

Math 210 – Topics in Finite Math

Spring 2007 – Midterm 1

Name: \_\_\_\_\_

TA: \_\_\_\_\_

VERSION A

- (a) The exam has 5 problems.
- (b) Show your work for every problem. Answers without justification will not receive credit.
- (c) Calculators are not allowed.
- (d) There is a blank page at the end of the exam for if you need it.

Problem	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	
Total	100	

1. (20 points) Two kids sell lottery tickets in your neighborhood and you buy one of their tickets. Each ticket has two letters on it, you win a prize if your lottery ticket has at least one letter in common with the code that is drawn [the order is important, for example, AB does not have a letter in common with BC]. Assuming that all letter-combinations are equally likely, what is the chance that you win a prize?

2. (20 points) A bag contains 8 balls, each of a different color. We randomly draw three balls from the bag.

(a) What is the the number of different color-combinations?

(b) One of the balls is red. How many color-combinations are there that include the red ball?

3. (20 points) Let  $S$  be a sample space, and suppose  $E$  and  $F$  are events.

(a) If  $\Pr[E] = 0.3$ ,  $\Pr[F] = 0.6$  and  $\Pr[E \cup F] = 0.8$ , what is  $\Pr[E \cap F]$ ?

(b) Draw a Venn Diagram that clearly shows all the relevant events and their probabilities.

4. (20 points) How many words can one make with the letters of the word "lemmon"? [Note that the words do not have to be actual English words]

5. (20 points) After graduating from the University of Wisconsin, Elianna applies to several different companies. She applies to two companies in Wisconsin, each with two branches, and three companies in Michigan, one with two branches and two with three branches.

(a) Draw a tree that clearly shows both states, the companies and their branches.

(b) Suppose for the sake of argument that Elianna gets to pick one of these branches and each branch is equally likely, what would be the chance that she picks a job in Wisconsin?