

Introduction to Statistics - Homework #4

- Use Appendix C: Distribution tables (e.g. Z-table) from page 408 to 417 in the textbook if necessary.

Exercise 1

An employee at a call center takes between 0.5 and 6.5 minutes to respond to a phone call, and this response time is assumed to be uniformly distributed between 0.5 and 6.5. If the response times of 60 independent calls are observed, approximate the probability that the average response time is at least 4 minutes.

Exercise 2

When Team A and Team B play a game in a sport, probabilities that Team A wins or loses are 0.6 and 0.4, respectively. Each outcome gives 3 points for a win and 0 points for a loss. Let X_1, X_2, \dots, X_n denote the points earned by Team A in n independent games (assume independence across games). Answer the following questions.

(1) Find the joint probability mass function of X_1 and X_2 .

(2) Let \bar{X}_2 be the average score over 2 games. Find the probability mass function of \bar{X}_2 .

(3) Find the expectation $E[\bar{X}_2]$ and variance $Var(\bar{X}_2)$.

(4) Suppose the two teams play 54 games. Approximate the probability that Team A's average score is at least 2.