

Diagrams

Question Paper 8

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Representation of data
Sub Topic	Diagrams
Booklet	Question Paper 8

Time Allowed: 70 minutes

Score: /58

Percentage: /100

Grade Boundaries:

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

- 1 As part of a data collection exercise, members of a certain school year group were asked how long they spent on their Mathematics homework during one particular week. The times are given to the nearest 0.1 hour. The results are displayed in the following table.

Time spent (t hours)	$0.1 \leq t \leq 0.5$	$0.6 \leq t \leq 1.0$	$1.1 \leq t \leq 2.0$	$2.1 \leq t \leq 3.0$	$3.1 \leq t \leq 4.5$
Frequency	11	15	18	30	21

- (i) Draw, on graph paper, a histogram to illustrate this information. [5]
- (ii) Calculate an estimate of the mean time spent on their Mathematics homework by members of this year group. [3]

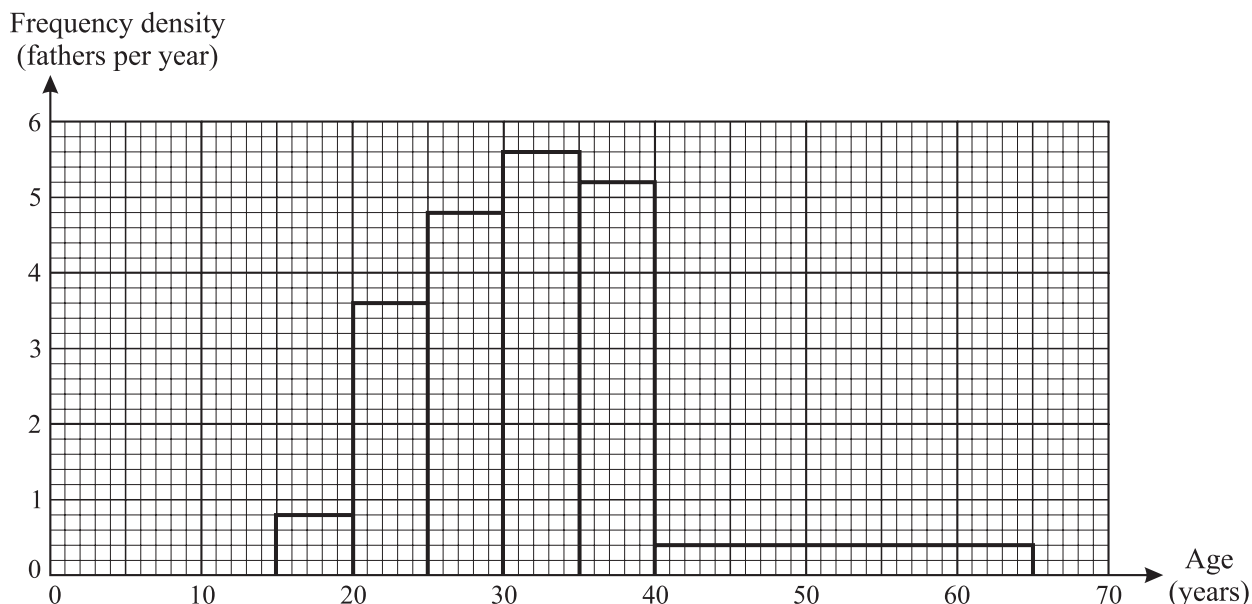
- 2 The lengths of time in minutes to swim a certain distance by the members of a class of twelve 9-year-olds and by the members of a class of eight 16-year-olds are shown below.

9-year-olds: 13.0 16.1 16.0 14.4 15.9 15.1 14.2 13.7 16.7 16.4 15.0 13.2

16-year-olds: 14.8 13.0 11.4 11.7 16.5 13.7 12.8 12.9

- (i) Draw a back-to-back stem-and-leaf diagram to represent the information above. [4]
- (ii) A new pupil joined the 16-year-old class and swam the distance. The mean time for the class of nine pupils was now 13.6 minutes. Find the new pupil's time to swim the distance. [3]

- 3 Each father in a random sample of fathers was asked how old he was when his first child was born. The following histogram represents the information.



- (i) What is the modal age group? [1]
- (ii) How many fathers were between 25 and 30 years old when their first child was born? [2]
- (iii) How many fathers were in the sample? [2]
- (iv) Find the probability that a father, chosen at random from the group, was between 25 and 30 years old when his first child was born, given that he was older than 25 years. [2]
- 4 A survey of adults in a certain large town found that 76% of people wore a watch on their left wrist, 15% wore a watch on their right wrist and 9% did not wear a watch.
- (i) A random sample of 14 adults was taken. Find the probability that more than 2 adults did not wear a watch. [4]
- (ii) A random sample of 200 adults was taken. Using a suitable approximation, find the probability that more than 155 wore a watch on their left wrist. [5]

- 5 The following back-to-back stem-and-leaf diagram shows the cholesterol count for a group of 45 people who exercise daily and for another group of 63 who do not exercise. The figures in brackets show the number of people corresponding to each set of leaves.

	People who exercise		People who do not exercise	
(9)	9 8 7 6 4 3 2 2 1	3	1 5 7 7	(4)
(12)	9 8 8 8 7 6 6 5 3 3 2 2	4	2 3 4 4	(6)
(9)	8 7 7 7 6 5 3 3 1	5	1 2 2 2 4 5 8 9	(13)
(7)	6 6 6 6 4 3 2	6	1 2 3 3 5 5 8 9	(14)
(3)	8 4 1	7	2 4 5 5 7 8	(9)
(4)	9 5 5 2	8	1 3 3 4 9 9	(9)
(1)	4	9	1 4 5 5	(5)
(0)		10	3 3 6	(3)

Key: 2 | 8 | 1 represents a cholesterol count of 8.2 in the group who exercise and 8.1 in the group who do not exercise.

- (i) Give one useful feature of a stem-and-leaf diagram. [1]
- (ii) Find the median and the quartiles of the cholesterol count for the group who do not exercise. [3]
- You are given that the lower quartile, median and upper quartile of the cholesterol count for the group who exercise are 4.25, 5.3 and 6.6 respectively.
- (iii) On a single diagram on graph paper, draw two box-and-whisker plots to illustrate the data. [4]
- 6 In a recent survey, 640 people were asked about the length of time each week that they spent watching television. The median time was found to be 20 hours, and the lower and upper quartiles were 15 hours and 35 hours respectively. The least amount of time that anyone spent was 3 hours, and the greatest amount was 60 hours.
- (i) On graph paper, show these results using a fully labelled cumulative frequency graph. [3]
- (ii) Use your graph to estimate how many people watched more than 50 hours of television each week. [2]

7 (i)



The diagram represents the sales of Superclene toothpaste over the last few years. Give a reason why it is misleading. [1]

(ii) The following data represent the daily ticket sales at a small theatre during three weeks.

52, 73, 34, 85, 62, 79, 89, 50, 45, 83, 84, 91, 85, 84, 87, 44, 86, 41, 35, 73, 86.

(a) Construct a stem-and-leaf diagram to illustrate the data. [3]

(b) Use your diagram to find the median of the data. [1]

8 A random sample of 97 people who own mobile phones was used to collect data on the amount of time they spent per day on their phones. The results are displayed in the table below.

Time spent per day (t minutes)	$0 \leq t < 5$	$5 \leq t < 10$	$10 \leq t < 20$	$20 \leq t < 30$	$30 \leq t < 40$	$40 \leq t < 70$
Number of people	11	20	32	18	10	6

(i) Calculate estimates of the mean and standard deviation of the time spent per day on these mobile phones. [5]

(ii) On graph paper, draw a fully labelled histogram to represent the data. [4]