

## Math 1050-2 ~ Exam #3 Review Guide\*

\*This is only a guide, for your benefit, and it in no way replaces class notes, homework, or studying

### General Tips for Studying:

1. Review this guide, class notes and handouts, the text, and examples
2. Review comments on quizzes and *rework* ALL quiz problems
3. *Review* (assuming you have completed it) ALL homework assigned for Chapters 7, 8, and 9
4. Complete ALL suggested problems for the exam review given in class
5. Start studying early enough to ask questions!

### Helpful Definitions:

Rework: write down the problem and solve it yourself, then check your work

Review: look over the material making note of what you comprehend, rework what you do not

### Chapter 7: Systems of Equations

*\*\*Remember! If the directions of a problem ask you to use a certain method, you MUST use that method or you will receive no credit.\*\**

- ◆ 7.1 Linear and Nonlinear Systems of Equations:
  - Determine if ordered pairs are solutions of systems of equations
    - Remember!  $(x,y)$  must solve ALL equations of the system to be a solution
  - Solve systems of 2 equations (especially lines) graphically
    - On the exam, any question of this nature will have integer solutions
    - It is useful to put the lines in slope-intercept form
  - Solve systems (BOTH linear and nonlinear) of 2 equations using substitution
- ◆ 7.2 Two-Variable \*Linear\* Systems:
  - Solve linear systems of 2 equations using elimination

**\*Remember! Linear systems have only 1 solution, infinitely many solutions, or no solutions\***

- ◆ 7.3 Multivariable \*Linear\* Systems:
  - Use Gaussian Elimination (without matrices) to reduce a system to row-echelon form
  - Be able to use back-substitution to solve a system after you put it in row-echelon form
- ◆ 7.4 Partial Fractions (de-emphasize):
  - Be able to write partial fraction decompositions of rational expressions
  - I will focus only on the simplest cases (at least feel comfortable completing HW # 1-21)

### Chapter 8: Matrices and Determinants

- ◆ 8.1 Matrices and Systems of Equations:
  - Know how to determine the order of a matrix
  - Be able to form coefficient and augmented matrices from linear systems and vice versa
  - Know and understand how to use the elementary row operations
  - Know the difference between row-echelon form and reduced row echelon form
  - Solve systems of equations using Gaussian Elimination with back-substitution (with matrices)
    - 1. Write the augmented matrix    2. Use elementary row operations to rewrite the augmented matrix in row-echelon form    3. Write the system of linear equations for this matrix, and use back-substitution to find the solution.

- Be able to solve systems of equations using Gauss-Jordan Elimination (with matrices)
  - 1. Write the augmented matrix 2. Use elementary row operations to rewrite the augmented matrix in reduced row-echelon form 3. Read off the solution
- See the handouts from class for more details on completing these steps
- Remember! Order matters! I suggest working top to bottom and left to right
- Focus on 3x3 systems for this section

**\*Remember! Linear systems have only 1 solution, infinitely many solutions, or no solutions\***

- ◆ 8.2 Operations with Matrices:
  - Know what it means for two matrices to be equal
  - Be able to add, subtract, and scalar multiply matrices and to multiply two matrices
  - Be sure you know when the above operations can and cannot be performed
- ◆ 8.3 The Inverse of a \*Square\* Matrix:
  - Be able to use the definition of matrix inverses to verify two matrices are inverses
  - Memorize the formula for the inverse of a 2x2 matrix
  - Know how to use Gauss-Jordan Elimination to find the inverses of 2x2 and larger matrices. Also be able to describe in words how you would find the inverse of a large (say, 100x100) matrix.
    - 1. Form the augmented matrix  $[A | I]$ , where A is the  $n \times n$  matrix and I is the  $n \times n$  identity matrix. 2. Perform elementary row operations on  $[A | I]$  until we have an augmented matrix of the form  $[I | B]$ . That is, until the matrix A on the left is transformed into the identity matrix. 3. The matrix B (on the right) is the inverse of A.
  - Be able to use inverse matrices to solve systems of linear equations
- ◆ 8.4 The Determinant of a \*Square\* Matrix:
  - Know how to find the determinant of 2x2 and 3x3 matrices

## **Chapter 9: Sequences and Series**

*\*See the handout from class for these formulas do NOT memorize!\**

- ◆ 9.1 Sequences and Series:
  - Be able to list several terms of a sequence (even those written in summation notation)
  - Know how to simplify factorial expressions
- ◆ 9.2 Arithmetic Sequences and Partial Sums:
  - Know how to recognize and write arithmetic sequences
  - Be able to find the  $n^{\text{th}}$  term and the  $n^{\text{th}}$  partial sum of an arithmetic sequence
- ◆ 9.3 Geometric Sequences and Series:
  - Know how to recognize and write geometric sequences
  - Be able to find the  $n^{\text{th}}$  term and the  $n^{\text{th}}$  partial sum of a geometric sequence
  - Be able to find the sum of an infinite geometric series
- ◆ 9.5 The Binomial Theorem:
  - Be able to expand binomials using the Binomial Theorem