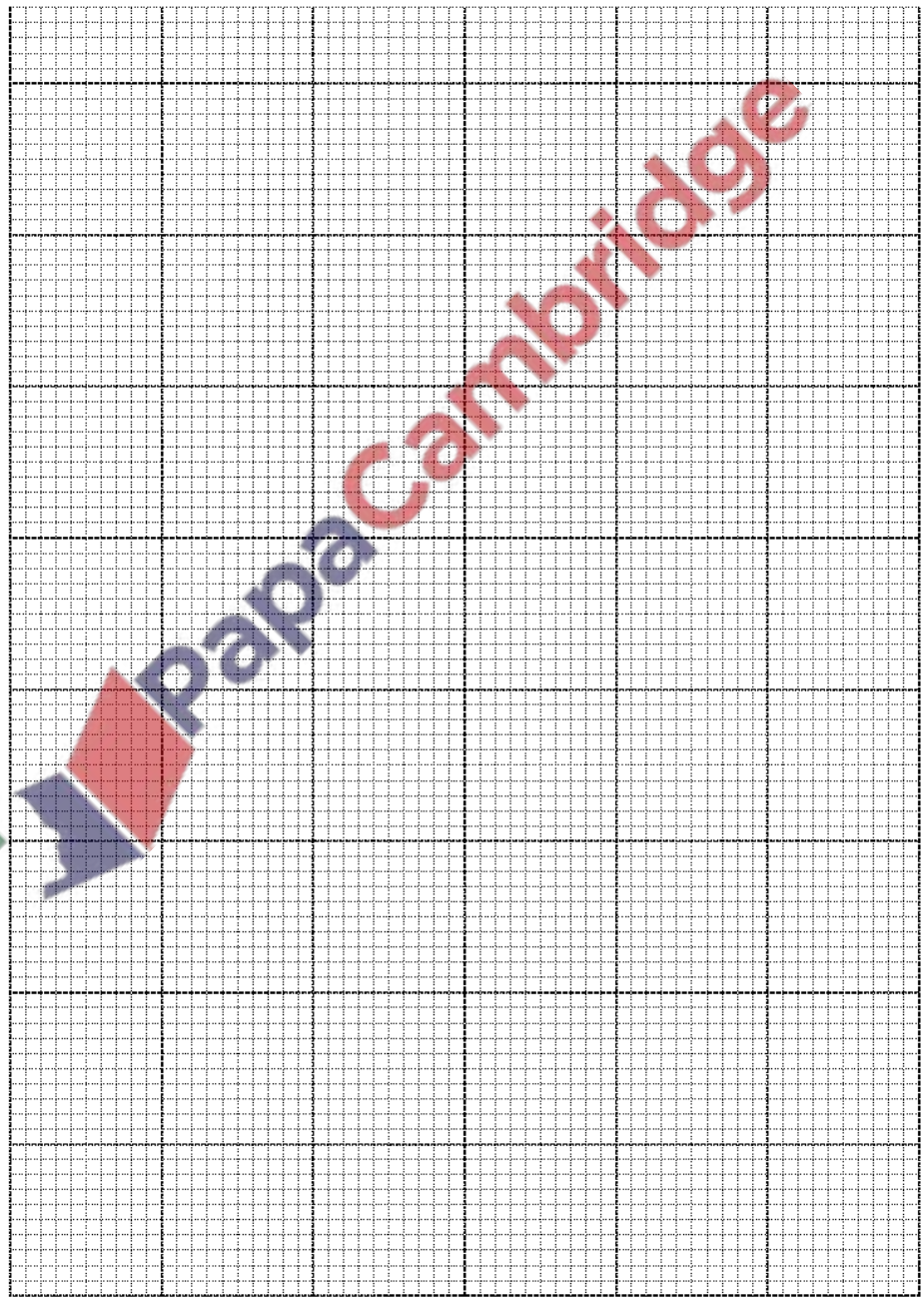
Data Representation and Spread – 2020 AS

1. Nov/2020/Paper_9709/51/No.6

The times, t minutes, taken by 150 students to complete a particular challenge are summarised in the following cumulative frequency table.

Time taken (t minutes)	$t \leqslant 20$	$t \leqslant 30$	$t \leqslant 40$	$t \leqslant 60$	$t \leqslant 100$
Cumulative frequency	12	48	106	134	150

(a) Draw a cumulative frequency graph to illustrate the data. [2]



(b) 24% of the students take k minutes or longer to complete the challenge. Use your graph to estimate the value of k. [2]

(c) Calculate estimates of the mean and the standard deviation of the time taken to complete the challenge. [6]

2. Nov/2020/Paper_9709/52/No.5

The following table gives the weekly snowfall, in centimetres, for 11 weeks in 2018 at two ski resorts, Dados and Linva.

Dados	6	8	12	15	10	36	42	28	10	22	16
Linva	2	11	15	16	0	32	36	40	10	12	9

(a) Represent the information in a back-to-back stem-and-leaf diagram. [4]

(b) Find the median and the interquartile range for the weekly snowfall in Dados. [3]

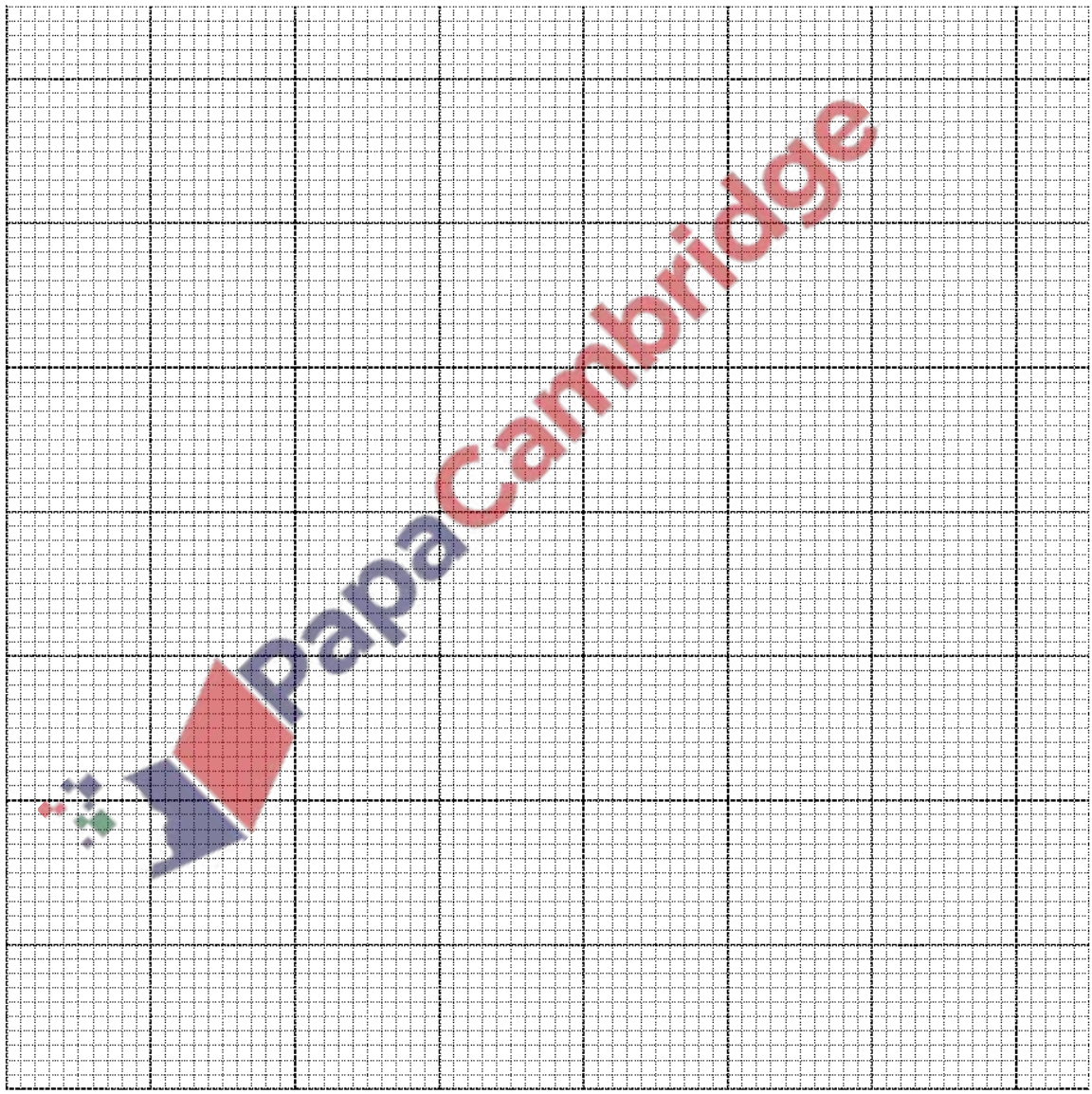
(c) The median, lower quartile and upper quartile of the weekly snowfall for Linva are 12, 9 and 32 cm respectively. Use this information and your answers to part **(b)** to compare the central tendency and the spread of the weekly snowfall in Dados and Linva. [2]

3. Nov/2020/Paper_9709/53/No.7

A particular piece of music was played by 91 pianists and for each pianist, the number of incorrect notes was recorded. The results are summarised in the table.

Number of incorrect notes	1 – 5	6 – 10	11 – 20	21 – 40	41 – 70
Frequency	10	5	26	32	18

(a) Draw a histogram to represent this information. [5]



(b) State which class interval contains the lower quartile and which class interval contains the upper quartile.

Hence find the greatest possible value of the interquartile range. [2]

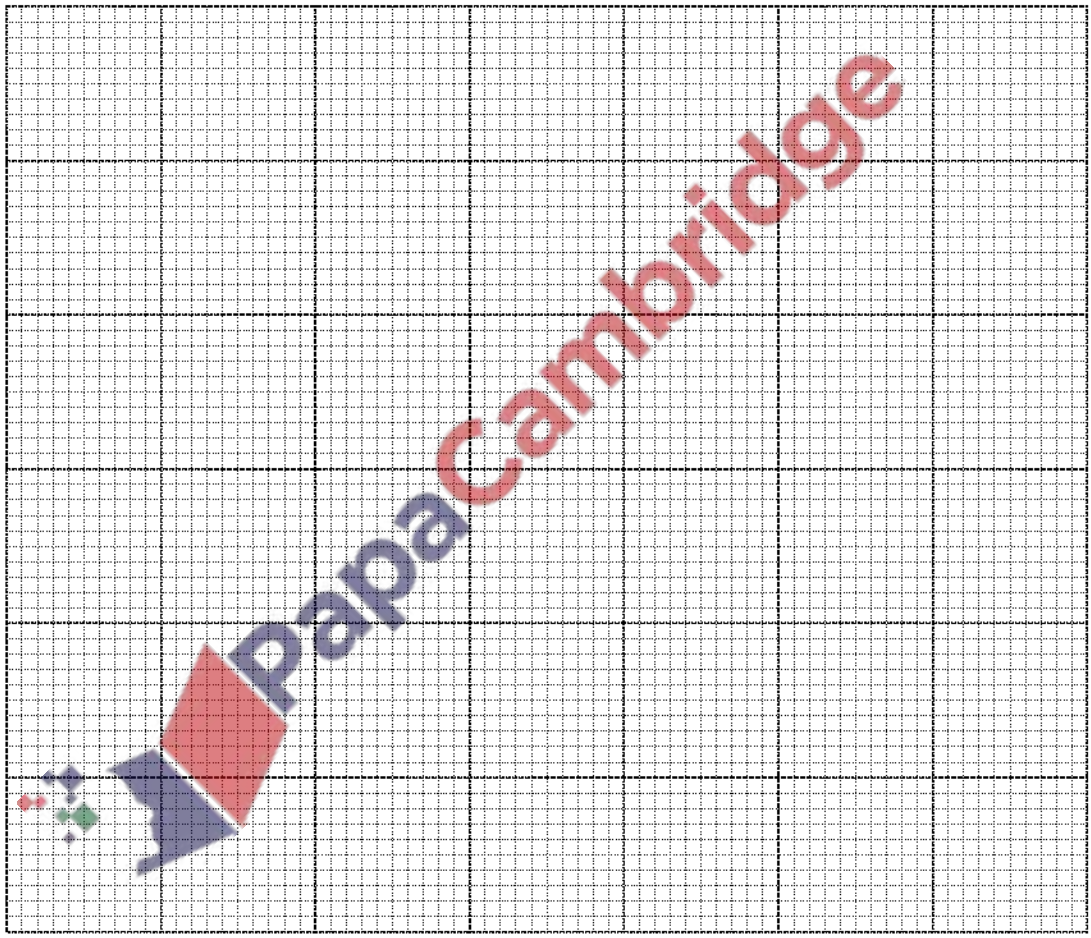
(c) Calculate an estimate for the mean number of incorrect notes. [3]

4. June/2020/Paper_9709/51/No.7

The numbers of chocolate bars sold per day in a cinema over a period of 100 days are summarised in the following table.

Number of chocolate bars sold	1 – 10	11 – 15	16 – 30	31 – 50	51 – 60
Number of days	18	24	30	20	8

(a) Draw a histogram to represent this information. [5]



(b) What is the greatest possible value of the interquartile range for the data? [2]

(c) Calculate estimates of the mean and standard deviation of the number of chocolate bars sold. [4]

5. June/2020/Paper_9709/52/No.1

For n values of the variable x, it is given that

$$\Sigma(x - 50) = 144 \quad \text{and} \quad \Sigma x = 944.$$

Find the value of n. [3]

6. June/2020/Paper_9709/52/No.3

Two machines, A and B, produce metal rods of a certain type. The lengths, in metres, of 19 rods produced by machine A and 19 rods produced by machine B are shown in the following back-to-back stem-and-leaf diagram.

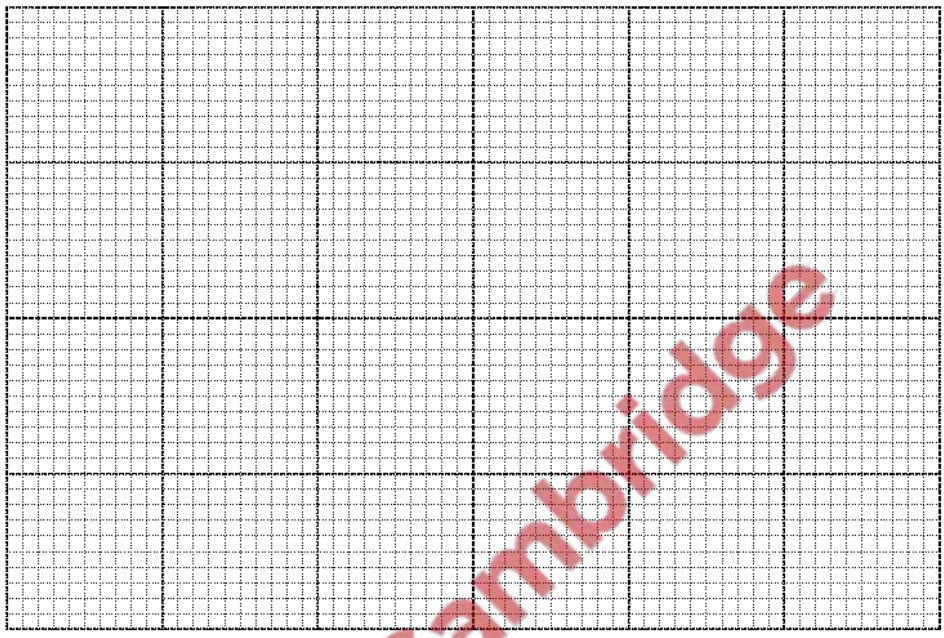
A							B					
						21	1	2	4			
		7	6	3	0	22	2	4	5	5	6	
8	7	4	3	1	1	23	0	2	6	8	9	9
	5	5	5	3	2	24	3	3	4	6		
		4	3	1	0	25	6					

Key: 7 | 22 | 4 means 0.227 m for machine A and 0.224 m for machine B.

(a) Find the median and the interquartile range for machine A. [3]

It is given that for machine B the median is 0.232 m, the lower quartile is 0.224 m and the upper quartile is 0.243 m.

(b) Draw box-and-whisker plots for A and B. [3]



(c) Hence make two comparisons between the lengths of the rods produced by machine A and those produced by machine B. [2]

7. June/2020/Paper_9709/53/No.6

The annual salaries, in thousands of dollars, for 11 employees at each of two companies A and B are shown below.

Company A	30	32	35	41	41	42	47	49	52	53	64
Company B	26	47	30	52	41	38	35	42	49	31	42

(a) Represent the data by drawing a back-to-back stem-and-leaf diagram with company A on the left-hand side of the diagram. [4]

(b) Find the median and the interquartile range of the salaries of the employees in company A. [3]

A new employee joins company B. The mean salary of the 12 employees is now \$38 500.

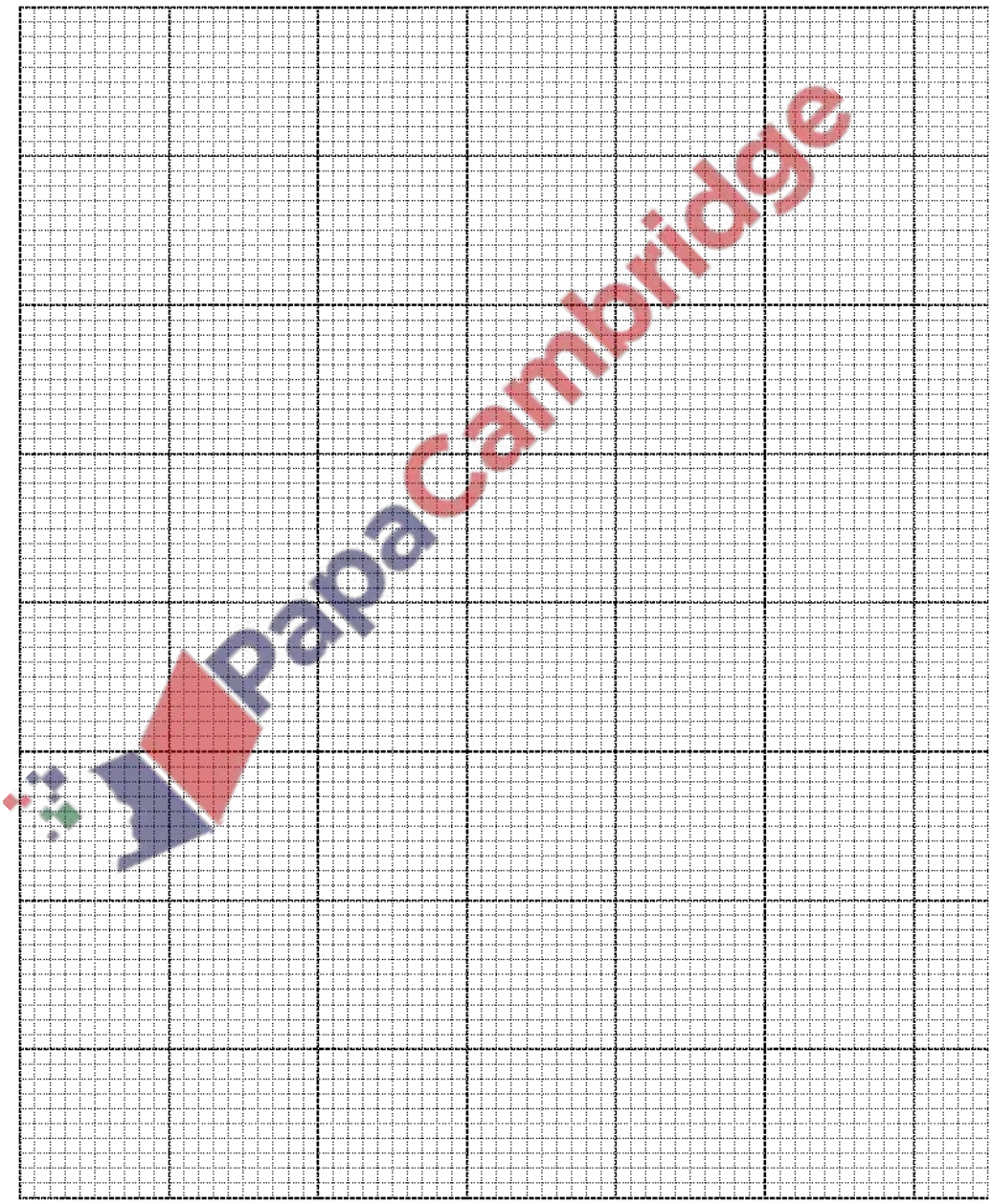
(c) Find the salary of the new employee. [3]

8. March/2020/Paper_9709/53/No.7

Helen measures the lengths of 150 fish of a certain species in a large pond. These lengths, correct to the nearest centimetre, are summarised in the following table.

Length (cm)	0 – 9	10 – 14	15 – 19	20 – 30
Frequency	15	48	66	21

(a) Draw a cumulative frequency graph to illustrate the data. [4]



(b) 40% of these fish have a length of d cm or more. Use your graph to estimate the value of d. [2]

The mean length of these 150 fish is 15.295 cm.

(c) Calculate an estimate for the variance of the lengths of the fish. [3]