

Advanced Higher Statistics

Unit Practice Test 1

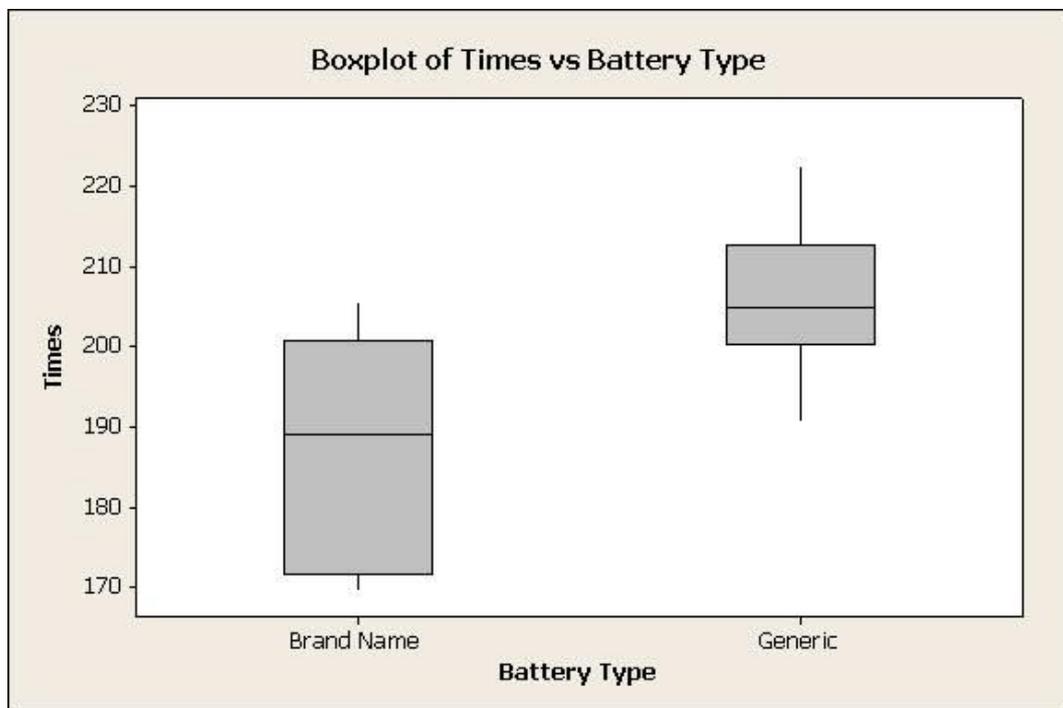
1) a) State whether the following would be discrete or continuous. (3 Marks)

i) Shoe Size

ii) Height of a Person

iii) The result of a 8 sided dice with sides numbered 1 to 8.

b) The boxplot below shows the time in hours different batteries lasted in torch. The experiment was conducted twice with two types of battery, a branded battery and a non-branded battery. Comment on the difference in time lasted between the two types of batteries. (2 Marks)



2) In a certain community, 46% of the adults are male. The probability that a male has blonde hair is 0.15 and the probability that a female has blond hair is 0.23. An adult is selected at random from the community.

a) Calculate the probability that the adult is a blonde female. (3 Marks)

b) Calculate the probability that the adult has blonde hair. (3 Marks)

- 3) A card is picked at random from a standard pack of 52 cards. Given that the card is a heart, what is the probability that it is not a face card (King, Queen or Jack)? (2 Marks)
- 4) The number of spots on opposite faces of a die add up to 7. A dishonest gambler changed a die so that the face opposite the 6 also has six spots, instead of one. Let X be the discrete random variable representing the score produced by the die.
- a) Determine the probability distribution of the discrete random variable X . (2 Marks)
- b) Calculate the mean and standard deviation of X . (5 Marks)
- 5) a) Given that Y is a random variable such that $E(Y) = 10$ and $V(Y) = 25$, find the expected value and variance of $3X - 5$. (4 Marks)
- b) Given that T and S are independent random variables such that:
- $E(T) = 9$ and $E(S) = 5$
- $SD(T) = 0.5$ and $SD(S) = 4$
- Determine the expected value and variance of the random variable $Q = S - T$. (2 Marks)
- 6) A multiple-choice test consists of twelve questions and there are five responses to each question, of which only one is correct. A student guesses the answer to each question.
- a) What is the probability he gets exactly 7 questions correct? (2 Marks)
- b) The number of trains passing a particular level crossing per hour follows a Poisson distribution with a mean of 8.
- Calculate the probability that fewer than 3 trains pass the level crossing in the next hour. (2 Marks)
- 7) Mr Hamilton was investigating the age of students at Firrhill High School, in years. He looked at the register and found that ages were uniformly on an interval of (13, 17).
- a) Calculate the mean age at Firrhill High School. (1 Mark)
- b) Calculate the variance of ages at Firrhill High School. (1 Mark)
- 8) A meteorologist investigated the number of lightning strikes during a particular storm. They found that the mean rate of lightning strikes was 9 every 12 minutes. State the parameters for a normal approximation for the number of lightning strikes in 2 hours and justify its use. (4 Marks)