

CS2022/MA2201
HW#7

DUE: Monday, October 4

1. (3 points) Suppose you and a friend each choose at random an integer between 1 and 8. For example, some possibilities are (3,7), (7,3), (4,4), (8,1), where your number is written first and your friend's number second. Find

- (a) $p(\text{you pick 5 and your friend picks 8})$
- (b) $p(\text{sum of the two numbers picked is } < 4)$
- (c) $p(\text{both numbers match})$

2. (2 points) Find and correct the error in the solution to the following problem:

PROBLEM: You flip two fair coins and want to find the probability that both coins show heads.

SOLUTION: There are three possible outcomes: 2 heads, 2 tails, or 1 head and 1 tail. Since a "success" is one of these three outcomes, $p(\text{both heads}) = 1/3$.

3. (4 points) Let A be the set of all strings of decimal digits of length 5. For example 00312 and 19483 are two strings in A . You pick a string from A at random. What is the probability that

- (a) the string begins with 7575?
- (b) the string has no 4 in it?

4. (8 points) Suppose you have 40 books (20 math books, 15 history books, and 5 geography books). Assume that all 40 books are different.

- (a) You pick one book at random. What is the probability that the book is a history book?
- (b) You pick one book at random. What is the probability that the book is not a geography book?
- (c) You pick two books at random one at a time. What is the probability that both books are history books?
- (d) You pick two books at random one at a time. What is the probability that the two books are from different disciplines?

5. (3 points) In the New York State Lottery you choose a set of 6 distinct numbers out of 54 numbers. Find the probability that none of your numbers match the 6 winning distinct numbers.

6. (6 points) A group of 10 women and 10 men are in a room.

- (a) If 5 of the 20 are selected at random and put in a row for a picture, what is the probability that the 5 are of the same sex?
- (b) If a 4-person committee is chosen at random, what is the probability that the committee consists only of women?

7. (1 point) Do **Exercise 4.5.16** from our text.

8. (5 points) Do **Exercise 4.5.18** from our text. Justify your response.