These are brief review notes for the second in-class test on Friday October 20, 2010: they are not complete, but they are a guide to what will be on the second test. They are not guaranteed to be complete.

Things you need to be able to do for this test

- Row reduce a matrix A.
- Compute the LU decomposition for a matrix A. (This will not involve swapping rows).
- Compute 2×2 and 3×3 determinants using the formulae developed in class.
- Compute determinants of $n \times n$ matrices by computing the LU decomposition (essentially, by row reduction).
- Know the definitions of vector space and subspace of a vector space, and understand what is required to show that a set is a vector space, and to show that a subspace is a subspace.
- Understand the row space and the column space for a matrix. Give definitions, prove that they are subspaces of the appropriate vector spaces (and hence know which spaces they are subspaces of!)
- Be able to work with vector spaces which don't look like $\mathbb{R}^n$: for example, the spaces of polynomials discussed in class.
- Understand linear dependence and linear independence.
- Be able to show that a set of vectors is linear dependent (give the coefficients of a non-trivial representation of the zero vector: so you need to know how to compute those coefficients!)
- Be able to show that a set of vectors is linearly independent (by computing the echelon form of the matrix having the vectors as columns, and showing that there is a pivot in every column).
- Be able to handle questions of linear independence and dependence for vector spaces other than $\mathbb{R}^n$.
- Understand spanning sets of vectors.
- Be able to show that a set of vectors spans $\mathbb{R}^n$.
- Understand bases for vector spaces.
- Be able to compute a basis for the null space of a matrix.
- Be able to compute a basis for the column space of a matrix.
- Given a basis for a vector space, be able to find the co-ordinates for a vector relative to that basis. This is principally for vectors already in $\mathbb{R}^n$ at this stage.
- Compute the inverse of an invertible matrix

- Know what conditions imply that a square matrix is invertible