

# Homework 3

S520, Fall 2019

Due at the beginning of class, Monday September 16th. Please upload your file to Canvas no later than 4pm on the due date. Late submission will be accepted (but penalized) before the solutions are posted.

Trosset question numbers refer to the hardcover textbook. Show all work.

1. Trosset exercise 3.7.14 (15 points)
2. Trosset exercise 4.5.2 (15 points)
3. Consider an unfair six-sided die. Let  $X$  be a discrete random variable representing the result of a roll of the die. The probability mass function of  $X$  is

$$f(x) = \begin{cases} 0.1 & x = 1 \\ 0.1 & x = 2 \\ 0.3 & x = 3 \\ 0.3 & x = 4 \\ 0.1 & x = 5 \\ 0.1 & x = 6 \\ 0 & \text{otherwise.} \end{cases}$$

- (a) Find  $F(x)$ , the cumulative distribution function of  $X$ , for all  $x \in (-\infty, \infty)$ . (3 points)
  - (b) Find the expected value and the variance of  $X$ . (6 points)
  - (c) Suppose I roll the die ten times (all independently.) Let  $Y$  be the sum of the ten die rolls. What are the expected value and the variance of  $Y$ ? (3 points)
4. Trosset exercise 4.5.10 (3 points)
  5. Trosset exercise 4.5.13 (6 points)
  6. Trosset exercise 4.5.14 (9 points)