

# Exam 1 - topics

Topics Covered: Sections 1.1 – 1.5

Exam Date: Thursday, Sept 5

Know the following definitions:

- Linear systems
- Vector equations
- Matrix equations
- Vectors & matrices
- Augmented matrix & coefficient matrix
- Span
- Linear combination
- Uniqueness/existence/consistent/inconsistent
- Homogeneous/non-homogeneous systems

*Echelon &  
Reduced Echelon  
forms*

Know how to:

- Solve a linear system (or vector/matrix equation) by row reducing the augmented matrix
- Use Gaussian elimination
- Add or multiply a vector(s) by a constant
- Multiply a vector and a matrix
- Write the solution of a system in parametric form
- Determine when a system is consistent or inconsistent
- Get the solution of a non-homogeneous system from its associated homogeneous system

Know the main properties (ie: important theorems)

Sample Questions:

- Look over homework questions from sections 1.1 – 1.5
- Solve the following linear system:  
$$x_1 + 2x_2 + 3x_3 = 0$$
$$2x_1 + x_2 + x_3 = -1$$
$$4x_1 + 5x_2 + 7x_3 = 2$$
- Solve the following non-homogeneous linear system by first solving the associated homogeneous system:  
$$x_1 + 2x_2 + x_3 + 7x_4 = 8$$
$$2x_1 + 4x_2 + x_3 + 10x_4 = 11$$
$$5x_1 + 10x_2 + x_3 + 19x_4 = 20$$