

## Homework 5: Discrete Random Variables

1. §3.1, #2, 3.
2. An urn contains seven balls numbered 1 to 7. Two balls are drawn simultaneously. Let  $X$  be the larger of the two numbers drawn. Find  $f_X(x)$ .
3. A fair die is tossed three times. Let  $X$  be the number of different faces that appear. Find  $f_X(x)$ .
4. Two dice are rolled. Let  $X$  be the product of the two dice. Find  $f_X(x)$ .
5. Suppose that five people, including you and a friend, line up at random. Let the random variable  $X$  denote the number of people standing between you and your friend. What is  $f_X(x)$ ?
6. Five men and five women are ranked according to their scores on an examination. Assume that no two scores are alike and all  $10!$  possible rankings are equally likely. Let  $X$  denote the highest ranking achieved by a woman. (For instance,  $X = 1$  if the top-ranked person is a woman.) Find  $f_X(x)$ .
7. Let  $X$  be the difference between the number of heads and the number of tails when a coin is tossed  $n$  times. What are the possible values of  $X$ ?
8. An elementary school has 3 sixth-grade classes, each consisting of 20 students. From these 60 sixth-grade students, a committee of 3 students is selected at random. Let the random variable  $X$  be the number of different classes the three committee members are from. (For example,  $X = 3$  if the committee members are all from different classes.) What are the different values  $X$  can take? Find the probability function of  $X$ .