Math 1500: Review Topics for Exam #2

General comments:

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 6.2: Experiments, Outcomes and Events

1. What is the sample space for an experiment?

2. What is an event compared to the sample space?

3. You can interpret the events $E \cap F$ and $E \cup F$ to be when both $E$ and $F$ occur, or when either $E$ or $F$ (or both) occur, respectively.

4. What does it mean when two events are mutually exclusive? How do we check for this mathematically?

Section 6.3: Assignment of Probabilities

1. Be able to give the probability distribution for an experiment.

2. What two fundamental properties does a probability distribution have?

3. We can use the addition principle to find the probability of an event by adding the probabilities of the elementary events that make it up.

4. The Inclusion-Exclusion Principle should look familiar from chapter 5, it’s just with a Pr.

5. Be able to convert back and forth between odds and probabilities.

Section 6.4: Calculating Probabilities of Eventss

1. If an event $E$ has $N$ equally likely outcomes (sample space), then

   $$\Pr(E) = \frac{\# \text{ of ways } E \text{ can happen}}{\# \text{ of elements in sample space}}$$

2. When doing all these problems, decide whether it’s easier to find the probability of $E$ or $E_0$ and subtract that from 1.
Section 6.5: Conditional Probability

1. Be able to use the conditional probability formula.
2. Be able to use the conditional probability formula in the case of equally likely outcomes. How are these alike?
3. Be able to use the product rule for probability.
4. What does it means that two events $E$ and $F$ are independent?
5. What are two ways we can check for independence mathematically?
6. The product rule extends to more than two events as long as you have independence.

Section 6.6: Tree Diagrams

1. Be able to draw tree diagrams to solve probability problems.
2. Multiply across from left to right to find the probability of each outcome.
3. What should the probabilities emanating from each point add up to?

Section 6.7: Bayes’ Theorem

1. Bayes’ Theorem allows us to reverse the order of conditional probabilities.
2. What if you knew $\Pr(B | A)$ and you wanted to know $\Pr(A | B)$?

Section 1.1: Coordinate Systems and Graphs

1. Determine if a point lies on a graph.
2. Put a linear equation in standard form.
3. Graphing linear equations by plotting points and connecting the dots.

Section 1.2: Linear Inequalities

1. Put a linear inequality in standard form.
2. Graphing a linear inequality, which part do you shade?
3. Graphing the feasible set for a system of inequalities. You have to test a point, and tell me which point you are using.

Section 1.3: The Intersection Point of a Pair of Lines
1. Find the point of intersection of a pair of lines.

2. Find the coordinates for the vertices of a feasible set.

3. Graphing a feasible set for a system of inequalities, and solving to find the coordinates of the vertices. *You may not find the coordinates by looking at the graph unless they are the x or y intercepts.*

4. For two or more lines, make sure to label the lines with their equations.

5. Word problems involving the intersection of two lines.

**Section 1.4: The Slope of a Straight Line**

1. Finding the slope of a line in standard form, or the line between two given points.

2. Using the steepness property to draw the graph of a line.

3. Finding lines parallel or perpendicular to a given line, through a given point.

4. Finding the equation of a line, notice we have two forms.

5. Word problems involving the equation of a line.

**Section 2.1: Solving Systems on Linear Equations I**

1. We have three elementary row operations.

2. Remember to convert the linear system into a matrix.

3. You must write down your row operations like \([2]+3[1]\) or how they do it in the book. *You may not make up your own notation.*

4. Solving linear systems using the Gaussian elimination method. **Hint:** work column by column. How do you know when to stop?

**Section 2.2: Solving Systems on Linear Equations II**

1. Be able to pivot a matrix about a given entry, remember this is different from solving a system of equations (no vertical line).

2. Use the steps of the Gaussian elimination method.

3. What do you do when a matrix cannot be completely diagonalized?