

# 1 Math 225 M1 Exam 1 Review

Exam 1 will cover Chapter 1 sections: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7 and Chapter 2 sections: 2.1, 2.2, 2.3, 2.4

The exam will consist of seven questions, some having multiple parts. Each question will be worth 10 points. The first **two** questions will be theoretical in the sense that they will ask for either a definition or a statement of a theorem. I stress the fact that only **two** of the questions will be of that nature. They are also easy as all you need to do is memorize some statements. You should spend most of your study time practicing problem solving skills.

## Definitions

- \* Coefficient and Augmented matrix of a system of linear equations (p. 5)
- \* What it means for two matrices to be row equivalent (p. 7)
- \* Echelon and Reduced Echelon forms of a matrix (p. 14)
- \* When are variables free or basic (p. 20)
- \* Span of a set of vectors (p. 35)
- \* Linear independence and linear dependence (p. 65)
- \* Transpose of a matrix (p. 114)
- \* Invertible square matrix (p. 119)

## Theorems:

- \* Theorem 1 (p. 15)
- \* Theorem 2 (p. 24)
- \* Theorem 3 (p. 42)
- \* Theorem 4 (p. 43)
- \* Blue box on page 67 (even though it's a blue box, call it a Theorem)
- \* Theorem 8 and 9 (p. 69)

\* **Theorem 8 (p. 129)**

This seems like a lot but I'm asking for nothing more than statements of definitions or the theorems. For example, I might ask something like "*Quote the Existence and Uniqueness theorem which discusses when a linear system is consistent*" in which case you would write down Theorem 2. Or I can say "*Write down two statements equivalent to the statement 'A is an invertible matrix'*", in which case you would write down 2 of the conditions of Theorem 8 on page 129.

**"Skills:"**

- \* Be able to compute when a vector is in the span of other vectors. Good practice problems are from section 1.7: 9, 10
- \* Be able to compute when a set of vectors is linearly dependent or independent Good practice problems are from section 1.7: 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
- \* Find the inverse of a matrix A using the  $[A \ I]$  method. Good practice problems are from section 2.2: 29, 30, 31, 32
- \* Be able to multiply matrices and know when the product is not defined. Good practice problems are from section 2.1: 1, 2, 3, 4, 11
- \* Be able to find the parametric vector form solution of a system of linear equations. Good practice problems are from section 1.5: 16, 19
- \* Be able to solve the Leontief Input-Output problems from section 1.6 Good practice problems are from section 1.6: 1, 2, 3, 4