

Year 1 Applied Chapter 2: Measures of Spread - Exam Questions (Total Marks 35)

Q1.

Keith records the amount of rainfall, in mm, at his school, each day for a week. The results are given below.

2.8 5.6 2.3 9.4 0.0 0.5 1.8

Jenny then records the amount of rainfall, x mm, at the school each day for the following 21 days. The results for the 21 days are summarised below.

$$\sum x = 84.6$$

(a) Calculate the mean amount of rainfall during the whole 28 days.

(2)

Keith realises that he has transposed two of his figures. The number 9.4 should have been 4.9 and the number 0.5 should have been 5.0. Keith corrects these figures.

(b) State, giving your reason, the effect this will have on the mean.

(2)

(Total 4 marks)

Q2.

The mark, x , scored by each student who sat a statistics examination is coded using

$$y = 1.4x - 20$$

The coded marks have mean 60.8 and standard deviation 6.60

Find the mean and the standard deviation of x .

(4)

(Total 4 marks)

Q3.

The following table summarises the times, t minutes to the nearest minute, recorded for a group of students to complete an exam.

Time (minutes) t	11 – 20	21 – 25	26 – 30	31 – 35	36 – 45	46 – 60
Number of students f	62	88	16	13	11	10

[You may use $\sum ft^2 = 134281.25$]

(a) Estimate the mean and standard deviation of these data.

(5)

(b) Use linear interpolation to estimate the value of the median.

(2)

(c) Show that the estimated value of the lower quartile is 18.6 to 3 significant figures.

(1)

(d) Estimate the interquartile range of this distribution.

(2)

(e) Give a reason why the mean and standard deviation are not the most appropriate summary statistics to use with these data.

(1)

The person timing the exam made an error and each student actually took 5 minutes less than the times recorded above. The table below summarises the actual times.

Time (minutes) t	6 – 15	16 – 20	21 – 25	26 – 30	31 – 40	41 – 55
Number of students f	62	88	16	13	11	10

(f) Without further calculations, explain the effect this would have on each of the estimates found in parts (a), (b), (c) and (d).

(3)

(Total 14 marks)

Q4.

The daily mean windspeed, w knots was recorded at Heathrow during May 2015. The data were coded using $z = \frac{w - 3}{2}$.

Summary statistics were calculated for the coded data:

$$n = 31 \qquad \Sigma z = 106 \qquad S_{zz} = 80.55$$

- a** Find the mean and standard deviation of the coded data. **(2 marks)**
- b** Work out the mean and standard deviation of the daily mean windspeed at Heathrow during May 2015. **(2 marks)**

Q5.

20 endangered forest owlets were caught for ringing. Their wingspans (x cm) were measured to the nearest centimetre.

The following summary statistics were worked out:

$$\Sigma x = 316 \qquad \Sigma x^2 = 5078$$

a Work out the mean and the standard deviation of the wingspans of the 20 birds. **(3 marks)**

One more bird was caught. It had a wingspan of 13 centimetres.

b Without doing any further calculation, say how you think this extra wingspan will affect the mean wingspan. **(1 mark)**

20 giant ibises were also caught for ringing. Their wingspans (y cm) were also measured to the nearest centimetre and the data coded using $z = \frac{y - 5}{10}$.

The following summary statistics were obtained from the coded data:

$$\Sigma z = 104 \qquad S_{zz} = 1.8$$

c Work out the mean and standard deviation of the wingspans of the giant ibis. **(5 marks)**