S1 Numerical measures Challenge

Challenge 1

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)

Challenge 2

A survey was made of the times taken by 500 children to complete a gymnastics circuit. The results are shown on the following histogram.
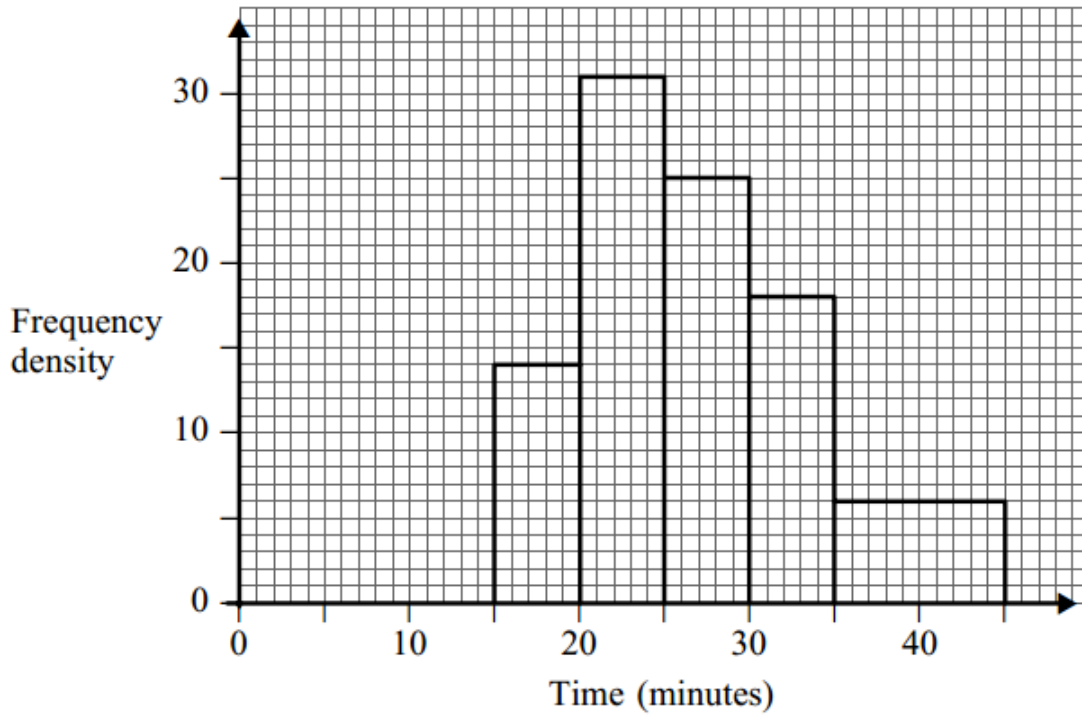
(a) Copy and complete the following table of cumulative frequencies.

Time, in minutes, up to	15	20	25	30	35	45
Cumulative frequency	0	70				500

(3 marks)

(b) Estimate the number of children who took more than 40 minutes to complete the circuit.

(1 mark)

(c) Use linear interpolation to estimate the median time.

(3 marks)

Challenge 3

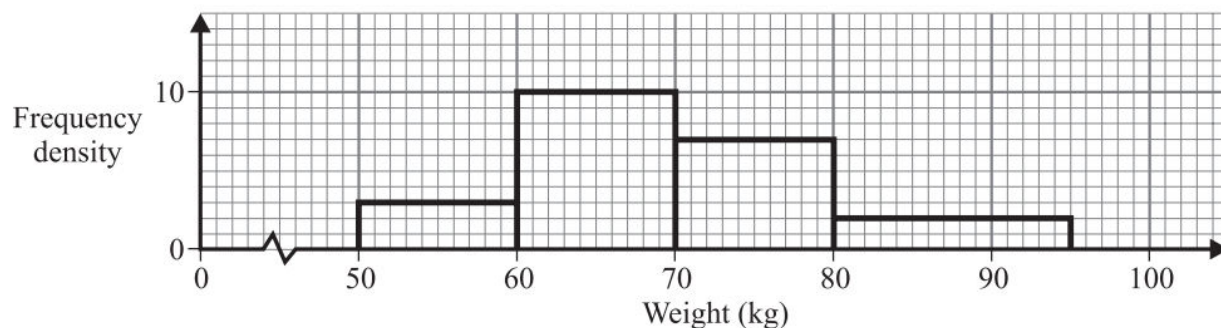The heights, x cm, of the 10 girls in an athletics team are such that

$$\sum x = 1550 \quad \text{and} \quad \sum x^2 = 241\,250.$$

(a) Find the mean and variance of x. *(3 marks)*

(b) One girl, who is 173 cm tall, drops out of the team. Calculate the mean and variance of the heights of the remaining nine members of the team. *(5 marks)*

Final Challenge

The histogram shows the weights of a group of university students.

It is given that there were 100 students with weights of between 60 kg and 70 kg.

(a) Find the number of students in the group.   *(2 marks)*

(b) Using linear interpolation, calculate an estimate of the median weight.   *(3 marks)*

(c) Calculate an estimate of the mean weight.   *(4 marks)*

(d) Explain why, using the information given in the histogram, it is only possible to calculate **estimates** for the median and mean weights.   *(2 marks)*