

Diagrams

Question Paper 1

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Representation of data
Sub Topic	Diagrams
Booklet	Question Paper 1

Time Allowed: 53 minutes

Score: /44

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 The following back-to-back stem-and-leaf diagram shows the times to load an application on 61 smartphones of type *A* and 43 smartphones of type *B*.

	Type <i>A</i>		Type <i>B</i>	
(7)	9 7 6 6 4 3 3	2	1 3 5 8	(4)
(7)	5 5 4 4 2 2 2	3	0 4 4 5 6 6 6 6 7 8 8 9	(12)
(13)	9 9 8 8 8 7 6 6 4 3 2 2 0	4	0 1 1 2 3 6 8 8 9 9	(10)
(9)	6 5 5 4 3 2 1 1 0	5	2 5 6 6 9	(5)
(4)	9 7 3 0	6	1 3 8 9	(4)
(6)	8 7 4 4 1 0	7	5 7	(2)
(10)	7 6 6 6 5 3 3 2 1 0	8	1 2 4 4	(4)
(5)	8 6 5 5 5	9	0 6	(2)

Key: 3 | 2 | 1 means 0.23 seconds for type *A* and 0.21 seconds for type *B*.

- (i) Find the median and quartiles for smartphones of type *A*. [3]

You are given that the median, lower quartile and upper quartile for smartphones of type *B* are 0.46 seconds, 0.36 seconds and 0.63 seconds respectively.

- (ii) Represent the data by drawing a pair of box-and-whisker plots in a single diagram on graph paper. [3]

- (iii) Compare the loading times for these two types of smartphone. [1]

- 2 On a certain day in spring, the heights of 200 daffodils are measured, correct to the nearest centimetre. The frequency distribution is given below.

Height (cm)	4 – 10	11 – 15	16 – 20	21 – 25	26 – 30
Frequency	22	32	78	40	28

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

- (ii) 28% of these daffodils are of height *h* cm or more. Estimate *h*. [2]

- (iii) You are given that the estimate of the mean height of these daffodils, calculated from the table, is 18.39 cm. Calculate an estimate of the standard deviation of the heights of these daffodils. [3]

- 3 A random sample of 25 people recorded the number of glasses of water they drank in a particular week. The results are shown below.

23	19	32	14	25
22	26	36	45	42
47	28	17	38	15
46	18	26	22	41
19	21	28	24	30

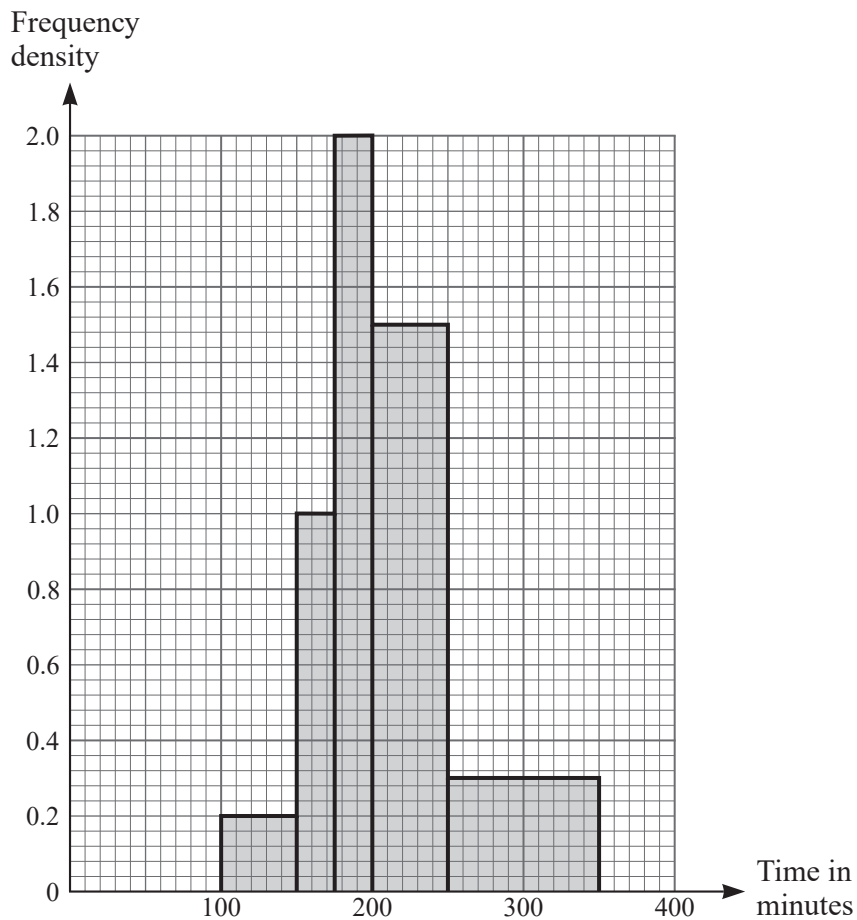
- (i) Draw a stem-and-leaf diagram to represent the data. [3]
- (ii) On graph paper draw a box-and-whisker plot to represent the data. [5]
- 4 It is given that $X \sim N(30, 49)$, $Y \sim N(30, 16)$ and $Z \sim N(50, 16)$. On a single diagram, with the horizontal axis going from 0 to 70, sketch three curves to represent the distributions of X , Y and Z . [3]

- 5 The following are the house prices in thousands of dollars, arranged in ascending order, for 51 houses from a certain area.

253	270	310	354	386	428	433	468	472	477	485	520	520	524	526	531	535
536	538	541	543	546	548	549	551	554	572	583	590	605	614	638	649	652
666	670	682	684	690	710	725	726	731	734	745	760	800	854	863	957	986

- (i) Draw a box-and-whisker plot to represent the data. [4]
- An expensive house is defined as a house which has a price that is more than 1.5 times the interquartile range above the upper quartile.
- (ii) For the above data, give the prices of the expensive houses. [2]
- (iii) Give one disadvantage of using a box-and-whisker plot rather than a stem-and-leaf diagram to represent this set of data. [1]

- 6 The following histogram summarises the times, in minutes, taken by 190 people to complete a race.

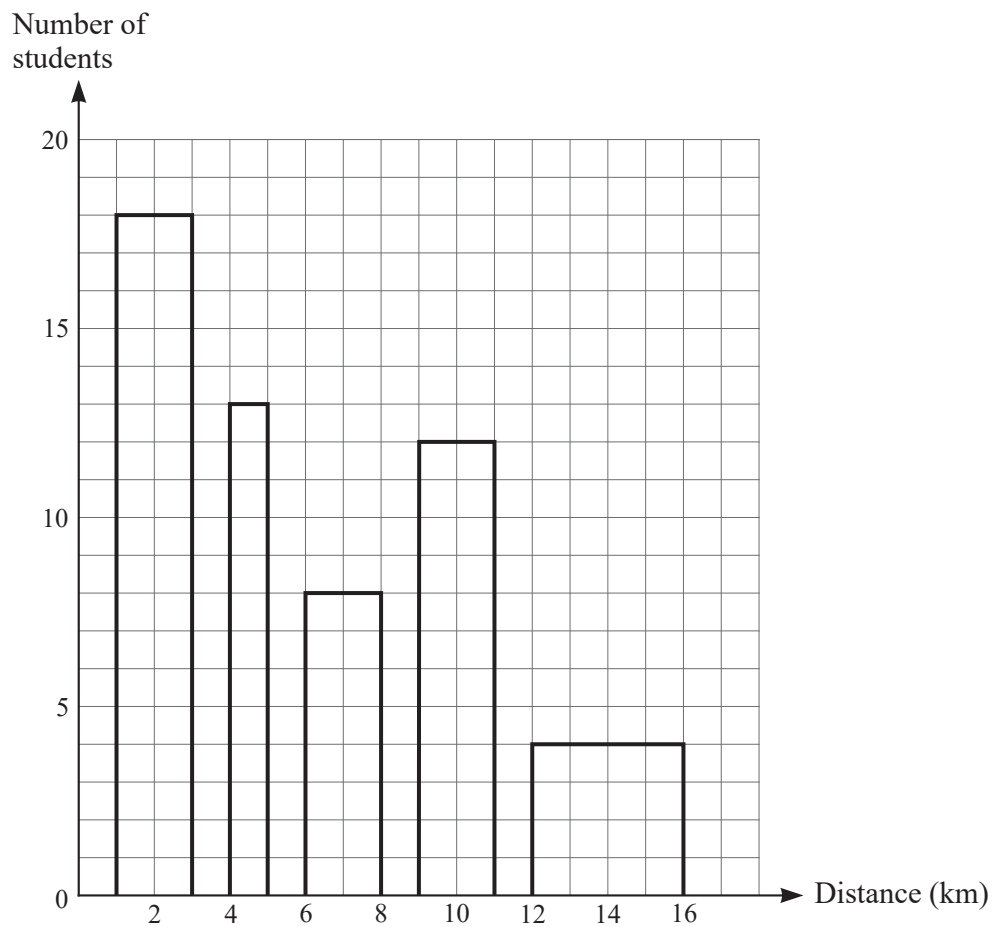


- (i) Show that 75 people took between 200 and 250 minutes to complete the race. [1]
- (ii) Calculate estimates of the mean and standard deviation of the times of the 190 people. [6]
- (iii) Explain why your answers to part (ii) are estimates. [1]

- 7 The distance of a student’s home from college, correct to the nearest kilometre, was recorded for each of 55 students. The distances are summarised in the following table.

Distance from college (km)	1 – 3	4 – 5	6 – 8	9 – 11	12 – 16
Number of students	18	13	8	12	4

Dominic is asked to draw a histogram to illustrate the data. Dominic’s diagram is shown below.



Give two reasons why this is not a correct histogram.

[2]