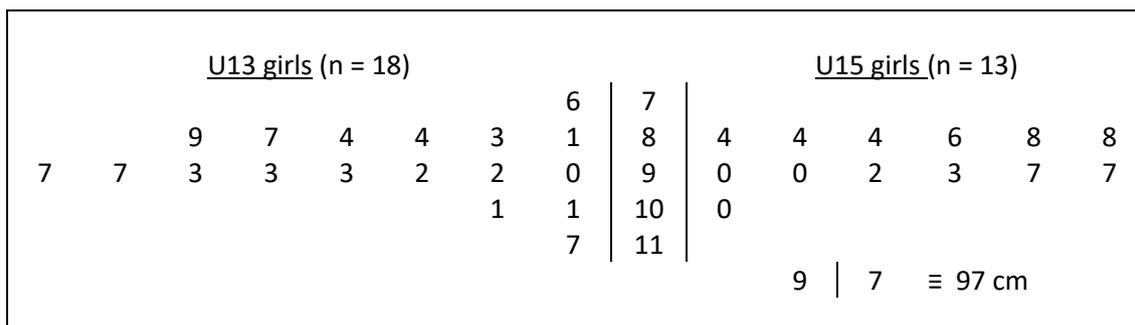


Advanced Higher Statistics

Unit Practice Test 1

1)

A group of 31 Junior (U13 and U15) netball players were practising defending a player with the ball. A defender needs to be 90cm from the attacker with the ball. The distribution of the U13 and U15 girls estimates is recorded in the back-to-back stem-and-leaf diagram below.



a) Explain why the data is either discrete or continuous. (1 Mark)

b) Determine if there are any outliers with the U13 distribution. (2 Marks)

2) 8% of herrings are born with a particular genetic defect. Of those with the defect, 75% will die within a month, while of those without the defect, only 30% will die within a month. Find the probability that a new born herring selected at random will die within a month. (3 Marks)

3) A card is picked at random from a standard pack of 52 cards. Given that the card is black, what is the probability that it is a face card (King, Queen or Jack)? (2 Marks)

4) A trial consists of tossing two unbiased coins.

Let the random variable X represent the number of heads obtained.

a) Tabulate the probability distribution of X after one trial. (2 Marks)

b) Calculate the $E[X]$, $V[X]$, and $SD[X]$. (5 Marks)

5) Two independent random variables A and B have means 53 and 21 and standard deviations 6 and 5 respectively. Find the mean and standard deviation of each of the random variables:

a) $5B + 6$ (3 Marks)

b) $2A - 3B$ (3 Marks)

6) a) At AHS College 35% of the pupils are female.
Find the probability of a random sample of 18 pupils yielding at least 10 females. (2 Marks)

b) The number of pupils suffering a bad reaction to an injection during an inoculation day in a school is assumed to follow a Poisson distribution with mean 4 pupils per day. Find the probability of there being exactly 5 pupils suffering a bad reaction on a given inoculation day at the school.

(2 Marks)

7) The arrival time of babies at a hospital in any given hour of a single day is known to follow a uniform distribution on the interval $[0, 24]$

a) Calculate the average time of the day a baby is born. (1 Mark)

b) Calculate the variance of times babies are born. (1 Mark)

8) In a particular form of cancer, deformed blood corpuscles occur at random at the rate of 450 per 1000 corpuscles. A random sample of 300 corpuscles is taken from a cancerous area to analyse the number of deformed corpuscles.

Justify the use of approximating the distribution and state the parameters of the approximate distribution.

(4 Marks)