Math 225, Spring 2010: Midterm 2 Summary

This is a list of the main ideas and results in each section of the book.

Chapter 2: Matrix Algebra

2.2 Inverses

- Properties of inverses (Theorem 6)
- Elementary matrices
- Algorithm for computing inverses

2.3 Characterization of invertibility in terms of:

- reduced echelon form, number of pivots, null space, linear independence of columns, column space

Chapter 3: Determinants

3.1 Introduction

- Cofactor expansion
- Determinant of a triangular matrix

3.2 Properties of det(A)

- Behavior under row operations
- Relation to invertibility
- Behavior under taking taking transpose
- Multiplicative properties

3.3 Cramer's Rule, volume, and linear transformations

- Formula for solutions to Ax=b
- Formula for inverses
- Behavior under taking transpose
- Multiplicative properties
- Area and volume formulae
- Determinant as distortion factor for linear transformation

Chapter 4: Vector spaces

41 Vector spaces and subspaces

- Definitions
- Span{v1,v2, …,vn}

4.2 Nul(A) and Col(A)

- Definitions and proof that they're subspaces
- Kernel and range for a linear transformation

4.3 Linear independence and bases

- Definitions of **generating set**, **linear independence**, **basis**
- Theorem: If the vectors in a spanning set are not linearly independent then one of them can be removed.
- Bases for Nul(A) and Col(A)