MATH 2210Q
Fall 2016
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Exam 1 Guidelines: Material and Review Suggestions

Date and place: Thursday, September 29, 6:00-8:00, MONT 320
Additional office hours before exam: Thursday, September 29, 3:30 – 4:30
Policies: No MAKE-Ups, unless there is a documented serious reason, in which case make-up date is Friday, September 30. Talk to me a week before the exam about the time.

This is a one-hour exam, but all students may stay for as long as they need to finish the exam.

Material:

- Chapter 1, Sections: 1.1, 1.2, 1.3, 1.4, 1.5, 1.7
- Homework points total = 10 points (1 point per section + 1 point per group-work and Math-autobio)
- Exam 1 total points = 90 points
- You may bring a Scientific Calculator (but not a programmable or symbolic calculator)
- You may not bring any notes or handouts

The exam will cover the material from Chapter 1: Sections 1 – 5, and 7 that we discussed in class and studied in the homework assignments. Suggested practice exercises: THE PRACTICE PROBLEMS at the end of each section, and exercises in the same groupings as those assigned as homework problems.

Section by section highlights you should master:

Section 1.1
Definitions: System of linear equations, Equivalent systems, Elementary row operations, Augmented matrix, Matrix of coefficients, A solution and the solutions set of a linear system
Skills: Determine when a system is consistent

Section 1.2
Definitions: Echelon form matrix, Reduced echelon form matrix, Pivot position, Pivot, Pivot column, Free variables, Basic variables, General solution (also called parametric solution)
Theorems: Theorem 1 (Uniqueness of the reduced echelon form, page 13), Theorem 2 (Existence and uniqueness, page 21).
Skills: Solve a consistent system by bringing the augmented matrix to reduced echelon form, Write the general solution, Determine values of coefficients that make the system consistent or make the solution unique, Describe existence or uniqueness of solutions in terms of pivot positions.

Section 1.3
Definitions: Vectors, Linear combination of vectors, Span{$\mathbf{u}$} and Span{$\mathbf{u}$, $\mathbf{v}$} algebraic and geometric interpretations in R^2 and R^3, Span{$\mathbf{v}_1,\ldots,\mathbf{v}_n$}
Skills: Add, subtract, and multiply vectors by scalars (algebraic and geometric interpretations), Determine when a vector is in the subset spanned by specified vectors, Exhibit a vector as a linear combination of specified vectors, Determine whether a specified set of vectors span R^m

Section 1.4
Definitions: A**x**, matrix vector product
Theorems: Theorem 3 (equality of the solutions in the three ways of expressing a system of linear equations, page 36), Theorem 4 (when do columns of A span R^m, page 37), Theorem 5 (properties of matrix-vector multiplication, page 39)
Skills: Determine whether the columns of an m x n matrix span R^m, Compute A**x** both ways, Be able to switch descriptions between a system of equations, its vector equation, and its matrix equation.

Section 1.5
Definitions: Homogeneous linear system, Parametric vector equation form of a general solution
Skills: Determine when a homogeneous system has a nontrivial solution, and write the general solution in parametric vector equation form.

Section 1.7
Definitions: Linearly dependent and linearly independent vectors.
Theorems: Theorems 7, 8, 9 (Properties of linearly independent sets of vectors, pages 58 - 59).
Skills: Determine whether the columns of a matrix are linearly independent. Determine whether a set of vectors is linearly independent. Know several methods that can sometimes produce an answer "by inspection", i.e., without much calculation.