COMP 170 Discrete Mathematical Tools for CS
2005 Fall Semester – Practice Assignment # 1
Distributed: Nov 25, 2005
To be discussed in tutorial on Dec 2, 2005

This handout is meant as a *practice* assignment to let you practice the material taught during the last weeks of class. Solutions to this assignment *should not* be handed in.

Most of these problems are taken (modified) from the backs of sections 5.3 and 5.4 of the book.

Problem 1: In the following question you are asked to calculate conditional probabilities. Think carefully about the *difference* between (a) and (b) in the information that you are conditioning upon.

(a) Suppose that boys and girls are equally likely to be born. In a family consisting of a mother, father, and two children of different ages, what is the probability that the family has two girls, given that one of the children is a girl?

(b) What is the probability that the children are both boys, given that the older child is a boy?

Problem 2: If a student knows 75% of the material in a course, and if a 100-question multiple-choice test with five choices per question covers the material in a balanced way, what is the student's probability of getting a right answer to a question, given that the student guesses at the answer to each question whose answer he does not know?

Problem 3: What is the expected sum of the tops of n dice when you roll them?

Problem 4: How many sixes do you expect to see on top if you roll 24 dice?

Problem 5: Suppose that you have a six-sided die; four of whose sides are red and two of whose sides are green. Roll the die until a red side comes up on top. Now continue rolling until a green side comes up. What is the expected number of rolls you made?
[Note: this question can not be answered until we learn about geometric distributions].

Problem 6: Give an example of two random variables (different than the examples given in class) X and Y such that $E(XY) \neq E(X)E(Y)$.