Material Covered

- Systems of linear equations.
    - As traditional equations
    - As a vector equation.
    - As a matrix equation.
    - Homogenous and non-homogenous systems
    - Types of solutions (general, particular, free variables, leading variables)
- Vectors
    - Linear Independence and dependence
    - Span
    - Geometric interpretation
    - Arithmetic of vectors (addition, scalar multiplication)
- Matrices
    - Echelon form, reduced echelon form
    - Arithmetic of matrices (addition, scalar multiplication, matrix multiplication)

Textbook Reference

- Chapter 1: sections 1 and 2.
- Chapter 2.
- Chapter 3: sections 1, 2, and 3.

Important Concepts

- Relationships, relationships, relationships! (between all the material covered)

Important Skills

- Be able to determine when a system has a solution and how many there are.
- Be able to determine when a point is a solution to a system.
- Be able to determine the solution to a system.
- Be able to perform any elementary row operation.
- Be able to relate elementary row operations to matrices.
- Know when to use the various elementary row operations.
- Be able to perform arithmetic on systems, vectors, and matrices.
    - Be able to perform vector arithmetic in low-dimensional spaces graphically as well.
- Be able to find the span of a collection of vectors, and identify when a vector is in a span.
- Be able to identify when a collection of vectors is linearly independent or linearly dependent.
- Be able to determine when a function is a linear transformation.
- Be able to relate $\mathbb{R}^n$'s, linear transformations, matrices, and collections of vectors.
- Be abler to describe a linear transformation.
- Be able to compute inverses and apply them to matrix equations.