MATH 241 Homework 2

Due: Sunday 3/7 11:59pm to Moodle

- Chapter 2 Problem 1

  A box contains 3 marbles: 1 red, 1 green, and 1 blue. Consider an experiment that consists of taking 1 marble from the box and then replacing it in the box and drawing a second marble from the box. Describe the sample space. Repeat when the second marble is drawn without replacing the first marble.

- Chapter 2 Problem 8

  Suppose that A and B are mutually exclusive events for which $P(A) = .3$ and $P(B) = .5$. What is the probability that

  (a) either A or B occurs?

  (b) A occurs but B does not?

  (c) both A and B occur?

- Chapter 2 Problem 13

  A certain town with a population of 100,000 has 3 newspapers: I, II, and III. The proportions of townspeople who read these papers are as follows:

  - I: 10 percent
  - I and II: 8 percent
  - I and II and III: 1 percent
  - II: 30 percent
  - I and III: 2 percent
  - III: 5 percent
  - II and III: 4 percent

  (The list tells us, for instance, that 8000 people read newspapers I and II.)

  (a) Find the number of people who read only one newspaper.

  (b) How many people read at least two newspapers?

  (c) If I and III are morning papers and II is an evening paper, how many people read at least one morning paper plus an evening paper?

  (d) How many people do not read any newspapers?

  (e) How many people read only one morning paper and one evening paper?

- Chapter 2 Problem 19

  Two symmetric dice have had two of their sides painted red, two painted black, one painted yellow, and the other painted white. When this pair of dice is rolled, what is the probability that both dice land with the same color face up?

- Chapter 2 Problem 27

  An urn contains 3 red and 7 black balls. Players A and B withdraw balls from the urn consecutively until a red ball is selected. Find the probability that A selects the red ball. (A draws the first ball, then B, and so on. There is no replacement of the balls drawn.)

- Chapter 2 Problem 36

  Two cards are chosen at random from a deck of 52 playing cards. What is the probability that they

  (a) are both aces?

  (b) have the same value?

- Chapter 2 Problem 43

  (a) If N people, including A and B, are randomly arranged in a line, what is the probability that A and B are next to each other?

  (b) What would the probability be if the people were randomly arranged in a circle?

- Chapter 2 Problem 47

  If there are 12 strangers in a room, what is the probability that no two of them celebrate their birthday in the same month?

- Chapter 2 Problem 49

  A group of 6 men and 6 women is randomly divided into 2 groups of size 6 each. What is the probability that both groups will have the same number of men?

- Chapter 2 Theoretical exercise 12

  Show that the probability that exactly one of the events E or F occurs equals

  $$P(E) + P(F) - 2P(EF).$$

- Chapter 2 Theoretical exercise 15

  An urn contains M white and N black balls. If a random sample of size r is chosen, what is the probability that it contains exactly k white balls?

Optional: if you feel like more practice
These will not be graded, but you are welcome to discuss these with me during the office hour.

- Textbook Chapter 2 Problems: 2, 3, 5, 6, 9-12, 14-16, 18, 20-24, 28-42, 44-46, 48,
- Textbook Chapter 2 Theoretical exercise: 1-3, 6, 7, 10, 11, 13