Topics for Test 3

Row reduction

You should be able to solve systems of equations using row reduction and decide when a system has none, one or infinitely many solutions. Hence you should understand the concepts of a free variable, pivot position and pivotal column. If there are infinitely many solutions you should be able to write them in parametrized form. You have to be able to derive the augmented matrix from a system of equations and conversely.

Linear combinations, span and linear indpedence

You should understand the notion of linear combinations and the notion of span of a set of vectors. Using row reduction you should be able to decide whether a given vector is in the span of a set of vectors or not. The notion of linear independence of a set of vector is important. You should be able to check using row reduction whether a system of vectors is linearly independent or linearly independent. It is important that you can reduce all these questions to systems of equations which you then convert to an augmented matrix. It is also important that you know the exact definitions of all these concepts.

Linear transformation:

You have to know the definition of a linear transformation and be able to derive the associated matrix. You should be able to decide when a linear transformation is one-to-one and onto and how these concepts are related to span and linear independence and reduce these problems to row reduction. You should be familiar with simple linear transformations such as rotations, shear transformations and reflections.