This is a list of topics for our second exam. This list is not necessarily exhaustive, but it covers all of the main ideas we have seen since the last midterm.

When you are studying, it would be worth it to go back and review the first midterm. Since our class is cumulative, this will help reinforce material that we studied earlier, as well as hopefully help you make connections between that material and the new material.

- Determinants
  - How to compute, row/column expansion.
  - Algebraic and geometric properties of determinants.
  - $\det A \neq 0$ if and only if A is invertible (why is this true?).

- Vector Spaces
  - Definition of vector space.
  - Subspaces: definition and how to prove that a subset $H \subset V$ is a subspace.
  - Special subspaces related to a matrix A: $\operatorname{Nul} A, \operatorname{Col} A$....definitions, computation, and bases for these spaces.
  - Linear transformations: definition, proving a function is a linear transformation (how is this related to the definition of a vector space?).
  - Definition of a function. Definitions of one-to-one and onto, and how one would show that a function is one-to-one or onto.
  - Definitions of linear independence and dependence.
  - Bases: definition. What are the implications of the two components of the definition and how do they balance each other?
  - Coordinate mapping/systems: definition and importance/significance.
  - Dimension. Spanning set theorem, linear independence expansion theorem, and basis theorem.
  - Rank: definition, rank-nullity theorem and a geometric interpretation.