Review Sheet for Exam1

Chapter 1:

-Know how to transform a system of equations into augmented matrix form and solve by reducing to row (reduced) echelon form.
-Know how to solve a system of equations depending on a parameter k.
-Understand the relationship between row reduced form and the original augmented matrix.
-Know and understand the definition of rank.
-Understand linear combinations and how they are related to matrix vector multiplication.

Chapter 2:

-Know the definition of linear transformation and understand how to apply it to problems.
-Geometry of linear transformations in the plane: rotations, projections, reflections, horizontal and vertical shears. Know the general form of the transformation for each case.
-Inverse of a linear transformation: When is a transformation invertible? Be able to compute the inverse of simple matrices.
-Matrix operations: properties, inverses, criterion for invertibility, special matrices (identity, zero, ...).

Chapter 3:

-Know the definition/properties of a (linear) subspace, span, kernel, image. Relate kernels and images to invertibility.
-Linear dependence/independence.
-Know the definition of basis and dimension. Be able to find a basis of the image and kernel of a linear transformation.
-Know how to state and work with Rank-Nullity Theorem.

General tips:

- You should be able to use all the above concepts in problems.
- Every statement that you make in the test should be backed up with a justification. If you think that a statement is true, prove it in general; on the contrary, give a counterexample if you think it is false.
- Attempt every question in the test. Partial credit will be given for sensefull work towards the solution. However, beware that it is better to answer 1 question fully than 2 partially!
- Review all the homework problems and examples covered in lecture.

- Good luck! -