

# Math 1500 Review Topics: Exam #2

## *General comments:*

I will give you pieces of problems for some questions on the test. If you actually try and do the entire problem, you will not finish the exam on time. Please read each question twice, and don't do any more than it asks you to.

Remember the decimal rule: if there are no decimals in the question, then you may not have any decimals in your answer. If there are decimals in the question, then you can have decimals in your answer.

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.

Remember I will not read your matrix work if you don't tell me what your row operations are. You must use either the notation I use in class or the notation in the book. *You may not make up your own notation!*

## Section 3.1: A Linear Programming Problem

1. Be able to set up linear programming problems by filling in a chart and giving the inequalities the variables must satisfy.
2. Draw the feasible set for the inequalities above.
3. What an the objective function?

## Section 3.2: Linear Programming I

1. What does the Fundamental Theorem of Linear Programming tell us?
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. Whatever you do, make sure to explicitly write down what points you are using to draw the line.
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 or shipping cars) it's hard to place all the information in a table. A diagram is much more helpful.

### Section 4.1: Slack Variables and the Simplex Tableaux

1. Be able to decide whether a linear programming problem is in standard form or not.
2. Restating a linear programming problem in terms of a linear system like in Example #1.
3. Identifying slack variables, you don't have to identify group I and group II variables unless I ask you to.
4. What exactly is a simplex tableaux?
5. Be able to find a particular solution by just looking at the simplex tableaux.
6. 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, and show the division by the positive elements. 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. 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. Be able to find the dual of a linear programming problem. Notice all problems are in standard form.
2. What happens to the original variables and the slack variables?
3. Make sure you can use the Fundamental Theorem of Duality to solve the original problem. Where do you look in the simplex tableaux?