

## Homework 2

**Due date: In class, Monday, October 13**

1. An agent working for the Census bureau is visiting a house to collect some information about the household. As she returns to her office, she realizes that she forgot to inquire about the gender of the three children living there although she recalls having seen two children returning from school; they were both girls. What is the probability that the child she has not seen is a boy? a girl?
2. Pitman Chapter 1, Review Exercises: Problem 16.
3. Five separate awards (best scholarship, best leadership qualities, and so on) are to be presented to selected students from a class of 30. How many different outcomes are possible if
  - (a) a student can receive any number of awards;
  - (b) each student can receive at most 1 award?
4. Pitman Chapter 2, Section 1 Problem 2.1.14.
5. The National Basketball Association (NBA) draft lottery involves the 11 teams that had the worst won-lost records during the year. A total of 66 balls are placed in an urn. Each of these balls is inscribed with the name of a team: 11 have the name of the team with the worst record, 10 have the name of the team with the second worst record, 9 have the name of the team with the third worst record, and so on (with 1 ball having the name of the team with the eleventh worst record). A ball is then chosen at random and the team whose name is on the ball is given the first pick in the draft of players about to enter the league. Another ball is then chosen and if it "belongs" to a different team than the one that received the first draft pick, then the team to which it belongs receives the second draft pick. (If the ball belongs to the team receiving the first pick, then it is discarded and another one is chosen; this continues until the ball of another team is chosen.) Finally, another ball is chosen and the team named on the ball (provided that it is different from the previous two teams) receives the third draft pick. The remaining draft picks 4 through 11 are then awarded to the 8 teams that did not "win the lottery" in inverse order of their won-lost records. For instance, if the team with the worst record did not receive any of the 3 lottery picks, then that team would receive the fourth draft pick. Let  $X$  denote the draft pick of the team with the worst record. Find the probability mass function of  $X$ .