

**COMP 170 – Discrete Mathematical Tools for CS**  
**2006 Fall Semester – Practice Assignment #1**  
**Distributed: Nov 28, 2006**

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 textbook.

**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 6's do you expect to see on top if you roll 24 dice?

**Problem 5:** Suppose that you have a six-sided die; four of its sides are red and two of its 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 cannot be answered until you learn about geometric distributions].

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