Some information about Exam 2

To be given in class on Wednesday, November 9

No notes/references/notecards, etc.

No calculators

Questions will focus on the material we covered from Sec. 3.1 (determinants) and up through Section 4.5 (discussed in class on Wednesday, November 2). This also includes any material covered in the lectures, distributed in class, or posted in the syllabus (for example, the material introducing diagonalization, eigenvectors and eigenvalues.) You got some practice with this supplementary material in the homework due on Friday (11/4). There are also problems on that material in WW9 if you want to use those problems for practice).

Even though the test "targets" material since Exam 1, you obviously need to be able to use earlier material to understand and work with the newer material.

As on Exam 1, there will be a mix of types of question such as

- Some true/false questions (the t/f questions that appear in the exercise at the end of almost every section are good examples). Such questions are not worded to be “tricky” but they are worded to see if you actually know the meaning of the terms and how the ideas come together.

- Some short answer questions

- Short calculations: I will try to be sure that all calculations are simple to do by hand.

- Here is a partial list of terms and ideas that you should be able to define or carefully describe.

  - Determinant of a square matrix $A$
  - Subspace of a vector space
  - Null space of a matrix $A$
  - Column space of a matrix $A$
  - Kernel of a linear transformation $T$
  - Range of a linear transformation $T$
  - Coordinate vector relative to a basis $B$
  - Change of coordinate matrix $P_B$
  - Isomorphism between two vector spaces
  - Spanning Set Theorem (p210)
  - Basis for a subspace $H$ of a vector space $V$
  - Theorem about expanding a linear independent set to a basis (p. 227)
Eigenvalue
Eigenvector
Diagonalizable matrix
Dimension of a vector space

- A partial list things you should know or be able to do

  Calculate det $A$ for a square matrix $A$
  How row operations and column operations affect det $A$
  How det $A$ is related to the pivot position entries in an echelon form of $A$
  How a determinant is related to areas and volumes in $\mathbb{R}^2$ and $\mathbb{R}^3$
  How a linear transformation affects the area of a region
  Decide whether a subset of a vector space is a subspace
  Find a basis for $\text{Nul } A$ and $\text{col } A$ (ker $T$ and range $T$ for a linear transformation $T$)
  Decide whether a set of vectors in a vector space (such as $P_n$, $M_{mn}$, ... is linearly dependent or independent
  Find the coordinate vector of a vector $v$ with respect to a basis $B$
  Change coordinates in $\mathbb{R}^n$
  Find the eigenvalues and eigenvectors (if there are any) for a square matrix $A$ (in simple cases)
  Decide (in simple cases) whether a square matrix $A$ is diagonalizable
  Use diagonalization of $A$ to compute $A^n$