

Homework 10

Section 7.1

4. What is the probability that a randomly selected day of a leap year (with 366 possible days) is in April?
12. What is the probability that a five-card poker hand contains exactly one ace?
20. What is the probability that a five-card poker hand contains a royal flush (royal flush means that you have a 10, jack, queen, king, and ace all of one suit)?
32. Suppose that 100 people enter a contest and that different winners are selected at random for first, second, and third prizes. What is the probability that Kumar, Janice, and Pedro each win a prize if each has entered the contest?
40. Suppose that instead of three doors, there are four doors in the Monty Hall puzzle. Once you select a door, the host, who knows what is behind each door, opens a losing door and gives you the chance to change doors.
 - (a) What is the probability that you win by not changing?
 - (b) What is the probability that you win by changing the door you select to one of the two remaining doors among the three that you did not select?

Section 7.2

2. Find the probability of each outcome when a loaded die is rolled, if a 3 is twice as likely to appear as each of the other five numbers on the die.
6. What is the probability of these events when we randomly select a permutation of $\{1, 2, 3\}$?
 - (a) 1 precedes 3.
 - (b) 3 precedes 1.
 - (c) 3 precedes 1, and 3 precedes 2.
24. What is the conditional probability that exactly four heads appear when a fair coin is flipped five times, given that the first flip came up tails?
28. Assume that the probability a child is a boy is 0.51 and that the sexes of children born into a family are independent. What is the probability that a family of five children has
 - (a) exactly three boys?
 - (b) at least one boy?
 - (c) at least one girl?
 - (d) all children of the same sex?

Section 7.4

2. What is the expected number of heads that come up when a fair coin is flipped 10 times?
4. A coin is biased so that the probability a head comes up when it is flipped is 0.6. What is the expected number of heads that come up when it is flipped 10 times?
8. What is the expected sum of the numbers that appear when three fair dice are rolled?
16. Let X and Y be the random variables that count the number of heads and the number of tails that come up when two fair coins are flipped. Show that X and Y are not independent.