

Midterm Exam 1, Spring 2008

Name:

- There are 3 problems, each worth between 30 and 40 points for a total of 100.
- Before you start, make sure your exam is not missing any page.
- You may do the problems in any order you like.
- You can earn lots of partial credits if you show your work.
- You are allowed one page of notes (both sides) and a calculator.

For instructor's use only

Problem	Points	Score
1	30	
2	40	
3	30	
Total	100	

1. A small company employs 5 men and 3 women. The company will send 4 people to a conference.
 - (a) The company makes a random selection of the 4 people to attend the conference. What is the probability that there will be 3 men and 1 woman attending the conference?
 - (b) How many selections are there which contain 2 men and 2 women?
 - (c) The decision was made that all 4 are to be men. How many different selections are possible for this choice?
 - (d) The company has a project which requires the selection of 4 people to perform different tasks. How many arrangements are possible within all the employees?
 - (e) The company realizes that one specific task can only be performed by a woman. The company decides to select a woman to fulfill this task and for the rest of three tasks only men. How many possible selections are there now?

2. It is known that each person passing through a metal detector in JFK airport has a 0.5% chance to activate the detector. I am leading various groups of invited speakers at a math conference organized by Stevens (I never go through the metal detector). The results for each individual are independent of the results for any other individual.
- (a) If the next group contains 20 individuals, what is the probability that none of them activate the detector?

 - (b) What is the expected number of people in my group of 20 that will activate the detector

 - (c) Suppose I just sit and look at the people passing the detector. What is the probability that the fifth individual will be the second person to trigger the detector's alarm?

 - (d) Assume now that I have a very large group of 500 individuals. I wonder what is the probability that exactly 5 of them will trigger the alarm. Calculate an approximation of this probability (the answer should be a decimal number)

3. At a large university, in the never-ending-quest for a satisfactory textbook, the Statistics Department has tried a different text during each of the last three quarters. During the fall quarter, 500 students used the text by Professor Mean; during the winter quarter, 300 students used the text by Professor Median; and during the spring quarter, 200 students used the text by Professor Mode. A survey at the end of each quarter showed that 200 students were satisfied with Mean's book, 150 were satisfied with Median's book, and 160 were satisfied with Mode's book. If a student who took statistics during one of these quarters is randomly selected and admits to have been satisfied with the text, is the student most likely to have used the book by Mean, Median, or Mode? Who is the least likely author?