

**Due: Wednesday January 20th, 2020**

*Problems to be turned in Problem 1,2,4,5*

1. Problem 5, Homework 3.
2. Consider the experiment of flipping a coin four times and recording the sequence of heads and tails. Let  $S$  be the sample space of all sixteen possible orderings of the results. Let  $X$  be the function on  $S$  describing the number of tails among the flips. Let  $Y$  be the function on  $S$  describing the first flip (if any) to come up tails.
  - (a) Create a table as discussed in class, describing functions  $X$  and  $Y$ .
  - (b) Use the table to calculate  $P(X = 2)$ .
  - (c) Use the table to calculate  $P(Y = 3)$ .
3. At the ISI-Olympics two volleyball teams have eight players each. Due to the pandemic, there is a 10% chance that any given player will not show up to a game, independently of any another. The game can be played if each team has at least six members show up. How likely is it the game can be played ?
4. Problem 4 Homework 4
5. Problem 8 Homework 4
6. A pair of fair dice are thrown. Let  $X$  represent the larger of the two values on the dice and let  $Y$  represent the smaller of the two values.
  - (a) Describe  $S$ , the domain of functions  $X$  and  $Y$ . How many elements are in  $S$ ?
  - (b) What are the ranges of  $X$  and  $Y$ . Do  $X$  and  $Y$  have the same range? Why or why not?
  - (c) Describe the distribution of  $X$  and describe the distribution of  $Y$  by finding the probability mass function of each. Is it true that  $X \sim Y$ ?
7. A pair of fair dice are thrown. Let  $X$  represent the number of the first die and let  $Y$  represent the number of the second die.
  - (a) Describe  $S$ , the domain of functions  $X$  and  $Y$ . How many elements are in  $S$ ?
  - (b) Describe  $T$ , the range of functions  $X$  and  $Y$ . How many elements are in  $T$ ?
  - (c) Describe the distribution of  $X$  and describe the distribution of  $Y$  by finding the probability mass function of each. Is it true that  $X \sim Y$ ?
  - (d) Are  $X$  and  $Y$  the same function? Why or why not?