Statistics
Difficulty: Medium

Question Paper 3

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Statistics
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 3

Time allowed: **124 minutes**

Score: **/108**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

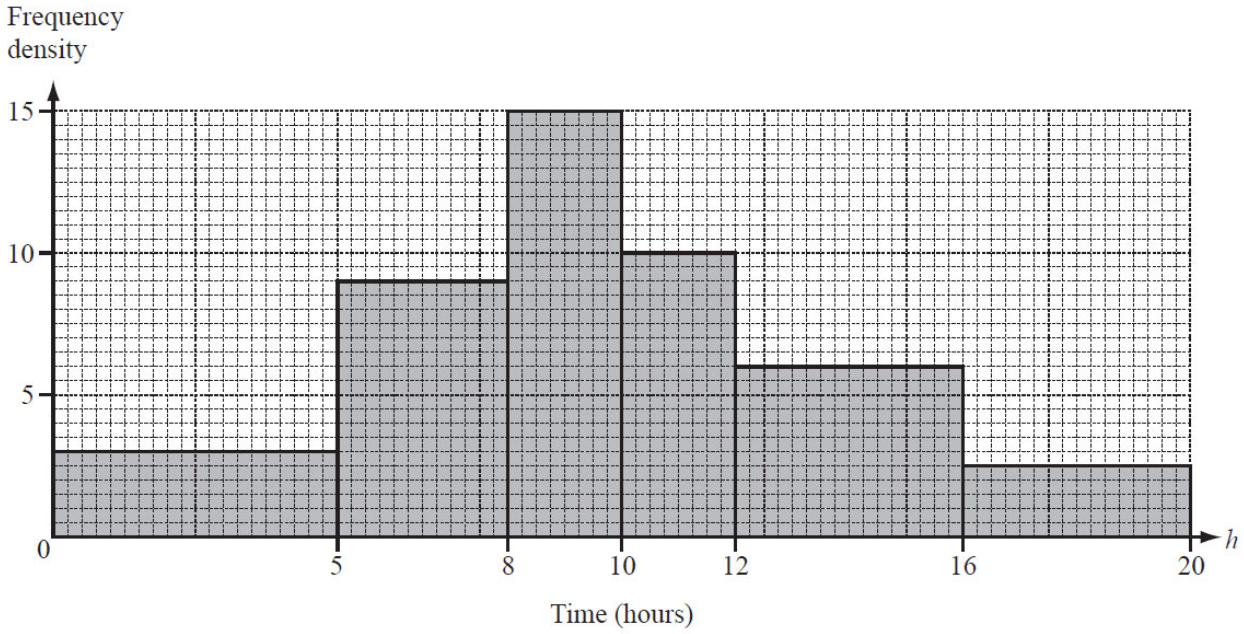
(a) The table shows how many books were borrowed by the 126 members of a library group in a month.

Number of books	11	12	13	14	15	16
Number of members (frequency)	35	28	22	18	14	9

Find the mode, the median and the mean for the number of books borrowed. [6]

(b) The 126 members record the number of hours they read in one week.

The histogram shows the results.



(i) Use the information from the histogram to complete the frequency table.

Number of hours (h)	$0 < h \leqslant 5$	$5 < h \leqslant 8$	$8 < h \leqslant 10$	$10 < h \leqslant 12$	$12 < h \leqslant 16$	$16 < h \leqslant 20$
Frequency				20	24	10

[3]

(ii) Use the information in this table to calculate an estimate of the mean number of hours.
Show your working.

[4]

Question 2

Fifty students are timed when running one kilometre. The results are shown in the table.

Time (t minutes)	$4.0 < t \leqslant 4.5$	$4.5 < t \leqslant 5.0$	$5.0 < t \leqslant 5.5$	$5.5 < t \leqslant 6.0$	$6.0 < t \leqslant 6.5$	$6.5 < t \leqslant 7.0$
Frequency	2	7	8	18	10	5

(a) Write down the modal time interval. [1]

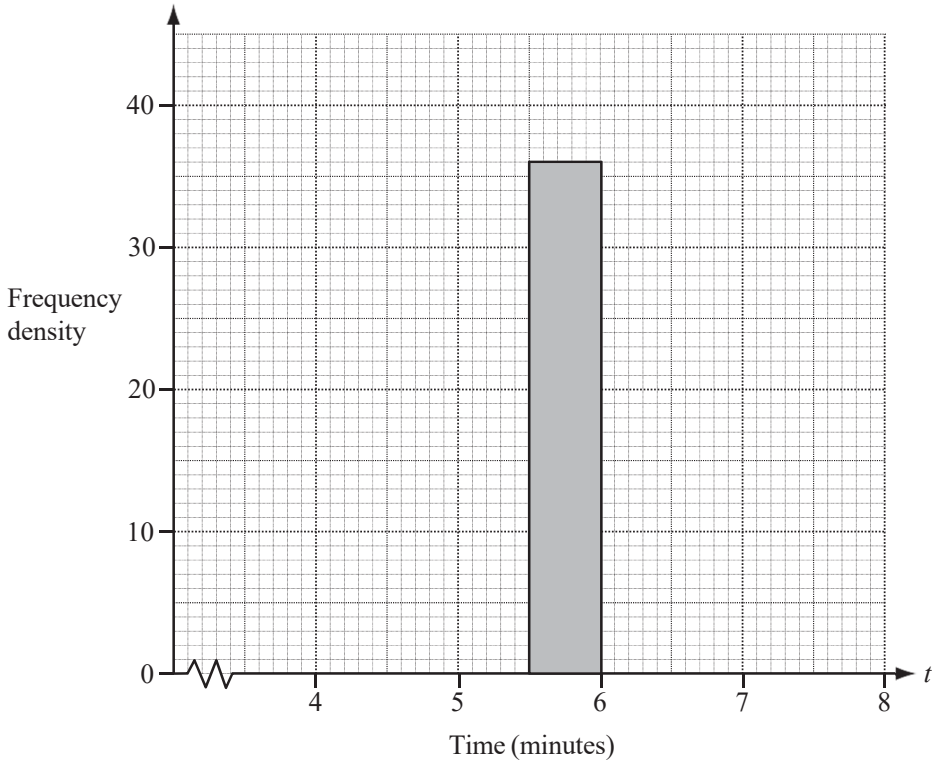
(b) Calculate an estimate of the mean time. [4]

(c) A new frequency table is made from the results shown in the table above.

Time (t minutes)	$4.0 < t \leqslant 5.5$	$5.5 < t \leqslant 6.0$	$6.0 < t \leqslant 7.0$
Frequency		18	

(i) Complete the table by filling in the two empty boxes. [1]

(ii) On the grid below, complete an accurate histogram to show the information in this new table.



[3]

(iii) Find the number of students represented by 1 cm^2 on the histogram. [1]

A normal die, numbered 1 to 6, is rolled 50 times.

The results are shown in the frequency table.

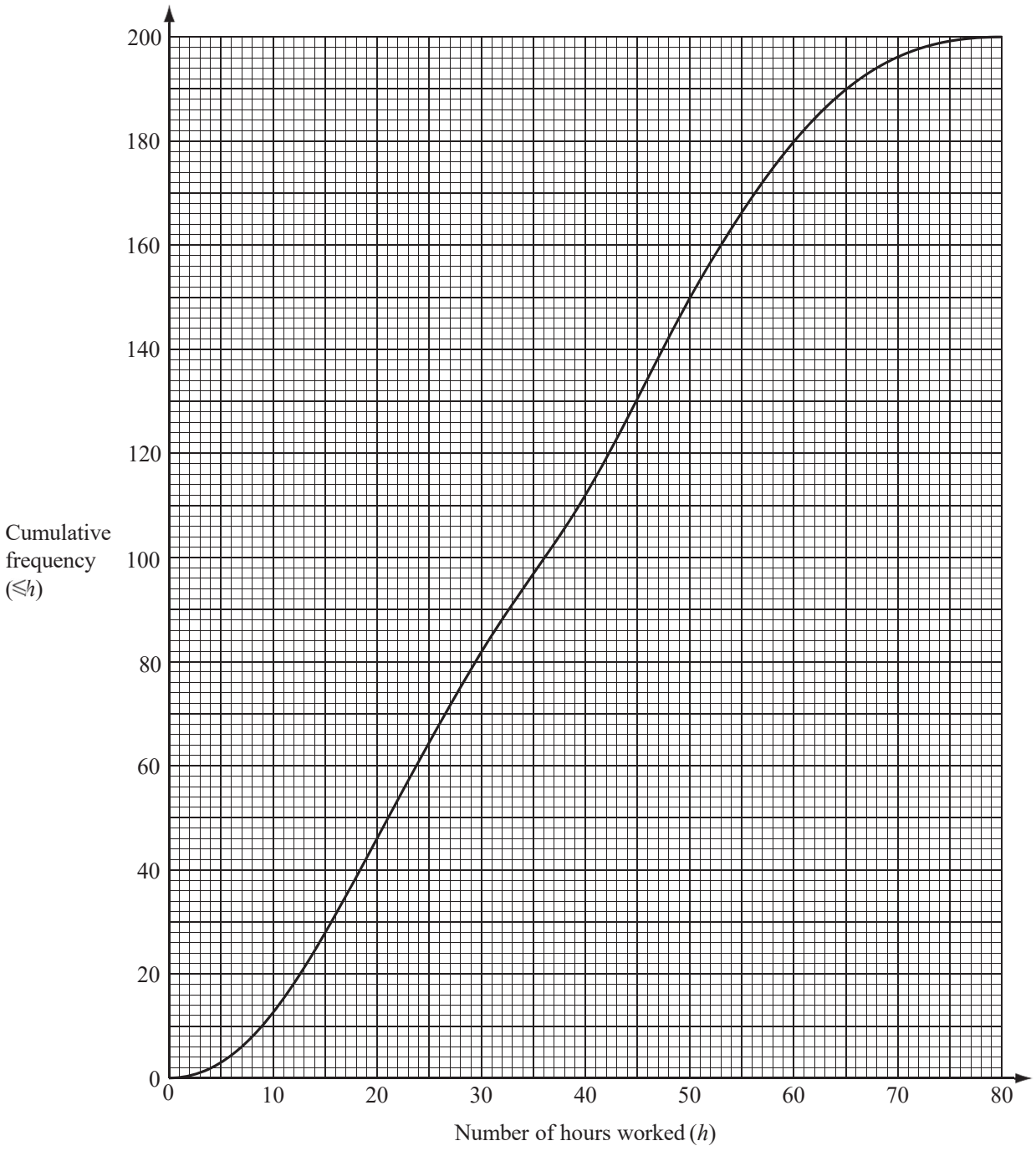
Score	1	2	3	4	5	6
Frequency	15	10	7	5	6	7

(a) Write down the modal score. [1]

(b) Find the median score. [1]

(c) Calculate the mean score. [2]

(d) The die is then rolled another 10 times.
The mean score for the 60 rolls is 2.95.
Calculate the mean score for the extra 10 rolls. [3]



200 people record the number of hours they work in a week.
The cumulative frequency graph shows this information.

(a) Use the graph to find

(i) the median, [1]

(ii) the upper quartile, [1]

(iii) the inter-quartile range, [1]

(iv) the number of people who work more than 60 hours in a week. [2]

(b) Omar uses the graph to make the following frequency table.

Hours worked (h)	$0<h\leqslant10$	$10<h\leqslant20$	$20<h\leqslant30$	$30<h\leqslant40$	$40<h\leqslant50$	$50<h\leqslant60$	$60<h\leqslant70$	$70<h\leqslant80$
Frequency	12	34	36	30	38	30	p	q

(i) Use the graph to find the values of p and q. [2]

(ii) Calculate an estimate of the mean number of hours worked in a week. [4]

(c) Shalini uses the graph to make a different frequency table.

Hours worked (h)	$0<h\leqslant30$	$30<h\leqslant40$	$40<h\leqslant50$	$50<h\leqslant80$
Frequency	82	30	38	50

When she draws a histogram, the height of the column for the interval $30<h\leqslant40$ is 9 cm.

Calculate the height of each of the other three columns. [4]

Kristina asked 200 people how much water they drink in one day.

The table shows her results.

Amount of water (x litres)	Number of people
$0 < x \leqslant 0.5$	8
$0.5 < x \leqslant 1$	27
$1 < x \leqslant 1.5$	45
$1.5 < x \leqslant 2$	50
$2 < x \leqslant 2.5$	39
$2.5 < x \leqslant 3$	21
$3 < x \leqslant 3.5$	7
$3.5 < x \leqslant 4$	3

(a) Write down the modal interval. [1]

(b) Calculate an estimate of the mean. [4]

(c) Make a cumulative frequency table for this data. [2]

(d) Using a scale of 4 cm to 1 litre of water on the horizontal axis and 1 cm to 10 people on the vertical axis, draw the cumulative frequency graph. [5]

(e) Use your cumulative frequency graph to find

(i) the median, [1]

(ii) the 40^{th} percentile, [1]

(iii) the number of people who drink at least 2.6 litres of water. [2]

(f) A doctor recommends that a person drinks at least 1.8 litres of water each day.
What percentage of these 200 people do not drink enough water? [2]

(a) The quiz scores of a class of n students are shown in the table.

Quiz score	6	7	8	9
Frequency (number of students)	9	3	a	5

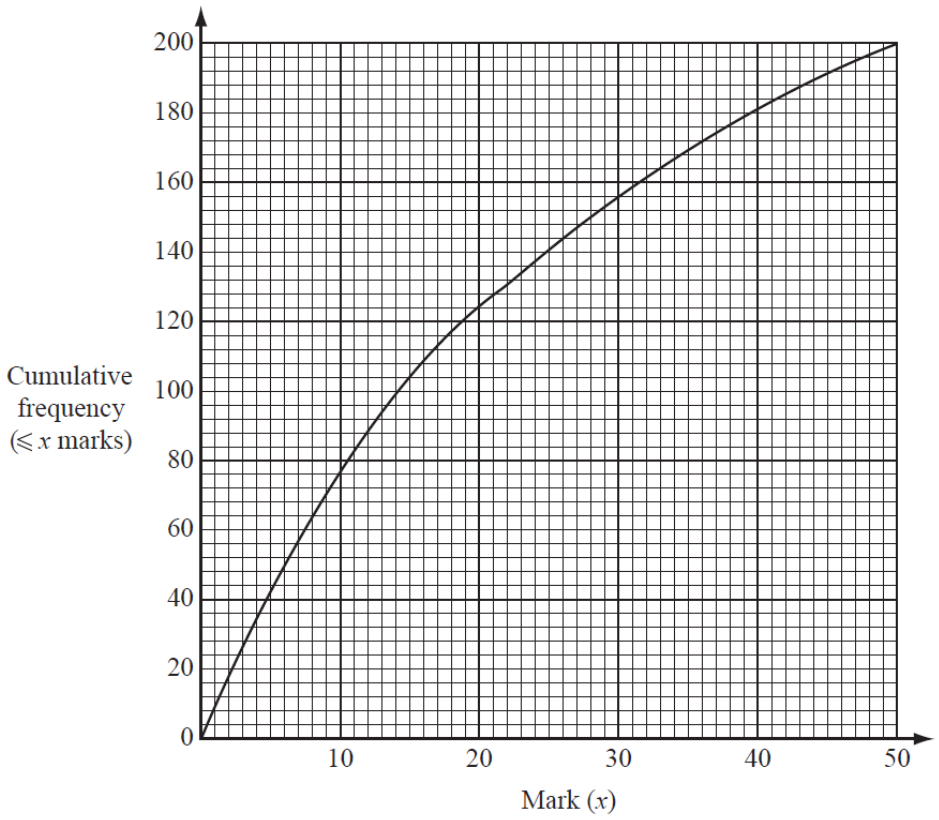
The mean score is 7.2. Find

(i) a, [3]

(ii) n, [1]

(iii) the median score. [1]

(b) 200 students take a mathematics test.
The cumulative frequency diagram shows the results.



Write down

(i) the median mark, [1]

(ii) the lower quartile, [1]

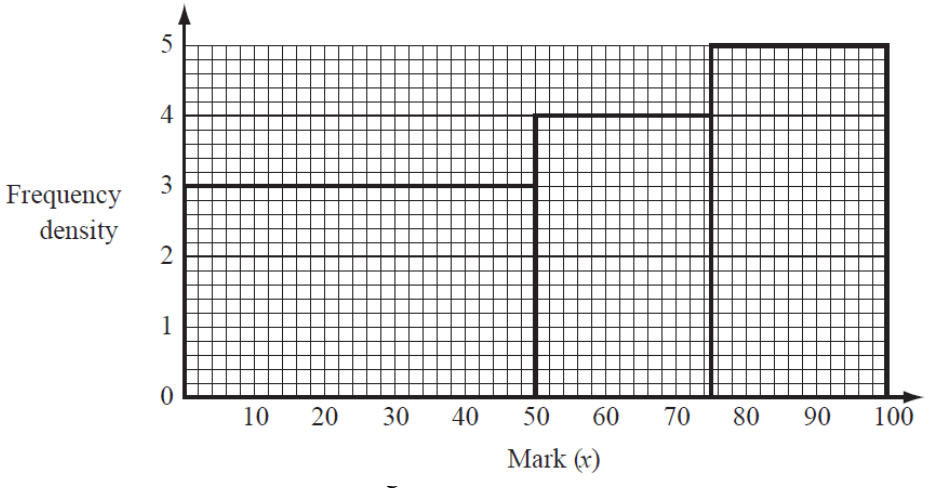
(iii) the upper quartile, [1]

(iv) the inter-quartile range, [1]

(v) the lowest possible mark scored by the top 40 students, [1]

(vi) the number of students scoring more than 25 marks. [1]

(c) Another group of students takes an English test.
The results are shown in the histogram.



(i) How many students score marks in the range $0 < x \leqslant 50$? [1]

(ii) How many students score marks in the range $75 < x \leqslant 100$? [1]

(iii) Calculate an estimate of the mean mark of this group of students. [4]

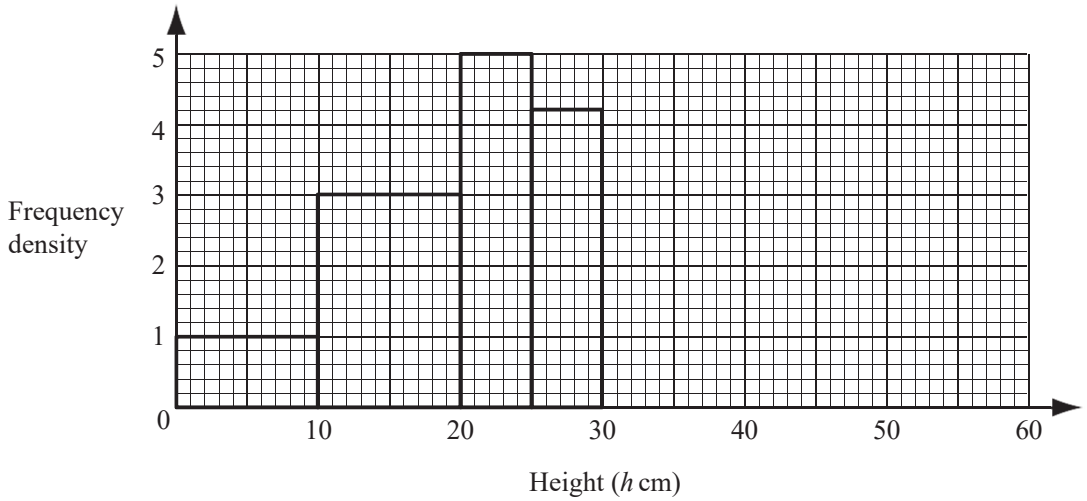
(a) Students are given marks 0, 1, 2, 3 or 4 for a piece of work.
The table shows the number of students getting each mark.

Mark	0	1	2	3	4
Frequency	3	10	12	9	x

(i) The mean mark is 2.125.
Find the value of x. [4]

(ii) Write down the lower quartile mark. [1]

(b) The heights (h centimetres) of flowers in a shop are shown in the histogram below.
All the flowers are less than 60 cm high.
One bar has not been drawn on the histogram.



(i) There are 25 flowers in the interval $20 < h \leqslant 25$.
How many flowers are there in the intervals

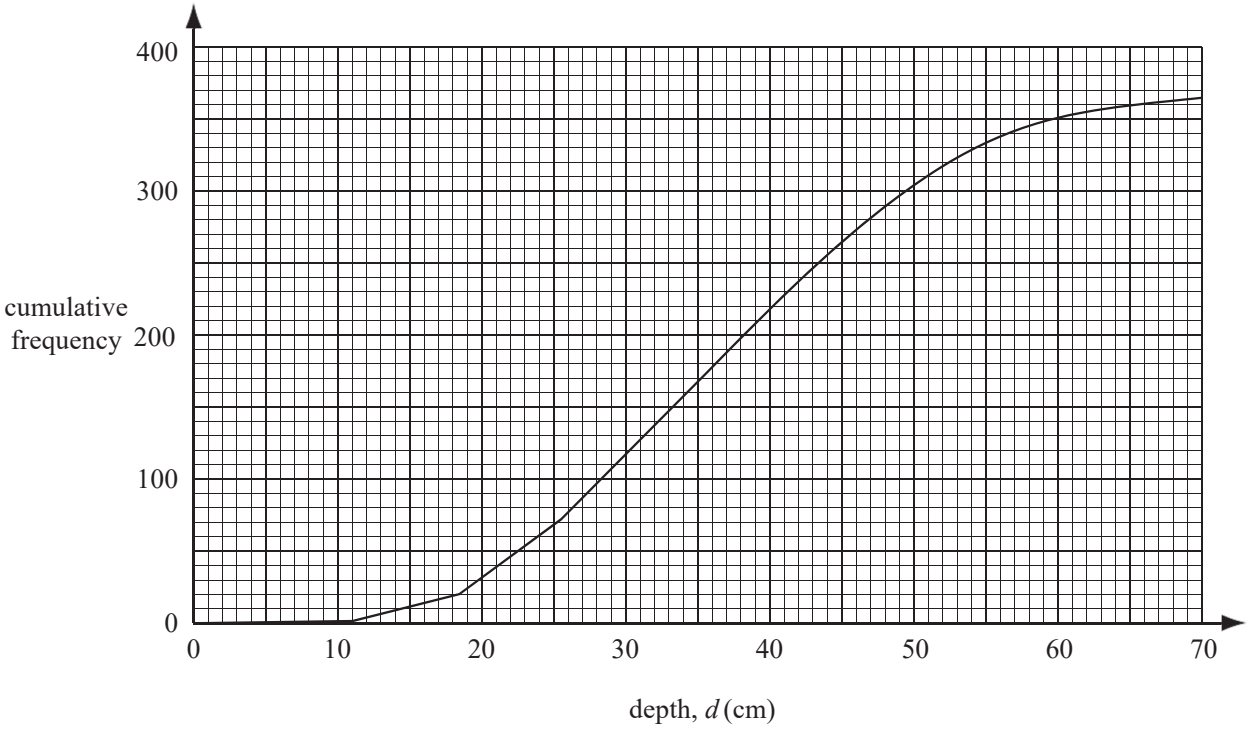
(a) $25 < h \leqslant 30$, [1]

(b) $10 < h \leqslant 20$? [1]

(ii) There are 42 flowers in the interval $30 < h \leqslant 60$.
This can be shown by a single bar on the histogram.
Calculate the height of this bar. [2]

(iii) Calculate an estimate of the mean height of the flowers. [3]

The depth, d centimetres, of a river was recorded each day during a period of one year (365 days).
The results are shown by the cumulative frequency curve.



(a) Use the cumulative frequency curve to find

(i) the median depth, [1]

(ii) the inter-quartile range, [2]

(iii) the depth at the 40th percentile, [2]

(iv) the number of days when the depth of the river was **at least** 25 cm. [2]

(b)

d	$0<d\leqslant 10$	$10<d\leqslant 20$	$20<d\leqslant 30$	$30<d\leqslant 40$	$40<d\leqslant 50$	$50<d\leqslant 60$	$60<d\leqslant 70$
Number of days	17	41	62	98	85	p	q

(i) Show that $p = 47$ and $q = 15$. [2]

(ii) Use the information in the table and the values of p and q to calculate an estimate of the mean depth of the river. [4]

(c) The following information comes from the table in **part (b).**

d	$0<d\leqslant 20$	$20<d\leqslant 40$	$40<d\leqslant 70$
Number of days	58	160	147

A histogram was drawn to show this information.
The height of the column for the interval $20 < d \leqslant 40$ was 8 cm.
Calculate the height of each of the other two columns.
[Do not draw the histogram.] [3]