Diagrams

Question Paper 4

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Representation of data
Sub Topic	Diagrams
Booklet	Question Paper 4

Time Allowed: **59 minutes**

Score: **/49**

Percentage: **/100**

Grade Boundaries:

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

1 The arrival times of 204 trains were noted and the number of minutes, t, that each train was late was recorded. The results are summarised in the table.

Number of minutes late (t)	$-2 \leqslant t < 0$	$0 \leqslant t < 2$	$2 \leqslant t < 4$	$4 \leqslant t < 6$	$6 \leqslant t < 10$
Number of trains	43	51	69	22	19

(i) Explain what $-2 \leqslant t < 0$ means about the arrival times of trains. [1]

(ii) Draw a cumulative frequency graph, and from it estimate the median and the interquartile range of the number of minutes late of these trains. [7]

2 The weights of 30 children in a class, to the nearest kilogram, were as follows.

50	45	61	53	55	47	52	49	46	51
60	52	54	47	57	59	42	46	51	53
56	48	50	51	44	52	49	58	55	45

Construct a grouped frequency table for these data such that there are fi e equal class intervals with the f rst class having a lower boundary of 41.5 kg and the f fth class having an upper boundary of 61.5 kg. [4]

3 In a survey, people were asked how long they took to travel to and from work, on average. The median time was 3 hours 36 minutes, the upper quartile was 4 hours 42 minutes and the interquartile range was 3 hours 48 minutes. The longest time taken was 5 hours 12 minutes and the shortest time was 30 minutes.

(i) Find the lower quartile. [2]

(ii) Represent the information by a box-and-whisker plot, using a scale of 2 cm to represent 60 minutes. [4]

4 A study of the ages of car drivers in a certain country produced the results shown in the table.

Percentage of drivers in each age group

	Young	Middle-aged	Elderly
Males	40	35	25
Females	20	70	10

Illustrate these results diagrammatically. [4]

5 The lengths of cars travelling on a car ferry are noted. The data are summarised in the following table.

Length of car (x metres)	Frequency	Frequency density
$2.80 \leqslant x < 3.00$	17	85
$3.00 \leqslant x < 3.10$	24	240
$3.10 \leqslant x < 3.20$	19	190
$3.20 \leqslant x < 3.40$	8	a

(i) Find the value of a. [1]

(ii) Draw a histogram on graph paper to represent the data. [3]

(iii) Find the probability that a randomly chosen car on the ferry is less than 3.20 m in length. [2]

6 The floor areas, x m^2, of 20 factories are as follows.

150	350	450	578	595	644	722	798	802	904
1000	1330	1533	1561	1778	1960	2167	2330	2433	3231

Represent these data by a histogram on graph paper, using intervals

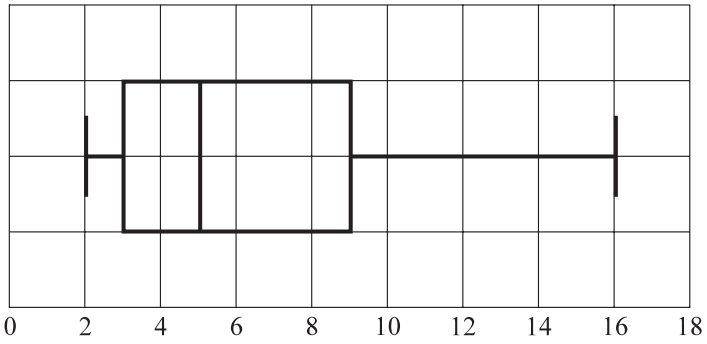
$0 \leqslant x < 500,\ 500 \leqslant x < 1000,\ 1000 \leqslant x < 2000,\ 2000 \leqslant x < 3000,\ 3000 \leqslant x < 4000.$ [4]

7 The length of time a person undergoing a routine operation stays in hospital can be modelled by a normal distribution with mean 7.8 days and standard deviation 2.8 days.

(i) Calculate the proportion of people who spend between 7.8 days and 11.0 days in hospital. [4]

(ii) Calculate the probability that, of 3 people selected at random, exactly 2 spend longer than 11.0 days in hospital. [2]

(iii) A health worker plotted a box-and-whisker plot of the times that 100 patients, chosen randomly, stayed in hospital. The result is shown below.



State with a reason whether or not this agrees with the model used in parts **(i)** and **(ii)**. [2]

8 The weights in kilograms of two groups of 17-year-old males from country P and country Q are displayed in the following back-to-back stem-and-leaf diagram. In the third row of the diagram, ... 4 | 7 | 1 ... denotes weights of 74 kg for a male in country P and 71 kg for a male in country Q.

Country P		Country Q
	5	1 5
	6	**2** 3
9 8 7 6 4	7	**1** 3 **7** 7
8 8 6 6 5 3	8	**2** 3 8 8
9 7 7 6 5 5 5 4 2	9	**0** 2
5 **4** 4	10	4 5

(i) Find the median and quartile weights for country Q. [3]

(ii) You are given that the lower quartile, median and upper quartile for country P are 84, 94 and 98 kg respectively. On a single diagram on graph paper, draw two box-and-whisker plots of the data. [4]

(iii) Make two comments on the weights of the two groups. [2]