Statistics
Difficulty: Medium

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Statistics
Paper	Paper 4
Difficulty	Medium
Booklet	Question Paper 2

Time allowed: **117 minutes**

Score: **/102**

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%

The times, t minutes, taken for 200 students to cycle one kilometre are shown in the table.

Time (t minutes)	$0 < t \leqslant 2$	$2 < t \leqslant 3$	$3 < t \leqslant 4$	$4 < t \leqslant 8$
Frequency	24	68	72	36

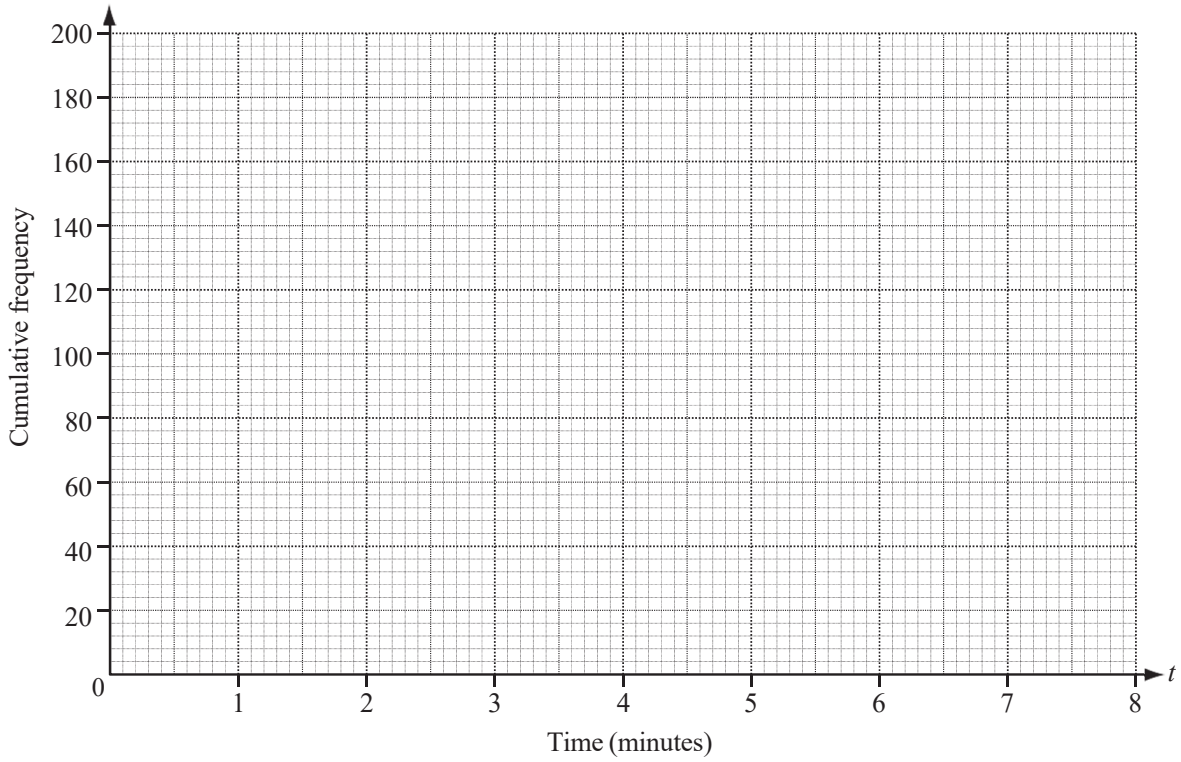
(a) Write down the class interval that contains the median. [1]

(b) Calculate an estimate of the mean.
Show all your working. [4]

(c) (i) Use the information in the table opposite to complete the cumulative frequency table. [1]

Time (t minutes)	$t \leqslant 2$	$t \leqslant 3$	$t \leqslant 4$	$t \leqslant 8$
Cumulative frequency	24			200

(ii) On the grid, draw a cumulative frequency diagram. [3]



(iii) Use your diagram to find the median, the lower quartile and the inter-quartile range. [3]

Time (t mins)	$0 < t \leqslant 20$	$20 < t \leqslant 35$	$35 < t \leqslant 45$	$45 < t \leqslant 55$	$55 < t \leqslant 70$	$70 < t \leqslant 80$
Frequency	6	15	19	37	53	20

The table shows the times taken, in minutes, by 150 students to complete their homework on one day.

(a) (i) In which interval is the median time? [1]

(ii) Using the mid-interval values 10, 27.5, ……..calculate an estimate of the mean time. [3]

(b) (i) Complete the table of cumulative frequencies. [2]

Time (t mins)	$t \leqslant 20$	$t \leqslant 35$	$t \leqslant 45$	$t \leqslant 55$	$t \leqslant 70$	$t \leqslant 80$
Cumulative frequency	6	21				

(ii) On the grid, label the horizontal axis from 0 to 80, using the scale 1 cm represents 5 minutes and the vertical axis from 0 to 150, using the scale 1 cm represents 10 students.

Draw a cumulative frequency diagram to show this information. [5]

(c) Use your graph to estimate

(i) the median time, [1]

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

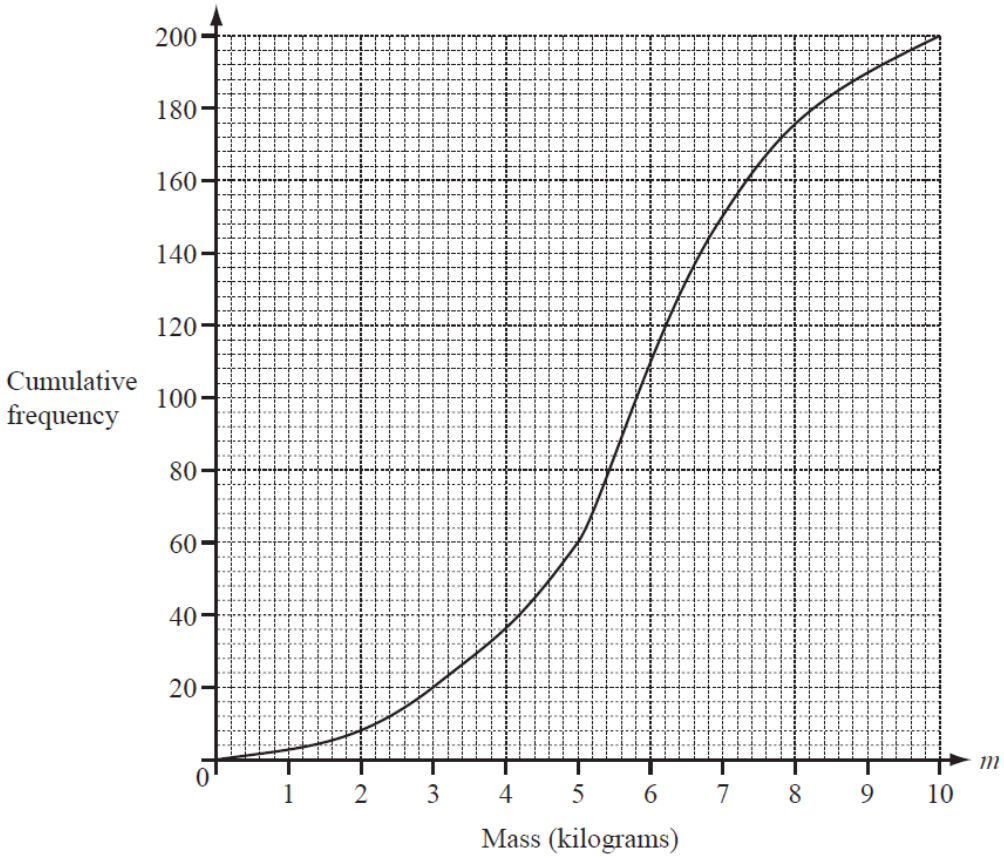
(iii) the number of students whose time was in the range $50 < t \leqslant 60$, [1]

(iv) the probability, as a fraction, that a student, chosen at random, took longer than 50 minutes,

[2]

(v) the probability, as a fraction, that two students, chosen at random, both took longer than 50 minutes.

[2]



The masses of 200 parcels are recorded.

The results are shown in the cumulative frequency diagram above.

(a) Find

(i) the median, [1]

(ii) the lower quartile, [1]

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

(iv) the number of parcels with a mass greater than 3.5 kg. [2]

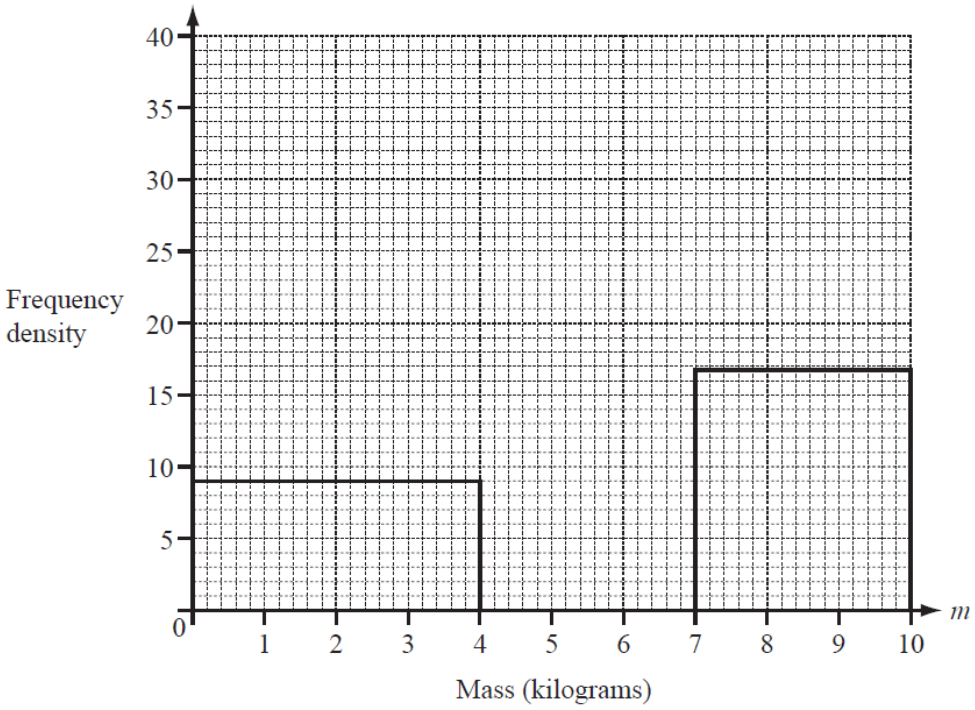
(b) (i) Use the information from the cumulative frequency diagram to complete the grouped frequency table. [2]

Mass (m) kg	$0 < m \leqslant 4$	$4 < m \leqslant 6$	$6 < m \leqslant 7$	$7 < m \leqslant 10$
Frequency	36			50

(ii) Use the grouped frequency table to calculate an estimate of the mean. [4]

(iii) Complete the frequency density table and use it to complete the histogram. [4]

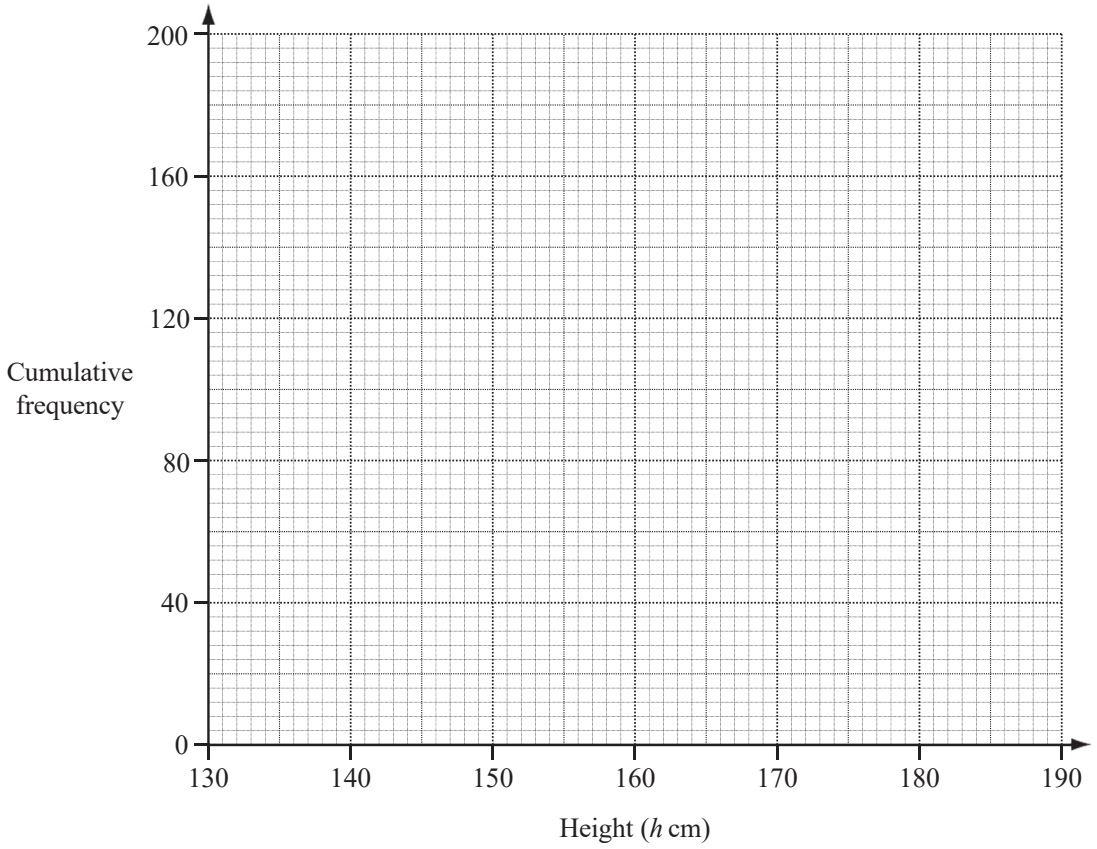
Mass (m) kg	$0 < m \leqslant 4$	$4 < m \leqslant 6$	$6 < m \leqslant 7$	$7 < m \leqslant 10$
Frequency density	9			16.7



The cumulative frequency table shows the distribution of heights, h centimetres, of 200 students.

Height (h cm)	$\leqslant 130$	$\leqslant 140$	$\leqslant 150$	$\leqslant 160$	$\leqslant 165$	$\leqslant 170$	$\leqslant 180$	$\leqslant 190$
Cumulative frequency	0	10	50	95	115	145	180	200

(a) Draw a cumulative frequency diagram to show the information in the table.



[4]

(b) Use your diagram to find

(i) the median, [1]

(ii) the upper quartile, [1]

(iii) the interquartile range. [1]

(c) (i) One of the 200 students is chosen at random.

Use the table to find the probability that the height of this student is greater than 170 cm. Give your answer as a fraction. [1]

(ii) One of the 200 students is chosen at random and then a second student is chosen at random from the remaining students.

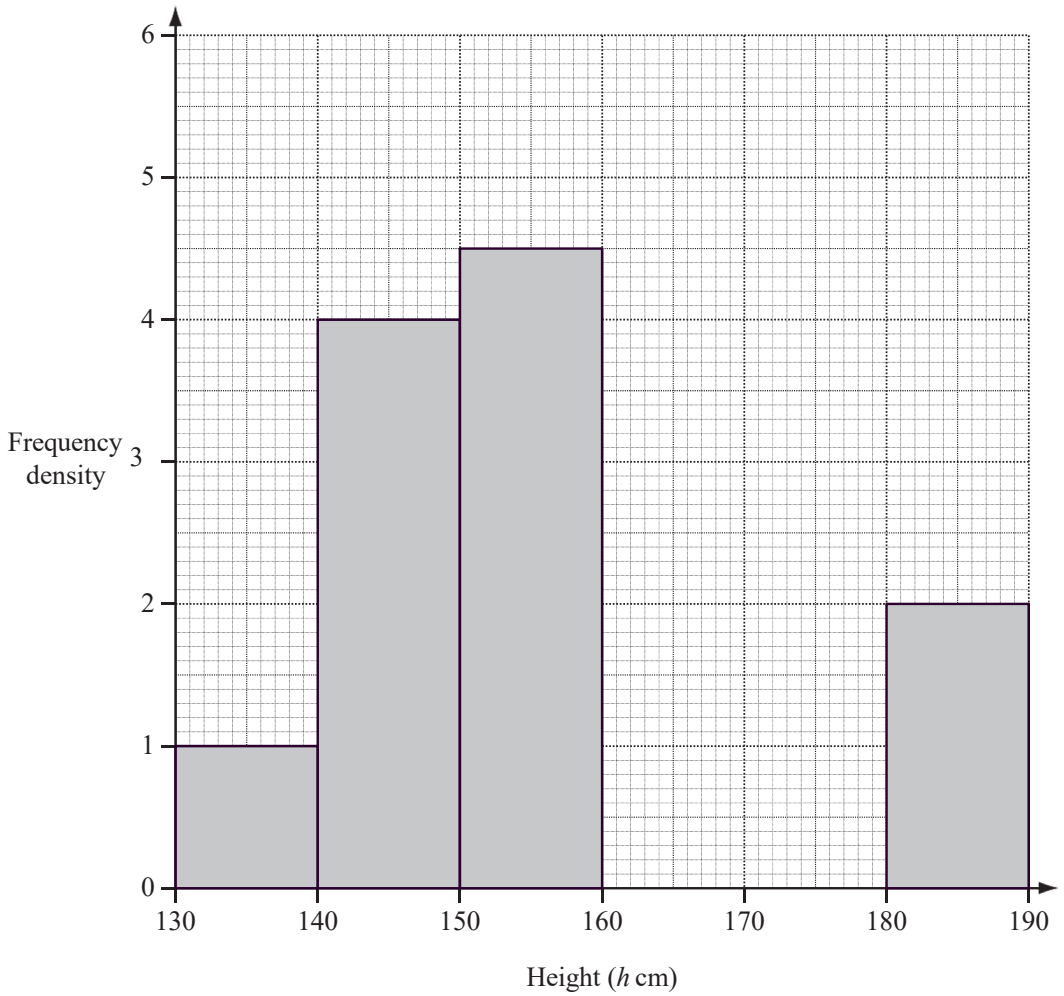
Calculate the probability that one has a height greater than 170 cm and the other has a height of 140 cm or less.
Give your answer as a fraction. [3]

(d) (i) Complete this frequency table which shows the distribution of the heights of the 200 students.

Height (h cm)	$130<h\leqslant140$	$140<h\leqslant150$	$150<h\leqslant160$	$160<h\leqslant165$	$165<h\leqslant170$	$170<h\leqslant180$	$180<h\leqslant190$
Frequency	10	40	45	20			

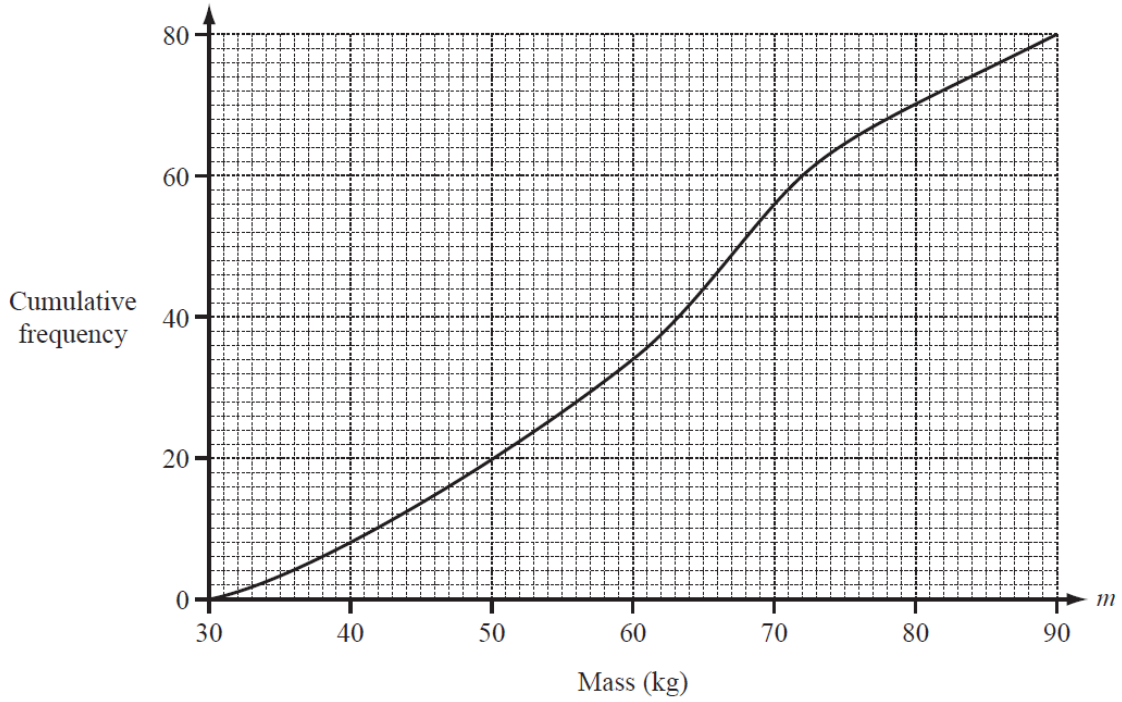
[2]

(ii) Complete this histogram to show the distribution of the heights of the 200 students.



[3]

80 boys each had their mass, m kilograms, recorded.
The cumulative frequency diagram shows the results.



(a) Find

(i) the median, [1]

(ii) the lower quartile, [1]

(iii) the interquartile range. [1]

(b) How many boys had a mass greater than 60kg? [2]

(c) (i) Use the cumulative frequency graph to complete this frequency table.

Mass, m	Frequency
$30 < m \leqslant 40$	8
$40 < m \leqslant 50$	
$50 < m \leqslant 60$	14
$60 < m \leqslant 70$	22
$70 < m \leqslant 80$	
$80 < m \leqslant 90$	10

[2]

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

40 students are asked about the number of people in their families.

The table shows the results.

Number of people in family	2	3	4	5	6	7
Frequency	1	1	17	12	6	3

(a) Find

(i) the mode, [1]

(ii) the median, [1]

(iii) the mean. [3]

(b) Another n students are asked about the number of people in their families.

The mean for these n students is 3.

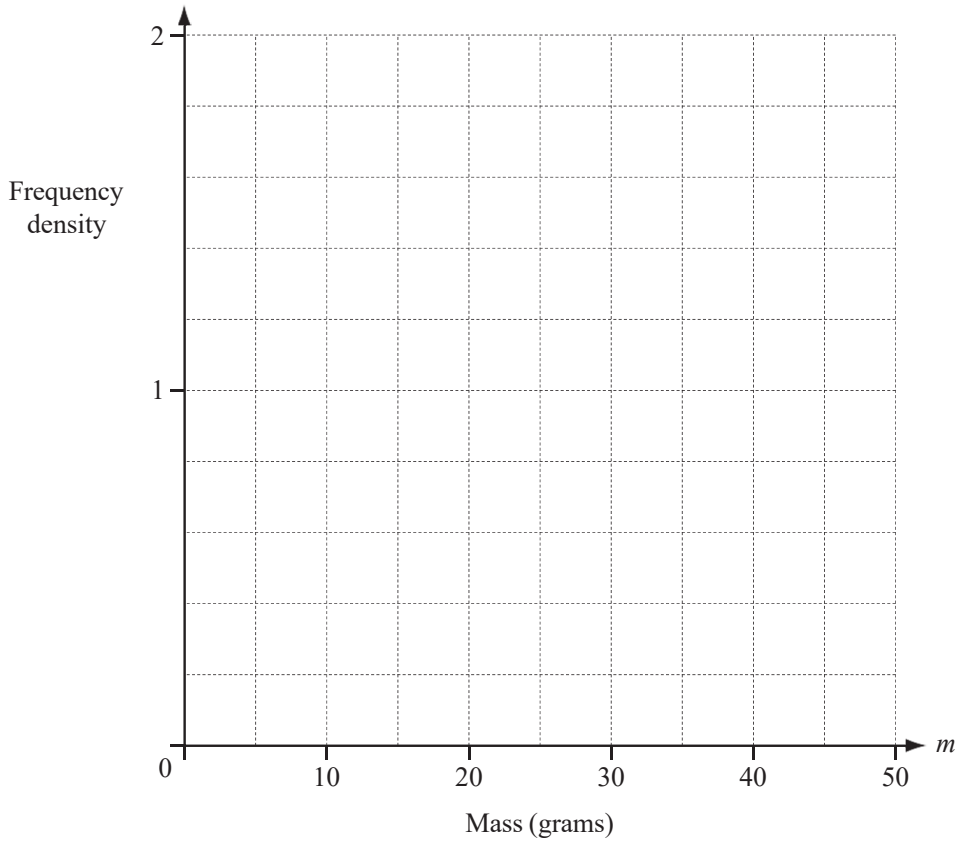
Find, in terms of n, an expression for the mean number for all $(40 + n)$ students. [2]

The masses of 60 potatoes are measured.
The table shows the results.

Mass (m grams)	$10 < m \leqslant 20$	$20 < m \leqslant 40$	$40 < m \leqslant 50$
Frequency	10	30	20

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

(b) On the grid, draw an accurate histogram to show the information in the table.



[3]

200 students were asked how many hours they exercise each week.

The table shows the results.

Time (t hours)	$0<t\leqslant 5$	$5<t\leqslant 10$	$10<t\leqslant 15$	$15<t\leqslant 20$	$20<t\leqslant 25$	$25<t\leqslant 30$	$30<t\leqslant 35$	$35<t\leqslant 40$
Number of students	12	15	23	30	40	35	25	20

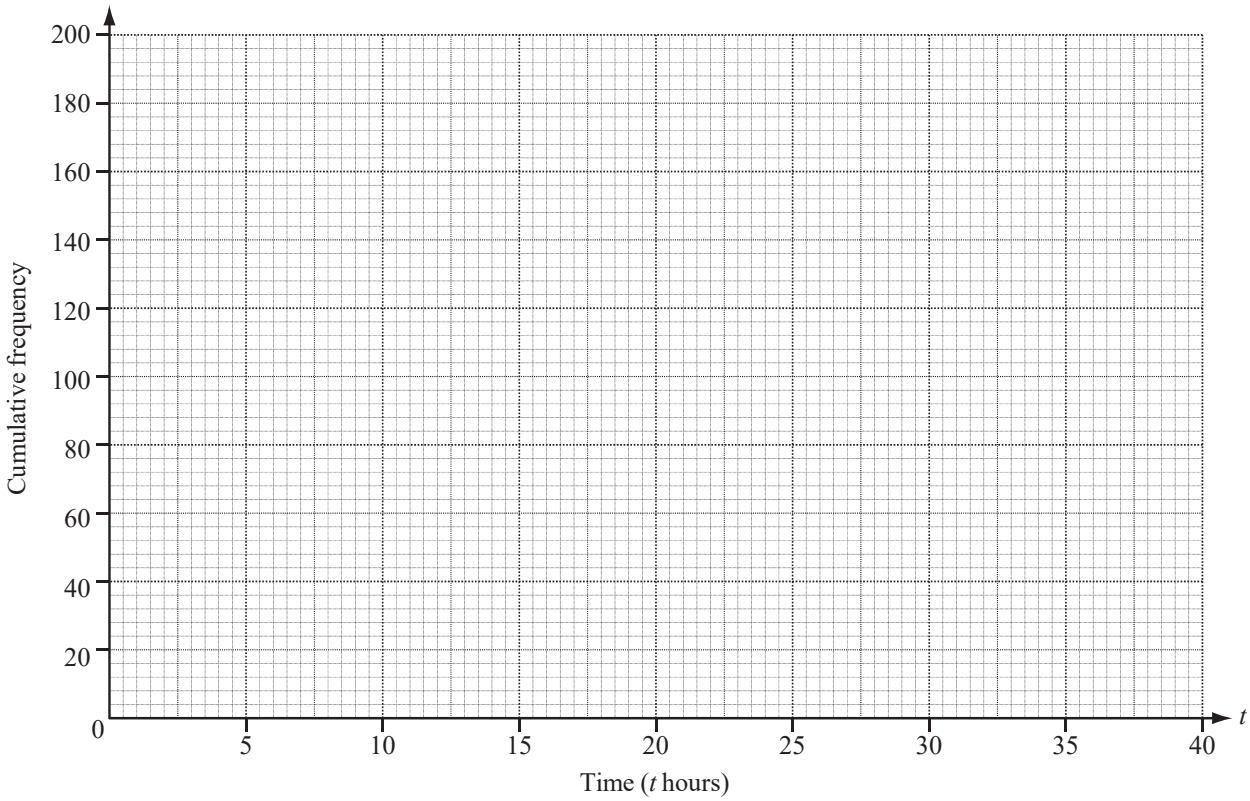
(a) Calculate an estimate of the mean. [4]

(b) Use the information in the table above to complete the cumulative frequency table.

Time (t hours)	$t \leqslant 5$	$t \leqslant 10$	$t \leqslant 15$	$t \leqslant 20$	$t \leqslant 25$	$t \leqslant 30$	$t \leqslant 35$	$t \leqslant 40$
Cumulative frequency	12	27	50	80	120			200

[1]

For Examiner's Use



(c) On the grid, draw a cumulative frequency diagram to show the information in the table in **part (b).** [4]

(d) On your cumulative frequency diagram show how to find the lower quartile. [1]

(e) Use your cumulative frequency diagram to find

(i) the median, [1]

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

(iii) the 64th percentile, [1]

(iv) the number of students who exercise for more than 17 hours. [2]