

MA 222. Assignment 1

due Tuesday May 31, 2011 at the beginning of the class.

Note that due to the Memorial day and Commencement day this assignment is actually two due in the same day. So the grade for this assignment is double the regular assignments (respectively 20 points). Also note that the numbered problems are from the 7th edition of the textbook. For convenience the text of these problems is copied and reproduced at the end. Please excuse any mistakes due to rush typing.

1. Gottfried Wilhelm Leibnitz (1646-1716), German mathematician, philosopher, statesman and one of the supreme intellects of the seventeenth century believed that in a throw of a pair of fair dice (labeled 1 to 6) the probability of obtaining the sum 11 is the same as obtaining the sum 12. Do you agree? Explain.
2. 6 faculty members in the Mathematical Sciences department have declared that their computers are no longer keeping up with the current day technology. The department gave them a choice and thus four members selected desktop computers and two requested laptop computers as replacement. However, soon after the department found out that funding is only available for two computers (regardless of type). Thus they decided to use random drawing to decide on the replacements.
 - a) The Department does not care who is going to receive the computers. It is only interested in the type of computers to be bought. List the outcomes in the sample space from the department perspective.
 - b) The faculty members on the other hand are very much interested in who will receive what. Use your own notation and write the sample space from the faculty members' perspective.

- c) List the outcomes in the event “Both computers chosen were laptops”. Use both sample spaces from a) and b)
- d) Professor Florescu is one of the members of the department who selected a replacement laptop. List all the outcomes in the event “professor Florescu will receive a replacement laptop”. Can you use both sample spaces to write this event? Why? /Why not?
- e) Calculate the probability of the event in d)

The rest of the problems are from the official textbook.

- 3. Problem 7 on page 55
- 4. Problem 14 on page 55
- 5. Problem 2 on page 38
- 6. Problem 12 on page 38
- 7. Problem 21 on page 39
- 8. Problem 27 on page 39

Please be aware that the only way one learns probability is through practice. So if you have difficulties with these problems or any other from subsequent assignments you need to go to the textbook and do **all** problems from the respective chapter where you have difficulties.

The text of these problems follows.

(7/55) In *USA Today* (Sep. 5, 1996) the results of a survey involving the use of sleepwear while traveling were listed as follows:

	Male	Female	
Underwear	0.220	0.024	0.244
Nightgown	0.002	0.180	0.182
Nothing	0.160	0.018	0.178
Pajamas	0.102	0.073	0.175
T-shirt	0.046	0.088	0.134
Other	0.084	0.003	0.087

- (a) What is the probability that a traveler is a female who sleeps in the nude?
 - (b) What is the probability that the traveler is a male?
 - (c) Assuming that the traveler is a male, what is the probability that he sleeps in the pajamas?
 - (d) What is the probability that a traveler is male if he/she sleeps in pajamas or a T-shirt?
- (14/55) In 1970, 11% of Americans completed four years of college; 43% of them were women. In 1990, 22% of Americans completed four years of college; 53% of them were women. (Time, Jan 19, 1996)
- (a) Given that a person completed four years of college in 1970, what is the probability that the person was a woman?
 - (b) What is the probability that a woman would finish 4 years of college in 1990?
 - (c) What is the probability that in 1990 a man would not finish college?
- (2/38) In a medical study patients are classified in 8 ways according to whether they have blood type AB^+ , AB^- , A^+ , A^- , B^+ , B^- , O^+ , O^- , and also according to whether their blood pressure is low, normal and high. Find the number of ways in which a patient may be classified.
- (12/38) (a) How many distinct permutations can be made from the letters of the word *columns*?
- (b) How many of these permutations start with the letter *m*?
- Bonus How many permutations can you make from the letters of the word *possum*?
- (21/39) Find the number of ways that 6 teachers can be assigned to 4 sections of an introductory psychology course if no teacher is assigned to more than one section.
- (27/39) A college plays 12 football games during a season with 12 different opponents. In how many ways can the team end the season with 7 wins 3 losses and 2 ties?