STA201: Elements of Statistics and Probability

Quiz 03

Section: 20

Date: 18/12/2022

1. A company produces high quality crystal cups for the elite. The chance of a randomly selected cup being defective is 5%. Suppose you are inspecting the cups.
    a. Among the first 25 cups inspected, what is the probability that only the last cup will be defective? [4 marks]
    b. Among 50 cups inspected, what is the probability that at most 2 cups will be flawed? [4 marks]
2. Car cooling systems are controlled by electrically driven fans. The service time of a fan made by a particular company can be modeled by an exponential distribution with a mean of 500 hours.
    a. Find the probability that a fan will give at least 250 hours of service. [4 marks]

    b. Find the probability that a fan will give service between 300 to 400 hours. [4 marks]
    c. Determine the 80'th percentile service time of the fans. [5 marks]
3. The monthly income of undergraduate students of Brac University is known to follow a normal distribution with a mean of Tk. 9000 and a standard deviation of Tk. 2500. A career bootcamp is being organized to help boost the students' career prospects. The bootcamp curriculum is designed for students who are currently earning between Tk. 7000 and Tk. 12000, therefore only students who meet the requirements will be eligible for the program.
    a. What is the probability that a randomly selected student earns more than Tk. 10000? [4 marks]
    b. Determine the 75th percentile income of the students. [5 marks]
    c. What is the probability that a randomly selected student will not satisfy the requirement for the bootcamp? [5 marks]
    d. Historically, the bootcamp was seen to most benefit students who were in the top 10.75% of the accepted range. What is the minimum income a participating student can have if they want to get the maximum benefit from the program? [5 marks]