Math 1500: Review Topics #4

General comments:

The final exam is CUMULATIVE. Use this review sheet along with the previous three review sheets so that you can review the entire semester.

You can have a 5” x 8” notecard, written on both sides. Any formulas that you think you will need but cannot memorize should go on the card.

I expect you to multiply out the permutations and combinations, unless it specifically says not to in the problem.

You will not receive credit for steps you skip or do in your head. Use the examples from class as a guide for how much work I expect.

Section 2.3: Arithmetic Operations on Matrices

1. When can you add, subtract, or multiply two matrices? What is the rule?
2. What does the identity matrix do?
3. Writing a system of equations as a matrix equation.

Section 2.4: Inverse of a Matrix

1. The 3-step method for the inverse of a $2 \times 2$ matrix does not work for larger matrices.
2. What happens if $D = 0$?
3. Be able to use a matrix inverse to solve a system of equations.
4. Word problems with inverses.

Section 2.5: The Gauss-Jordan Method for Calculating Inverses

1. Follow the three steps in the book. What do you start with on the left and right, and how do you know you are done?
2. Suppose that you get a row of zeros in the left-hand matrix. What does that mean?
3. How can you check your answer without re-working the problem?
Section 3.1: A Linear Programming Problem

1. Be able to set up linear programming problems by creating a chart and giving the inequalities the variables must satisfy.

2. Draw the feasible set for the inequalities above.

3. What is an objective function?

Section 3.2: Linear Programming I

1. What does the Fundamental Theorem of Linear Programming tell us about where the max and min are?

2. Follow the steps on pages 125–126 to solve any linear programming problem.

3. You don’t have to put the inequalities in standard form if you just find the $x$ and $y$ intercepts.

4. Tell me what your test points are.

5. When you plug points into the objective function, make sure to complete the table. Don’t just write down the biggest or smallest value and skip the rest.

6. After you find the max or the min, don’t forget to answer the original question!

Section 3.3: Linear Programming II

1. Although it looks like we need three or more variables in this section, you must simplify the problem so that it has only two variables. Otherwise, you would have to graph a three dimensional (or higher) feasible set!

2. For some problems (avocados, grapefruit, oranges) it’s a good idea to create a table.

3. For for other problems (shipping cars), a diagram is much more helpful.

4. There are the only two types of problems we’ll deal with in this section.

Section 4.1: Slack Variables and the Simplex Tableaux

1. This method only works for a linear programming problem is in standard form.

2. What is a slack variable?

3. Be able to restate a linear programming problem in terms of a linear system like in Example #1.

4. Identifying slack variables, you don’t have to identify group I vs. group II variables unless I ask you to.
5. What exactly is a simplex tableaux?

6. Be able to find a particular solution by just looking at the simplex tableaux.

7. Then pivot about a given element, and find a new solution by just looking at the simplex tableaux.

Section 4.2: The Simplex Method I: Maximum Problems

1. Be able to carry out the simplex method to solve a maximum problem. See the box on page 167.

2. I expect you to put the arrow below the most negative number in the bottom, and show the division by the positive elements on the far right. No credit for doing all this in your head.

3. I expect you to circle the pivot elements. How do you pick the pivot column, the pivot row?

4. Pivoting is a specific process from Section 2.2 where you start with multiplication or division. If you get a “1” a different way, you will not get the right answer. We discussed this in class.

5. How do you know when to stop?

6. What types of problems can the simplex method solve that the feasible set method cannot?

7. Give me (or circle just) the relevant values to answer the question, and nothing else.

Section 4.5: Duality

1. I didn’t teach you how to solve a min problem, I taught you how to change a min program into a max problem.

2. Be able to find the dual of a linear programming problem. Notice all problems are in standard form.

3. What happens to the original variables and the slack variables?

4. Make sure you can use the Fundamental Theorem of Duality to solve the original problem. Where do you look in the simplex tableaux?