Final Exam Review
Chapters 4,6

Disclaimer: This is my attempt to help you study. The problems below are a very minimal set of problems. You should know the general topics, concepts and problems discussed in class, the textbook or assigned as homework. As well as be able to do problems related to those found in the homework problems and quizzes. Problems on the exam may be on topics not covered in this review sheet and topics here may not appear on the exam. But, this review sheet can give you some extra practice with most of the main concepts covered in the course.

1. Two twelve-sided dice are thrown. What is the probability that the sum of the two dice will not be 6?

2. For each of the two parts, write down the expression involving factorials, that is the definition of the given permutation or combination number and then using cancellation and evaluation of factorials, find the corresponding numerical value.
   (a) ${}_{15}P_8$
   (b) ${}_{10}C_7$

3. In a particular neighborhood of 54 homes, 37 of the homes have children, 23 have pets, and 9 have both. What is the probability that a randomly selected home in the neighborhood will
   (a) have children or pets?
   (b) have neither children nor pets?

4. The Office of Admissions and Records of a large western university released the accompanying information concerning the contemplated majors of its freshman class:

Major	Number of Freshmen Choosing This Major	Percent Female	Percent Male
Business	290	48%	52%
Humanities	70	60%	40%
Education	180	67%	33%
Other	460	41%	59%

   (a) What's the probability that a random student from this class is planning to be a Humanities major?
   (b) What's the probability that a randomly chosen student is a female and is planning on majoring in education?
   (c) What is the probability that a student selected at random from the freshman class is female?
   (d) Given that a randomly chosen student is male, what's the probability that he's an education major?
   (e) Given that a randomly chosen student is not a business major, what's the probability that this student is female?
   (f) Given that a randomly chosen student is female, what's the probability that she is not a business major?

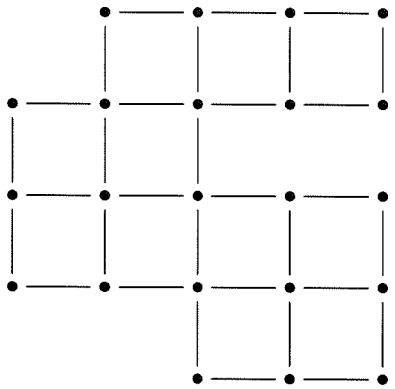
5. Suppose that a small summer camp (15 campers, 4 counselors, 2 mascots) is ready for their annual picture day. The photographer decides that everyone should stand in a line.
   (a) In total, how many ways can everyone line up?
   (b) Imagine that we want the campers to stand on the left side, the mascots in the middle, and the counselors on the right. With these restrictions, in how many ways can we line up everyone?

6. From a bag containing six red, five white, and ten blue marbles, three are drawn at random. What is the probability
   (a) that all three are the same color?
   (b) that all three are different colors?
   (c) that at least two two of the three are the same color?

7. You and a group of friends would like to visit Los Angeles, San Francisco, San Diego, and Las Vegas on a road trip. The mileage between these cities is given in the table below. You plan on flying to one of these cities and renting a car, so you'll need to begin and end in the same city. First, draw a graph representing this problem, then find a travel route using both the Nearest Neighbor Algorithm and the Greedy Algorithm. For the Nearest Neighbor assume that you have to start at LA.

	LA	SD	SF	LV
LA	0	130	390	270
SD	130	0	510	340
SF	390	510	0	570
LV	270	340	570	0

8. The grid below represents a city neighborhood. On collection day, the garbage truck must go down every street to pick up the curb-side trash. Can they do this by going down each street exactly once? If not, fins an Eulerization of the graph.



9. The graph below represents a group of computers in a dorm, and the distance between them. We'd like to network them, using the least amount of wire possible. Use Prim's Algorithm to find a suitable way to network these 12 computers.