Challenge problems for Chapter 2

Math 382 Fall 2011

Note: Even if you solve one or two problems, you are encouraged to turn them in.

1. Jean baked 12 cookies, to be divided evenly among her 3 children. Three of the cookies contain a special surprise inside. If the children randomly divided cookies (still evenly), what is the probability that each child gets a surprise?

2. Eight men and two ladies signed up for a tennis tournament. All 10 people are randomly split into pairs.

   (a) What is the probability that the two ladies will not be in the same pair?

   (b) Can you generalize the solution: suppose there are now $2n$ players overall, among whom k are ladies, $k \leq n$. Find the probability that none of the pairs consists of two ladies.

3. Jack and Jill are playing the following game: a bowl contains n white balls and one red ball. Each player takes one ball at random, taking turns, until one of the players gets the red ball and wins. Who has the advantage: the player who starts first or the one who follows?

4. Problem 2.28 from Notes.

5. Problem 2.33 from Notes.

6. A player takes 2 cards randomly from a standard 52-card deck.

   (a) What is the probability that she has two red cards?

   (b) Suppose I glanced at her hand and noticed that one of the cards is an ace, but I did not notice the color. Does this extra information change the probability in part (a)? If it does, what is the new probability?