

Statistics

Difficulty: Medium

Question Paper 1

| | |
|------------|-------------------|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Statistics |
| Paper | Paper 4 |
| Difficulty | Medium |
| Booklet | Question Paper 1 |

Time allowed: 114 minutes

Score: /99

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% |

-Assembled by A.S.

Question 1

120 students take a mathematics examination.

- (a) The time taken, m minutes, for each student to answer question 1 is shown in this table.

| Time (m minutes) | $0 < m \leq 1$ | $1 < m \leq 2$ | $2 < m \leq 3$ | $3 < m \leq 4$ | $4 < m \leq 5$ | $5 < m \leq 6$ |
|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Frequency | 72 | 21 | 9 | 11 | 5 | 2 |

Calculate an estimate of the mean time taken.

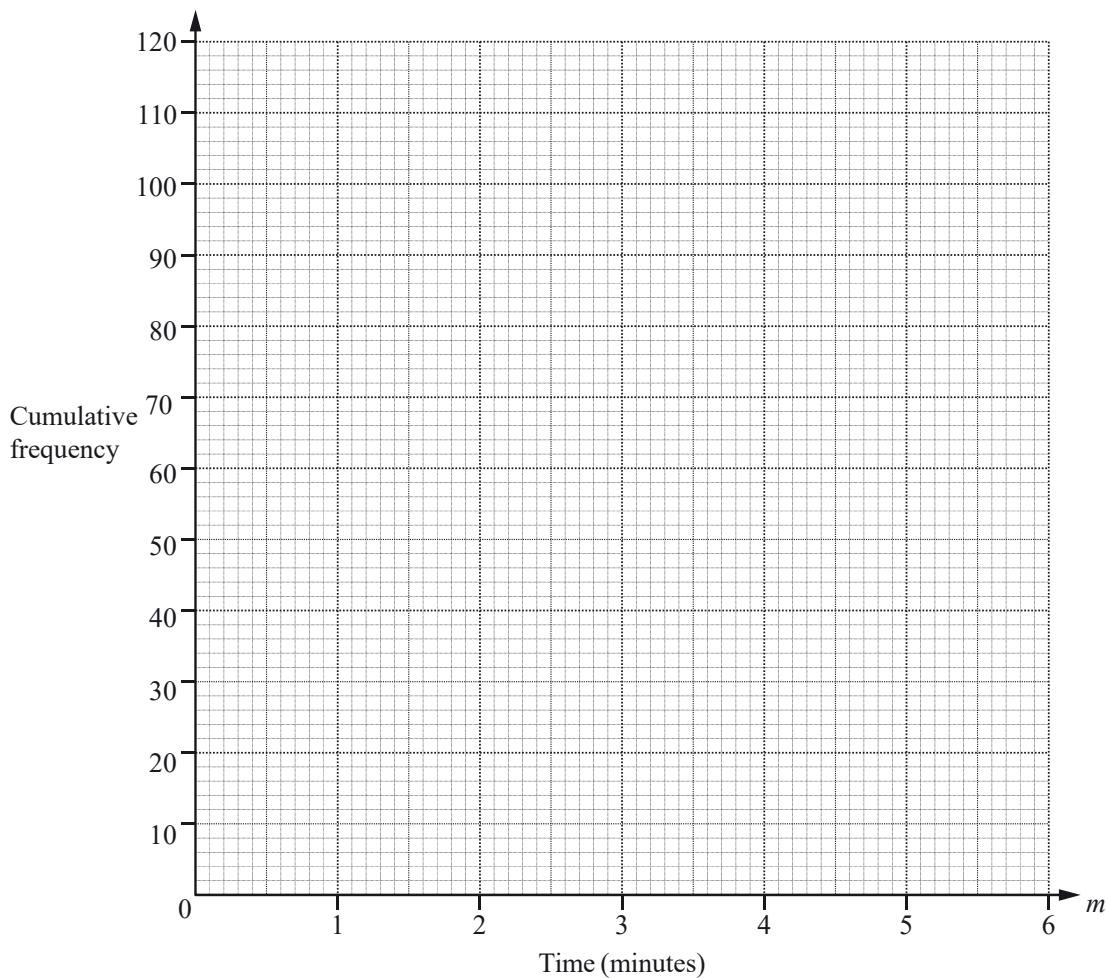
[4]

- (b) (i) Using the table in **part (a)**, complete this cumulative frequency table.

| Time (m minutes) | $m \leq 1$ | $m \leq 2$ | $m \leq 3$ | $m \leq 4$ | $m \leq 5$ | $m \leq 6$ |
|----------------------|------------|------------|------------|------------|------------|------------|
| Cumulative frequency | 72 | | | | | 120 |

[2]

- (ii) Draw a cumulative frequency diagram to show the time taken.



[3]

- (iii) Use your cumulative frequency diagram to find
- (a) the median, [1]
- (b) the inter-quartile range, [2]
- (c) the 35th percentile. [2]

(c) A new frequency table is made from the table shown in **part (a)**.

| Time (m minutes) | $0 < m \leq 1$ | $1 < m \leq 3$ | $3 < m \leq 6$ |
|---------------------|----------------|----------------|----------------|
| Frequency | 72 | | |

- (i) Complete the table above. [2]
- (ii) A histogram was drawn and the height of the first block representing the time $0 < m \leq 1$ was 3.6 cm.

Calculate the heights of the other two blocks.

[3]

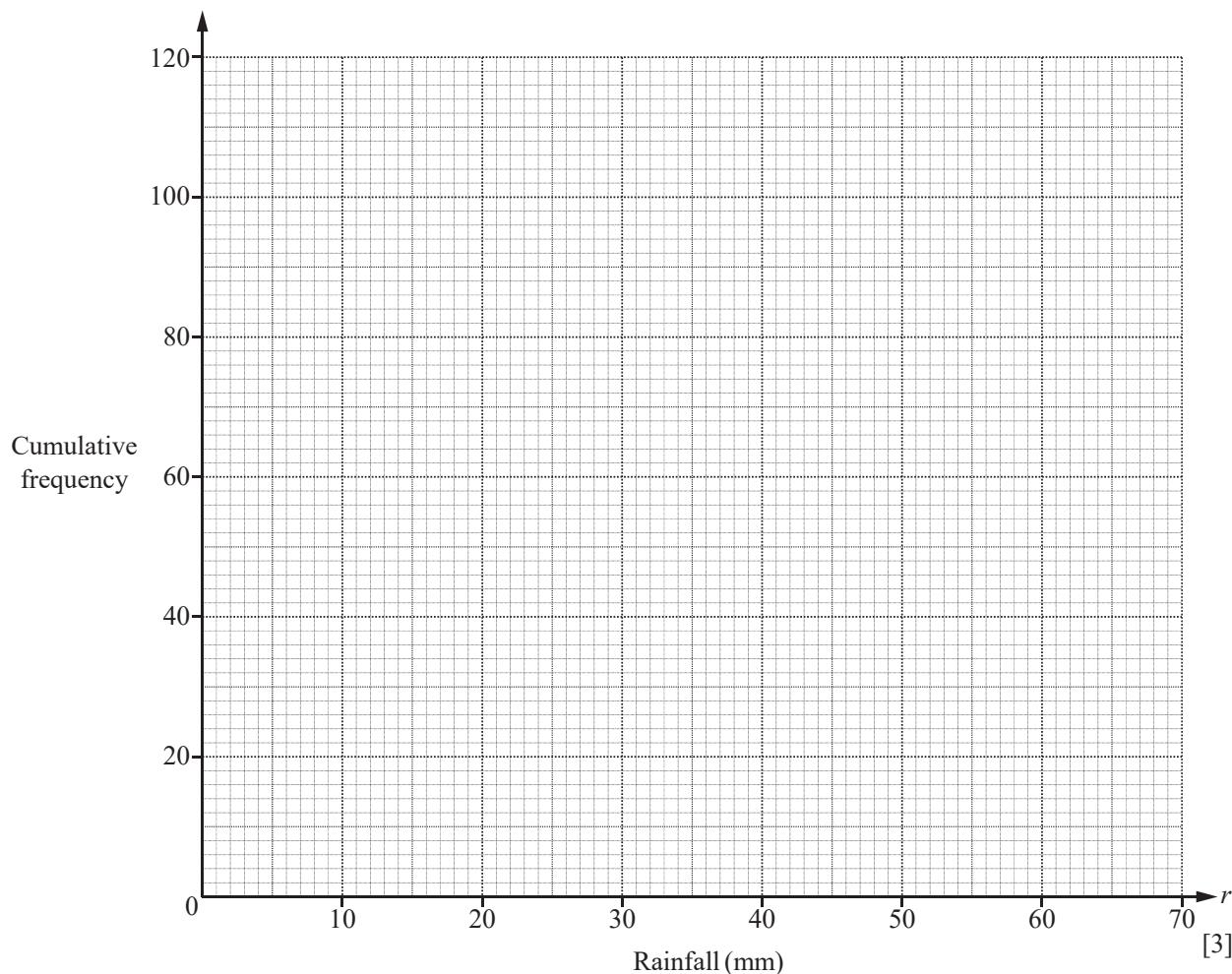
Question 2

Leo measured the rainfall each day, in millimetres, for 120 days.

The cumulative frequency table shows the results.

| Rainfall (r mm) | $r \leq 20$ | $r \leq 25$ | $r \leq 35$ | $r \leq 40$ | $r \leq 60$ | $r \leq 70$ |
|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Cumulative frequency | 5 | 13 | 72 | 90 | 117 | 120 |

(a) On the grid below, draw a cumulative frequency diagram to show these results.



(b) (i) Find the median.

[1]

(ii) Use your diagram to find the number of days when the rainfall was more than 50mm.

[2]

- (c) Use the information in the cumulative frequency table to complete the frequency table below.

| | | | | | | |
|--------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| Rainfall (r mm) | $0 < r \leq 20$ | $20 < r \leq 25$ | $25 < r \leq 35$ | $35 < r \leq 40$ | $40 < r \leq 60$ | $60 < r \leq 70$ |
| Frequency | 5 | | 59 | | | 3 |

[2]

- (d) Use your frequency table to calculate an estimate of the mean.

You must show all your working.

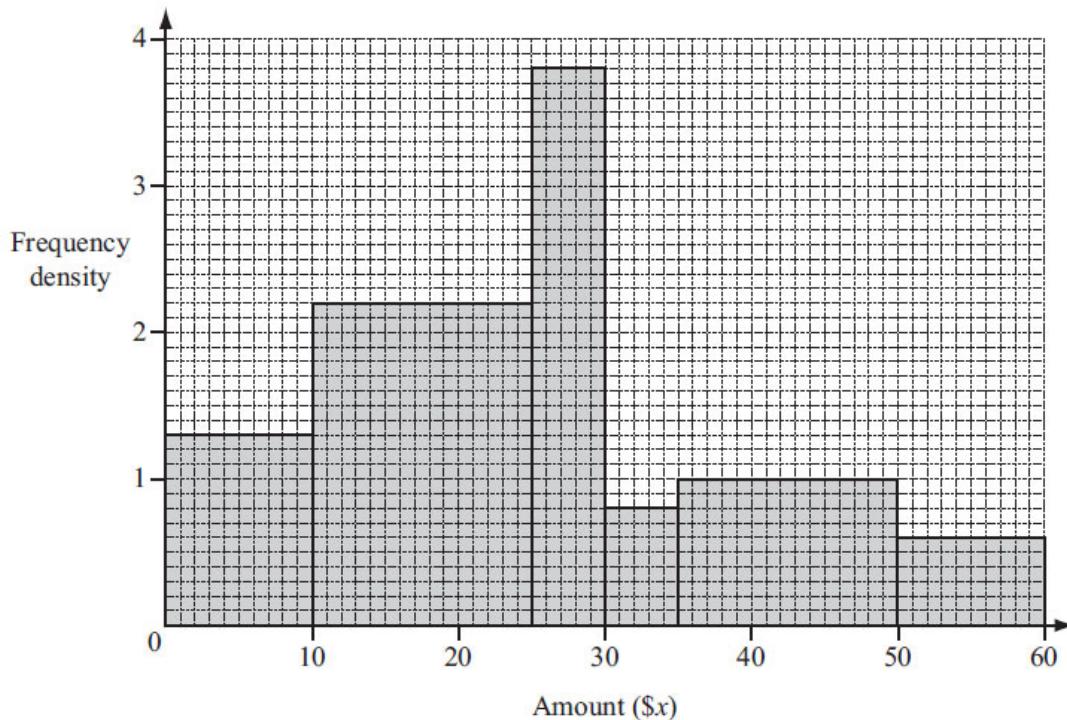
[4]

- (e) In a histogram drawn to show the information in the table in **part (c)**, the frequency density for the interval $25 < r \leq 35$ is 5.9 .

Calculate the frequency density for the intervals $20 < r \leq 25$, $40 < r \leq 60$ and $60 < r \leq 70$.

[4]

Question 3



A survey asked 90 people how much money they gave to charity in one month.
The histogram shows the results of the survey.

- (a) Complete the frequency table for the six columns in the histogram.

[5]

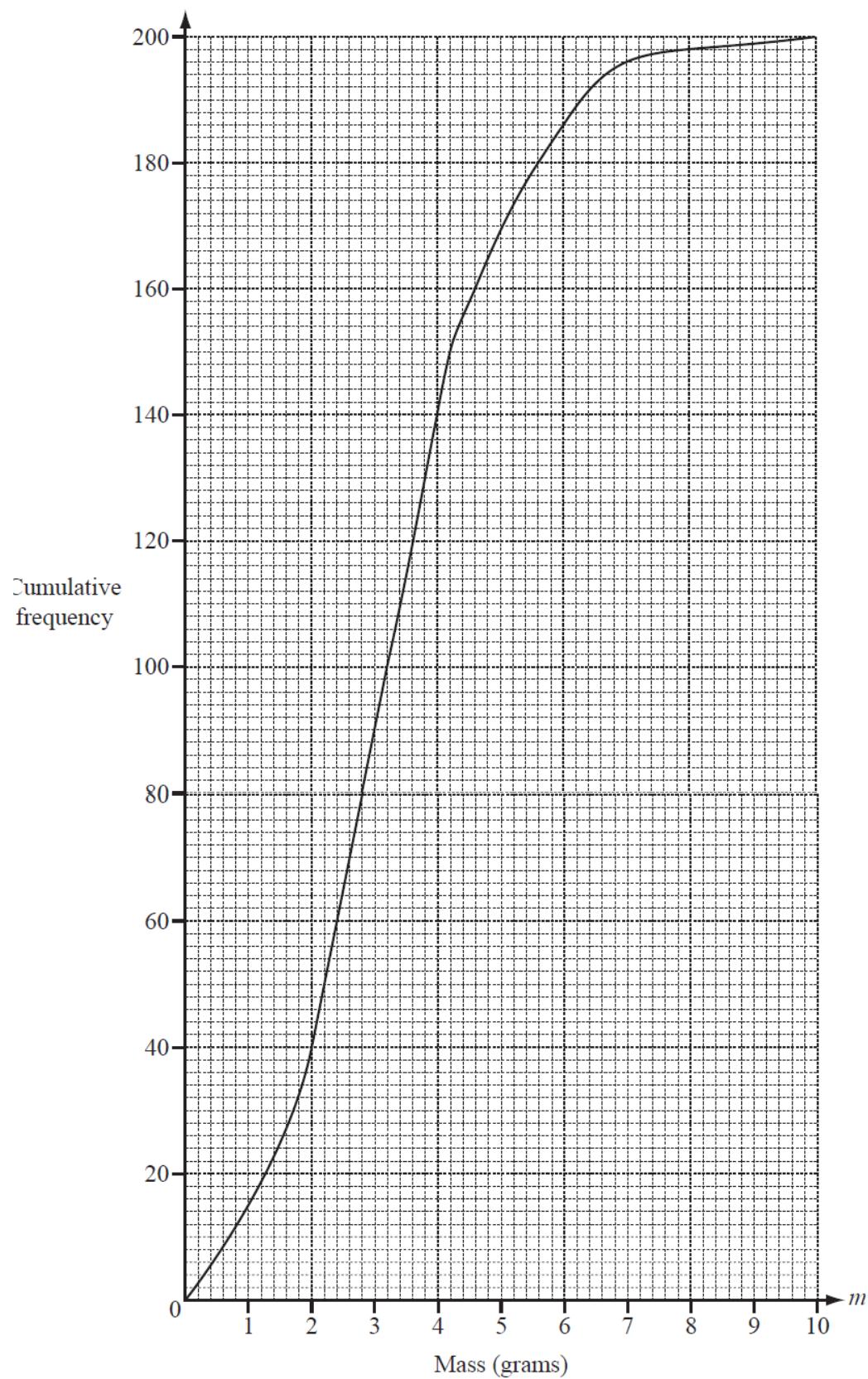
| | | | | | | |
|--------------|-----------------|--|--|---|--|--|
| Amount (\$x) | $0 < x \leq 10$ | | | | | |
| Frequency | | | | 4 | | |

- (b) Use your frequency table to calculate an estimate of the mean amount these 90 people gave to charity.

[4]

Question 4

200 students estimate the mass (m grams) of a coin.
The cumulative frequency diagram shows the results.



(a) Find

(i) the median, [1]

(ii) the upper quartile, [1]

(iii) the 80th percentile, [1]

(iv) the number of students whose estimate is 7 g or less. [1]

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

| Mass (m grams) | $0 < m \leq 2$ | $2 < m \leq 4$ | $4 < m \leq 6$ | $6 < m \leq 8$ | $8 < m \leq 10$ |
|-------------------|----------------|----------------|----------------|----------------|-----------------|
| Frequency | 40 | | | | 2 |

(ii) A student is chosen at random.

The probability that the student estimates that the mass is greater than M grams is 0.3.

Find the value of M . [2]

Question 5

- (a) A farmer takes a sample of 158 potatoes from his crop. He records the mass of each potato and the results are shown in the table.

| Mass (m grams) | Frequency |
|--------------------|-----------|
| $0 < m \leq 40$ | 6 |
| $40 < m \leq 80$ | 10 |
| $80 < m \leq 120$ | 28 |
| $120 < m \leq 160$ | 76 |
| $160 < m \leq 200$ | 22 |
| $200 < m \leq 240$ | 16 |

Calculate an estimate of the mean mass.

Show all your working.

[4]

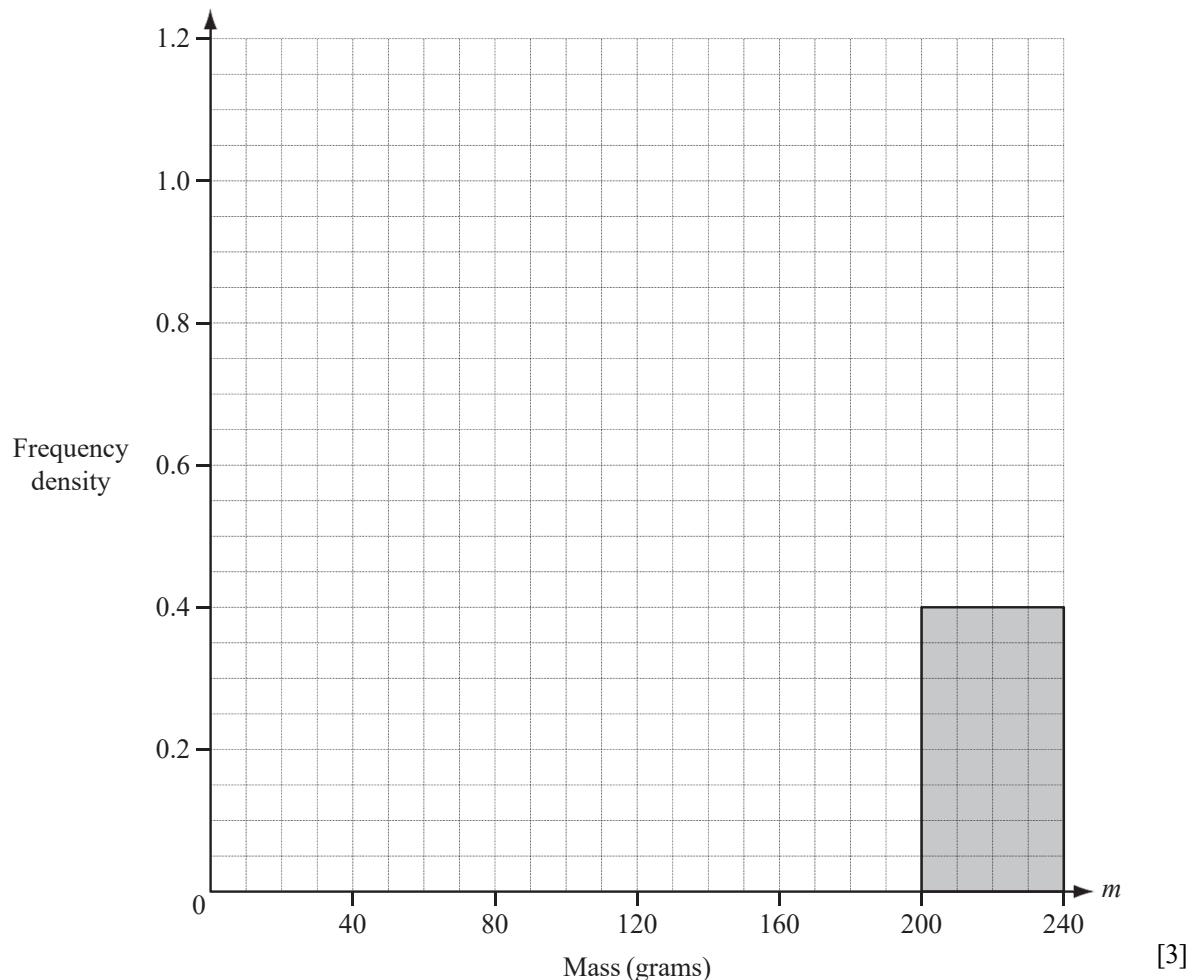
- (b) A new frequency table is made from the results shown in the table in part (a).

| Mass (m grams) | Frequency |
|--------------------|-----------|
| $0 < m \leq 80$ | |
| $80 < m \leq 200$ | |
| $200 < m \leq 240$ | 16 |

- (i) Complete the table above.

[2]

- (ii) On the grid opposite, complete the histogram to show the information in this new table.



[3]

- (c) A bag contains 15 potatoes which have a mean mass of 136 g.
The farmer puts 3 potatoes which have a mean mass of 130 g into the bag.

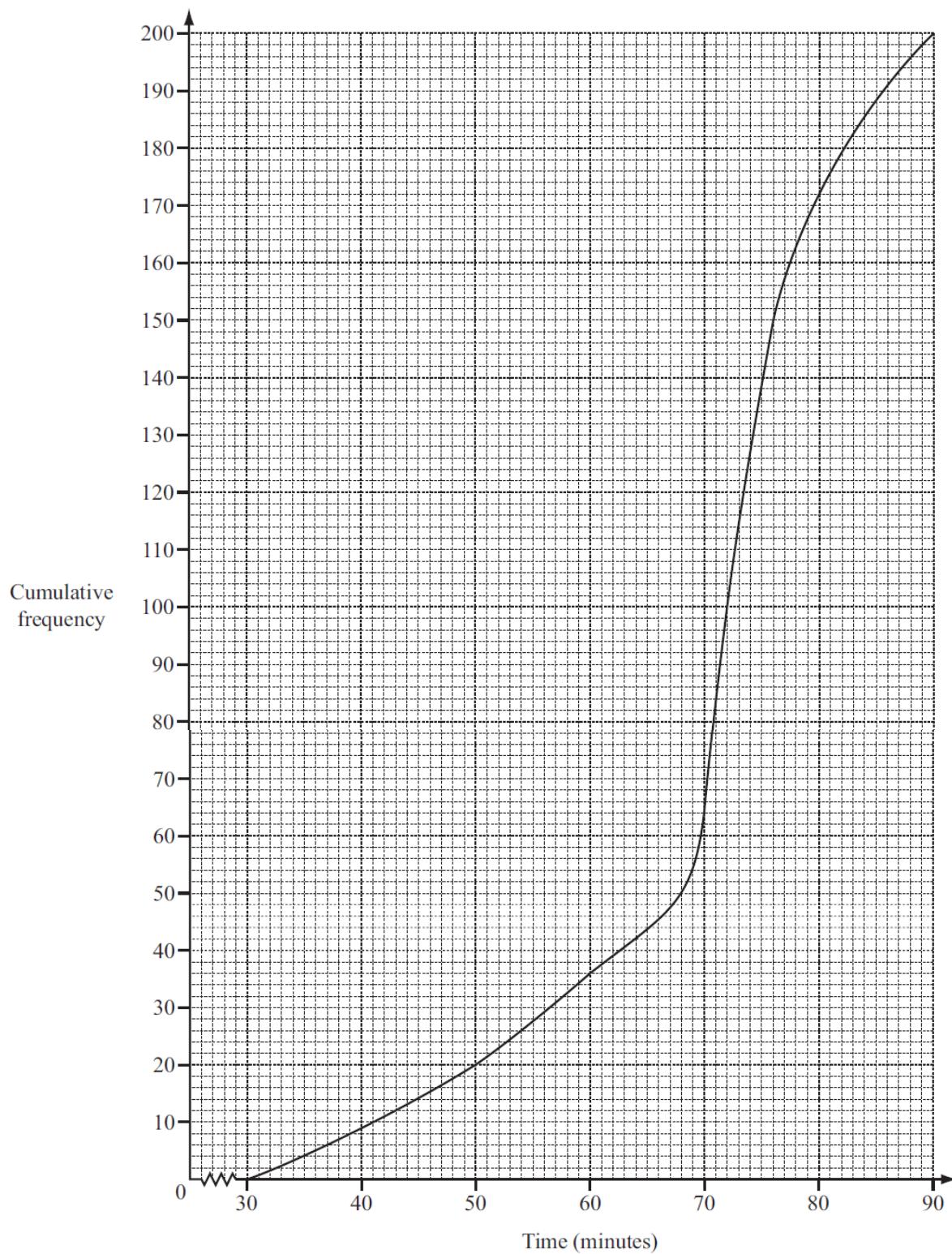
Calculate the mean mass of all the potatoes in the bag.

[3]

Question 6

200 students take a Mathematics examination.

The cumulative frequency diagram shows information about the times taken, t minutes, to complete the examination.



(a) Find

(i) the median, [1]

(ii) the lower quartile, [1]

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

(iv) the number of students who took more than 1 hour. [2]

(b) (i) Use the cumulative frequency diagram to complete the grouped frequency table.

| Time, t minutes | $30 < t \leq 40$ | $40 < t \leq 50$ | $50 < t \leq 60$ | $60 < t \leq 70$ | $70 < t \leq 80$ | $80 < t \leq 90$ |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 9 | | 16 | 28 | 108 | 28 |

[1]

(ii) Calculate an estimate of the mean time taken by the 200 students to complete the examination.

Show all your working.

[4]

Question 7

(a) In a football league a team is given 3 points for a win, 1 point for a draw and 0 points for a loss.

The table shows the 20 results for Athletico Cambridge.

| | | | |
|-----------|----|---|---|
| Points | 3 | 1 | 0 |
| Frequency | 10 | 3 | 7 |

(i) Find the median and the mode.

[3]

(ii) Thomas wants to draw a pie chart using the information in the table.

Calculate the angle of the sector which shows the number of times Athletico Cambridge were given 1 point.

[2]

(b) Athletico Cambridge has 20 players.

The table shows information about the heights (h centimetres) of the players.

| | | | |
|------------------|--------------------|--------------------|--------------------|
| Height (h cm) | $170 < h \leq 180$ | $180 < h \leq 190$ | $190 < h \leq 200$ |
| Frequency | 5 | 12 | 3 |

Calculate an estimate of the mean height of the players.

[4]

Question 8

(a) The times, t seconds, for 200 people to solve a problem are shown in the table.

| Time (t seconds) | Frequency |
|---------------------|-----------|
| $0 < t \leq 20$ | 6 |
| $20 < t \leq 40$ | 12 |
| $40 < t \leq 50$ | 20 |
| $50 < t \leq 60$ | 37 |
| $60 < t \leq 70$ | 42 |
| $70 < t \leq 80$ | 50 |
| $80 < t \leq 90$ | 28 |
| $90 < t \leq 100$ | 5 |

Calculate an estimate of the mean time.

[4]

(b) (i) Complete the cumulative frequency table for this data.

[2]

| Time (t seconds) | $t \leq 20$ | $t \leq 40$ | $t \leq 50$ | $t \leq 60$ | $t \leq 70$ | $t \leq 80$ | $t \leq 90$ | $t \leq 100$ |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| Cumulative Frequency | 6 | 18 | 38 | | | 167 | | |

(ii) Draw the cumulative frequency graph on the grid opposite to show this data.

[4]

(c) Use your cumulative frequency graph to find

(i) the median time,

[1]

(ii) the lower quartile,

[1]

(iii) the inter-quartile range,

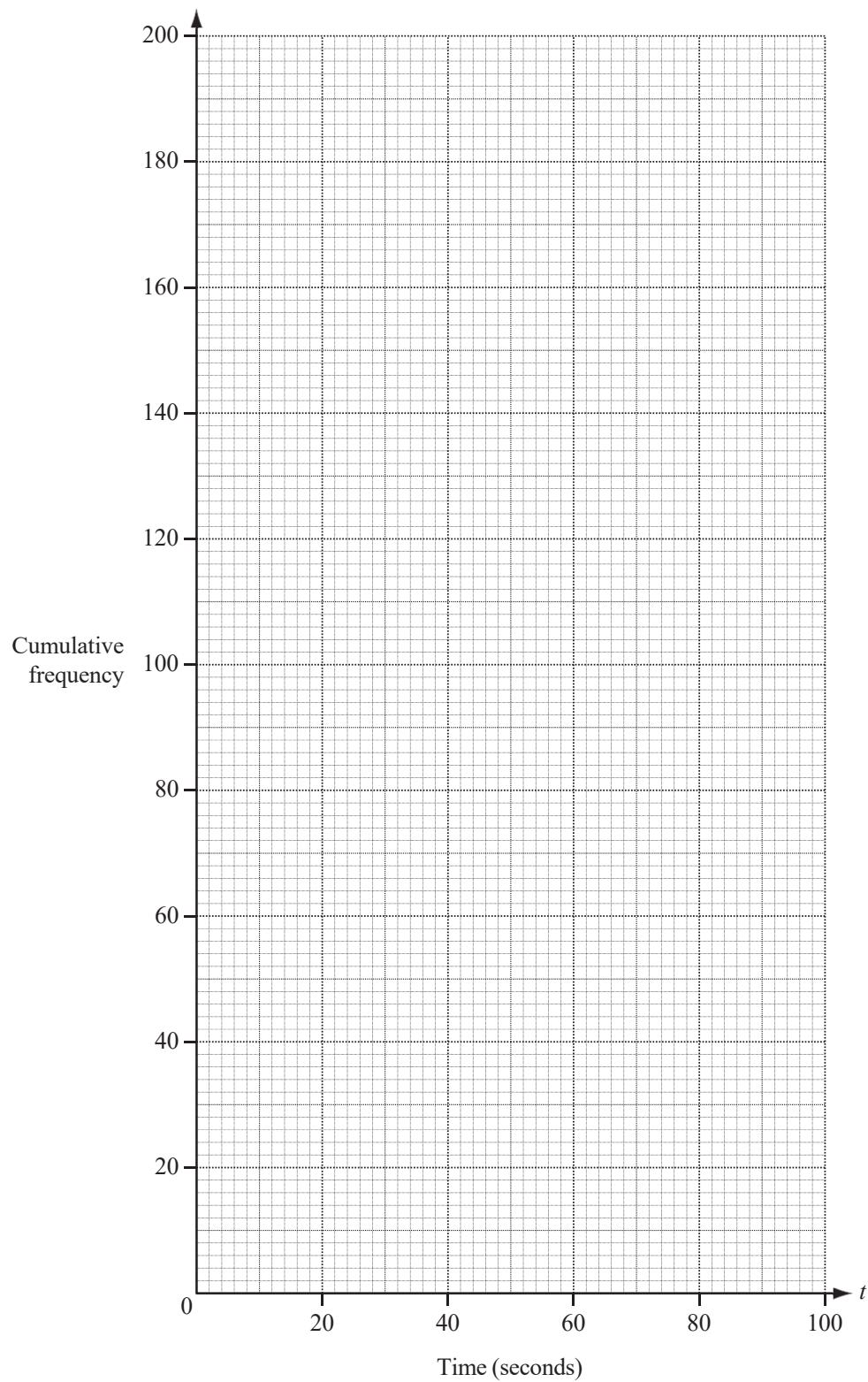
[1]

(iv) how many people took between 65 and 75 seconds to solve the problem,

[1]

(v) how many people took longer than 45 seconds to solve the problem.

[2]



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% |

Question 1

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

| Time (t minutes) | $0 < t \leq 2$ | $2 < t \leq 3$ | $3 < t \leq 4$ | $4 < t \leq 8$ |
|---------------------|----------------|----------------|----------------|----------------|
| 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]

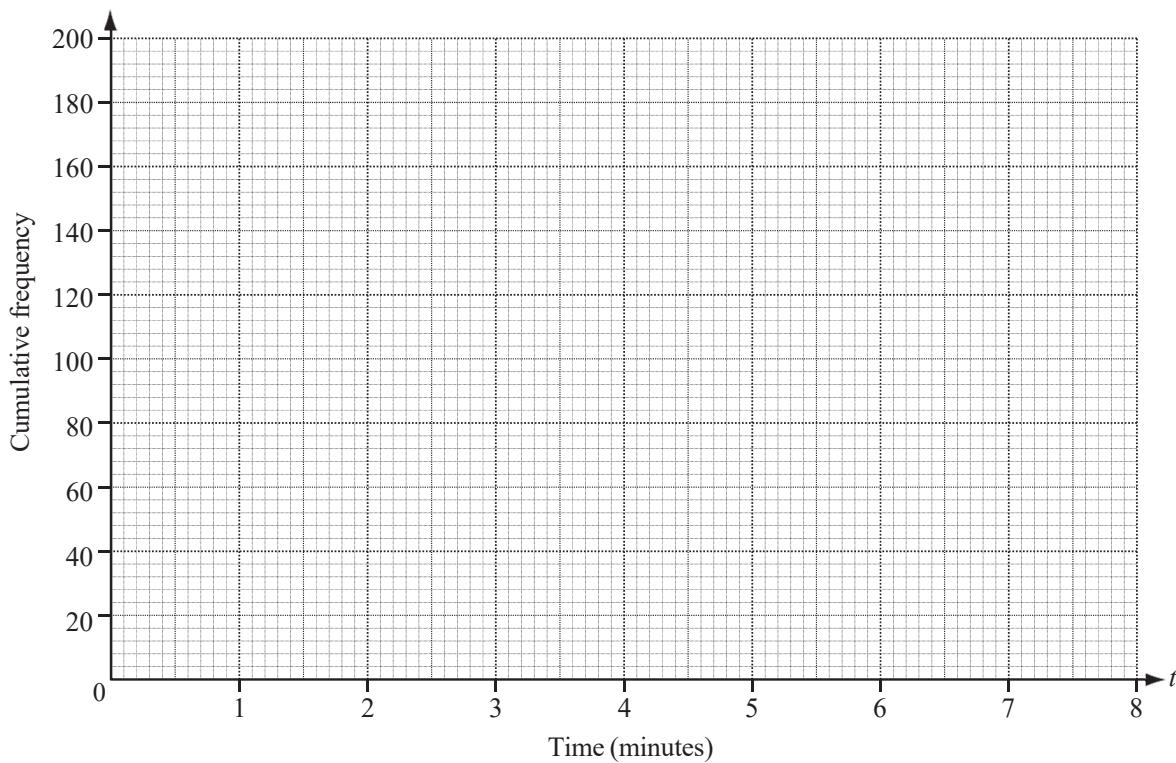
- (c) (i) Use the information in the table opposite to complete the cumulative frequency table.

[1]

| Time (t minutes) | $t \leq 2$ | $t \leq 3$ | $t \leq 4$ | $t \leq 8$ |
|----------------------|------------|------------|------------|------------|
| 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]

Question 2

| Time (t mins) | $0 < t \leq 20$ | $20 < t \leq 35$ | $35 < t \leq 45$ | $45 < t \leq 55$ | $55 < t \leq 70$ | $70 < t \leq 80$ |
|---------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| 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]

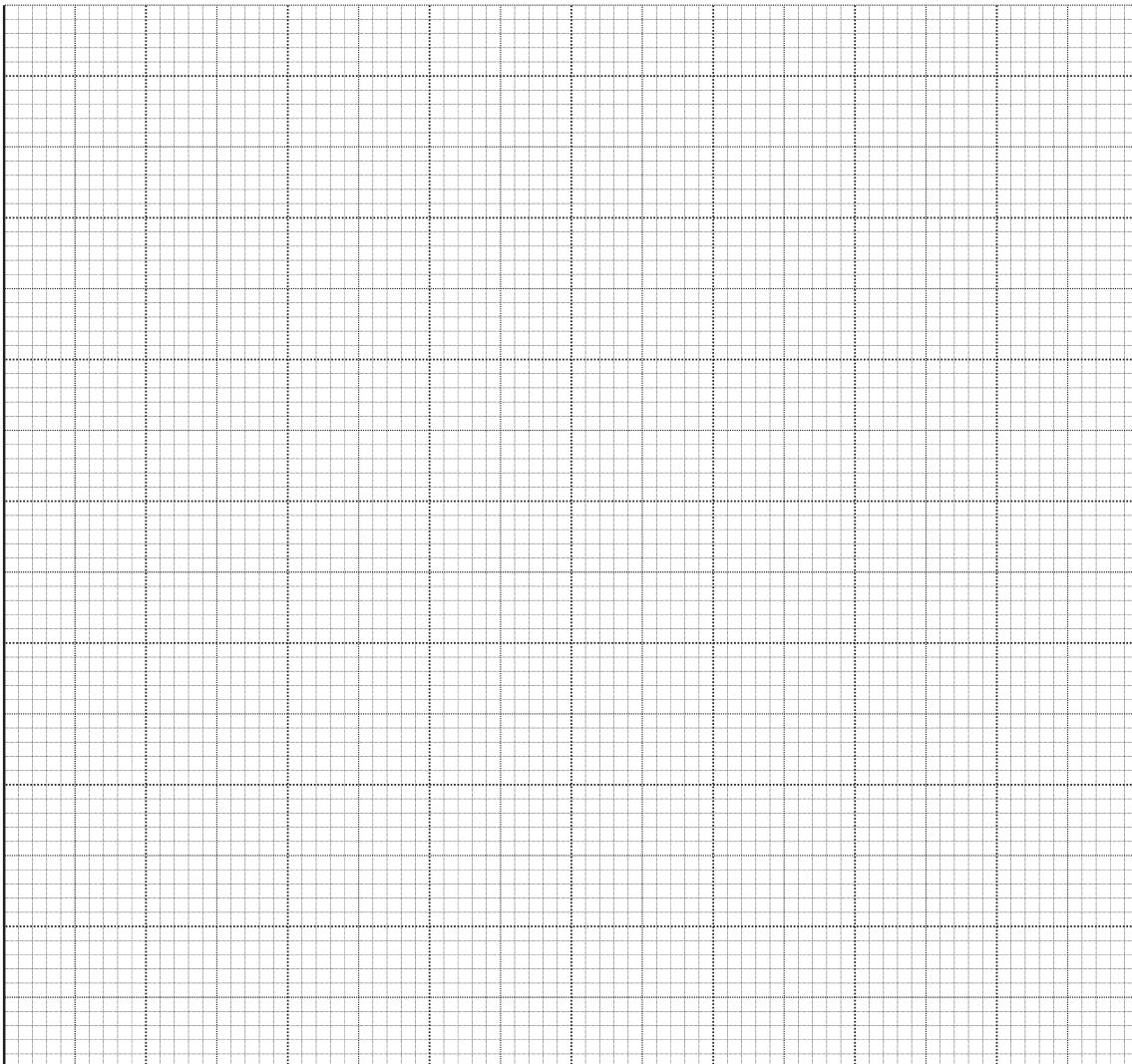
- (ii) Using the mid-interval values 10, 27.5,calculate an estimate of the mean time. [3]

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

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

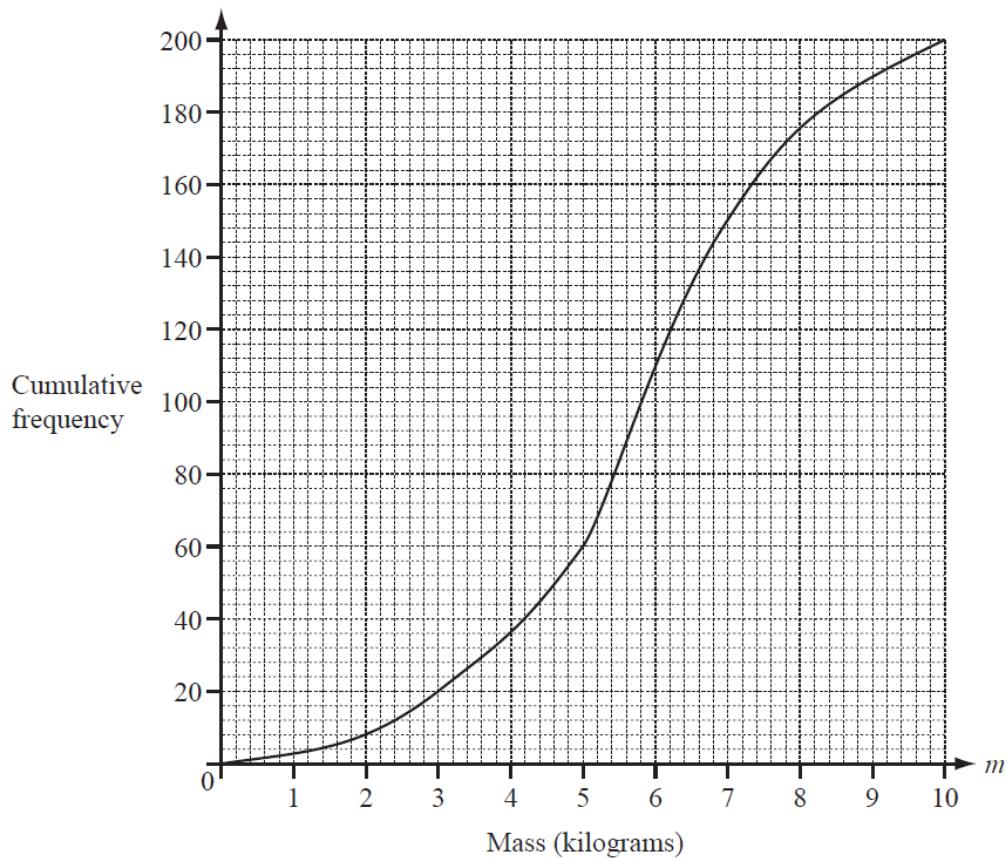
- (ii) On the grid, label the horizontal axis from 0 to 80, using the scale 1 cm represents 5 minutes and the vertical axis from 0 to 150, using the scale 1 cm represents 10 students.

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 $50 < t \leq 60$, [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]

Question 3



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]

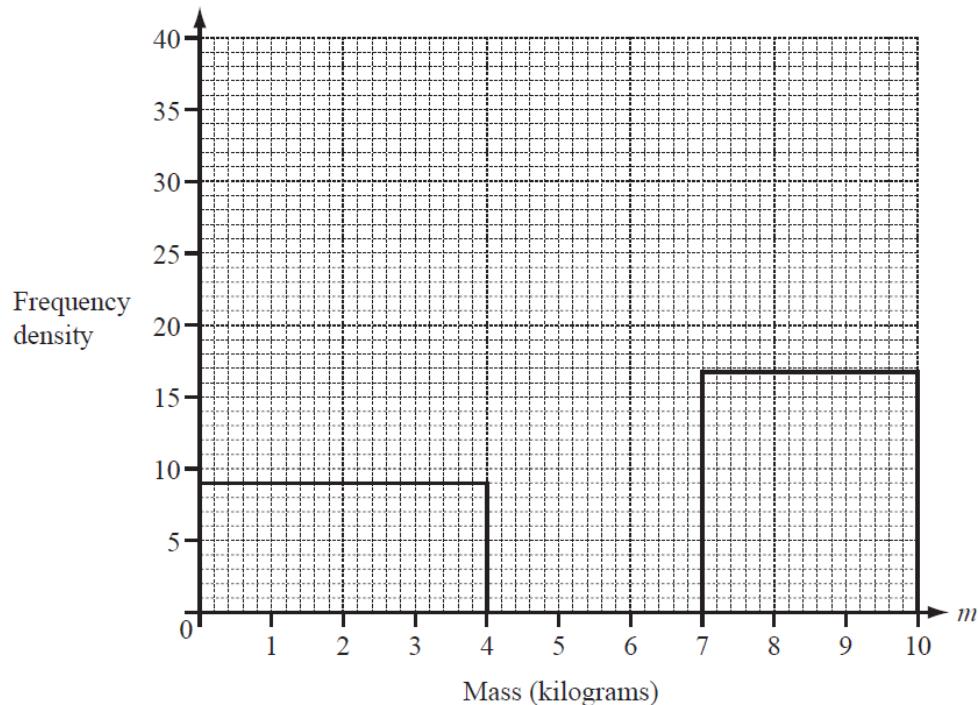
- (b) (i) Use the information from the cumulative frequency diagram to complete the grouped frequency table. [2]

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

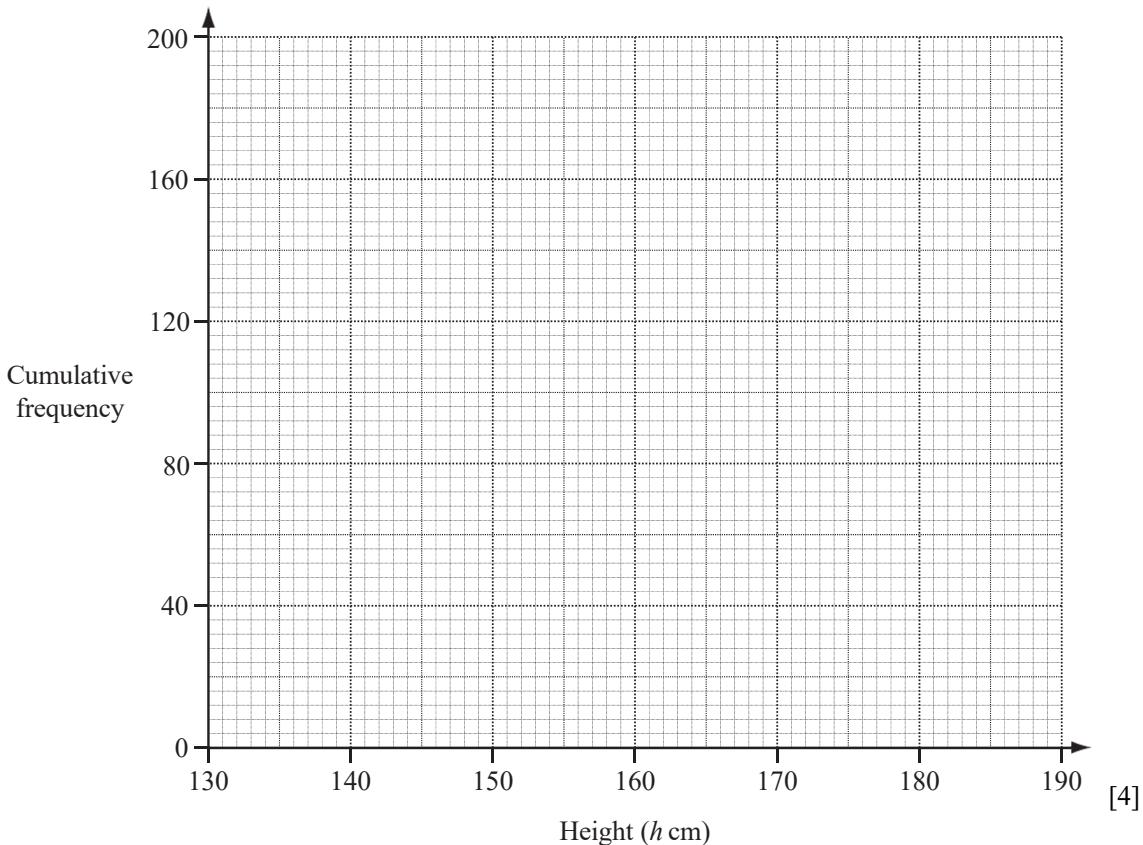


Question 4

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

| Height (h cm) | ≤ 130 | ≤ 140 | ≤ 150 | ≤ 160 | ≤ 165 | ≤ 170 | ≤ 180 | ≤ 190 |
|----------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Cumulative frequency | 0 | 10 | 50 | 95 | 115 | 145 | 180 | 200 |

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



(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.

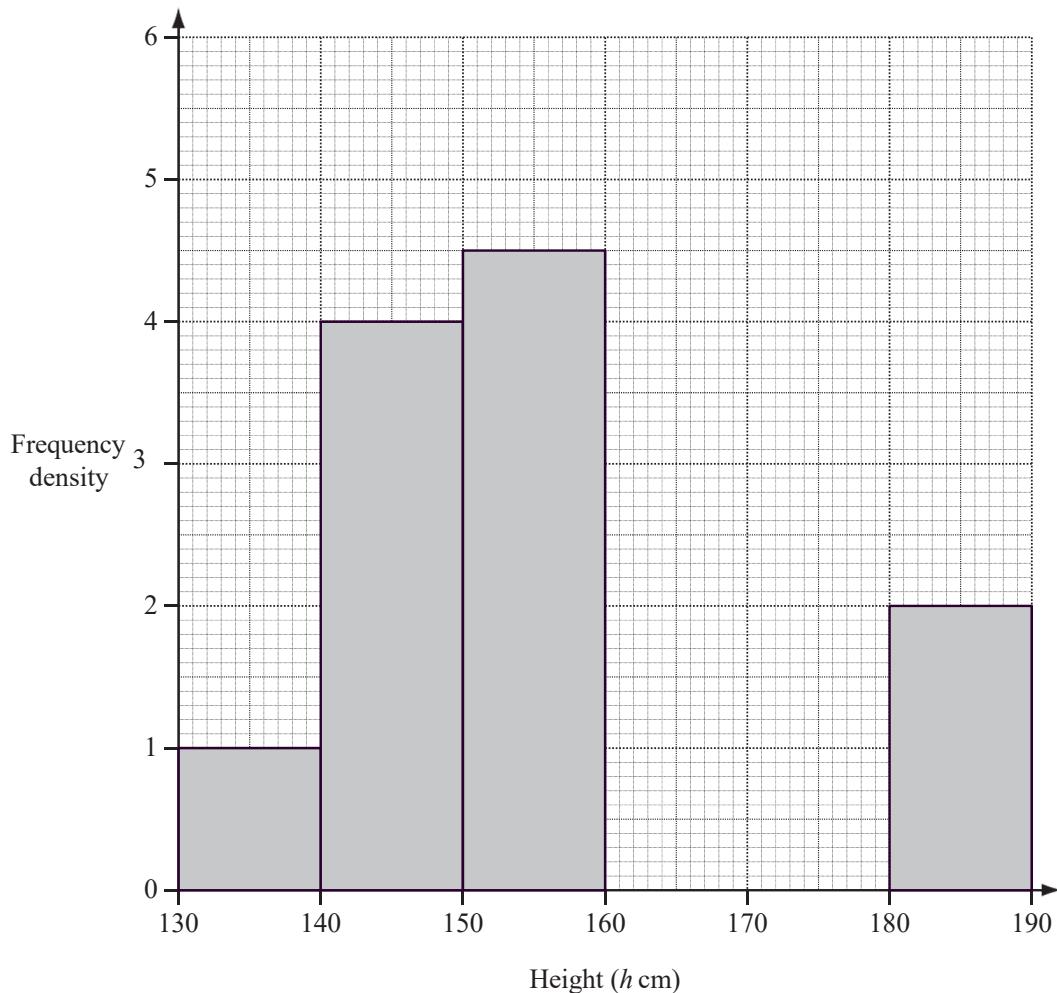
[3]

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

| Height (h cm) | $130 < h \leq 140$ | $140 < h \leq 150$ | $150 < h \leq 160$ | $160 < h \leq 165$ | $165 < h \leq 170$ | $170 < h \leq 180$ | $180 < h \leq 190$ |
|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Frequency | 10 | 40 | 45 | 20 | | | |

[2]

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

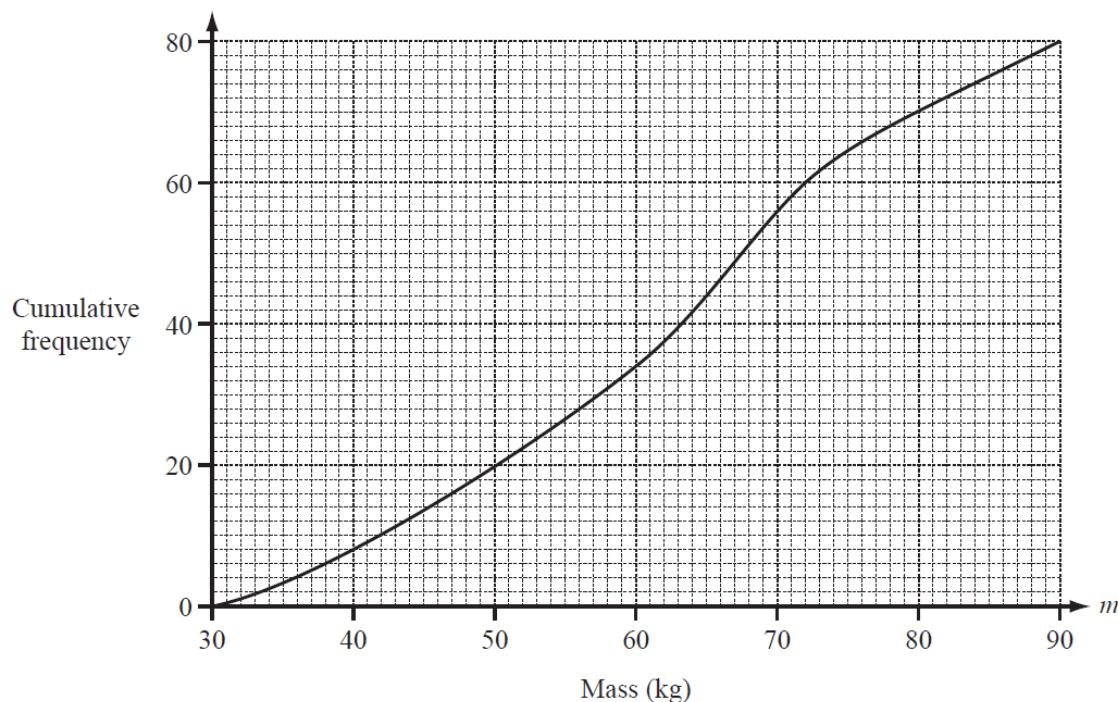


[3]

Question 5

80 boys each had their mass, m kilograms, recorded.

The cumulative frequency diagram shows the results.



(a) Find

[1]

(i) the median,

(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 |
|------------------|-----------|
| $30 < m \leq 40$ | 8 |
| $40 < m \leq 50$ | |
| $50 < m \leq 60$ | 14 |
| $60 < m \leq 70$ | 22 |
| $70 < m \leq 80$ | |
| $80 < m \leq 90$ | 10 |

[2]

- (ii) Calculate an estimate of the mean mass.

[4]

Question 6

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]

Question 7

The masses of 60 potatoes are measured.

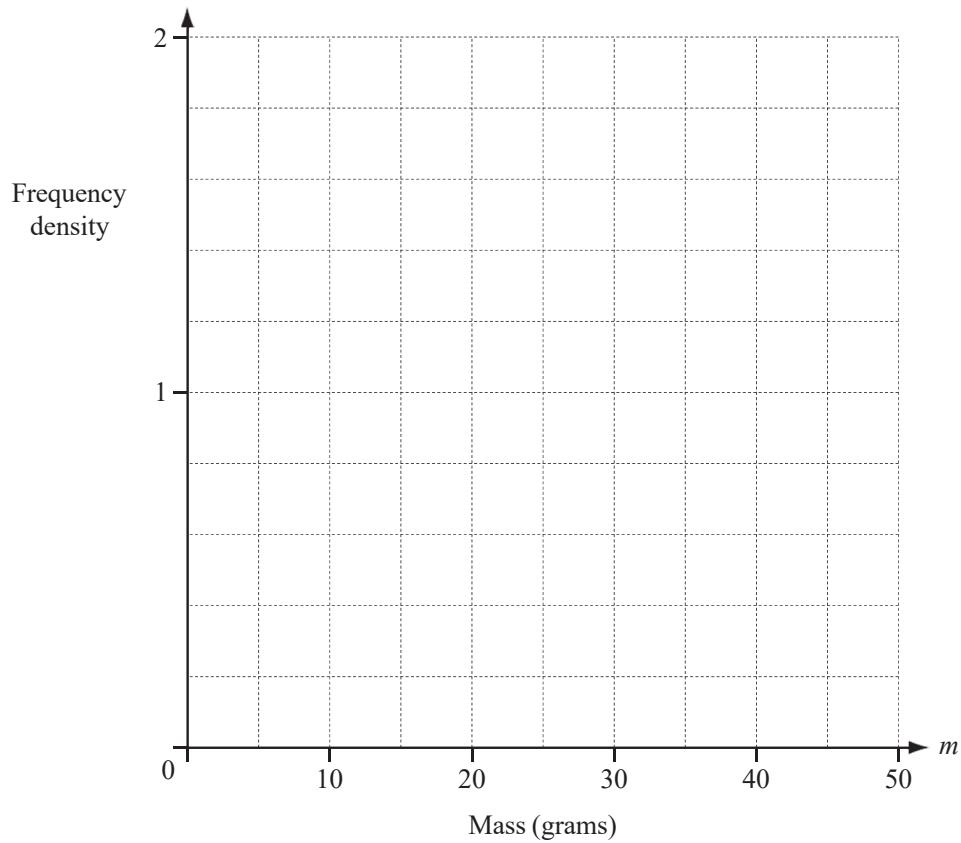
The table shows the results.

| Mass (m grams) | $10 < m \leq 20$ | $20 < m \leq 40$ | $40 < m \leq 50$ |
|-------------------|------------------|------------------|------------------|
| 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]

Question 8

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

The table shows the results.

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

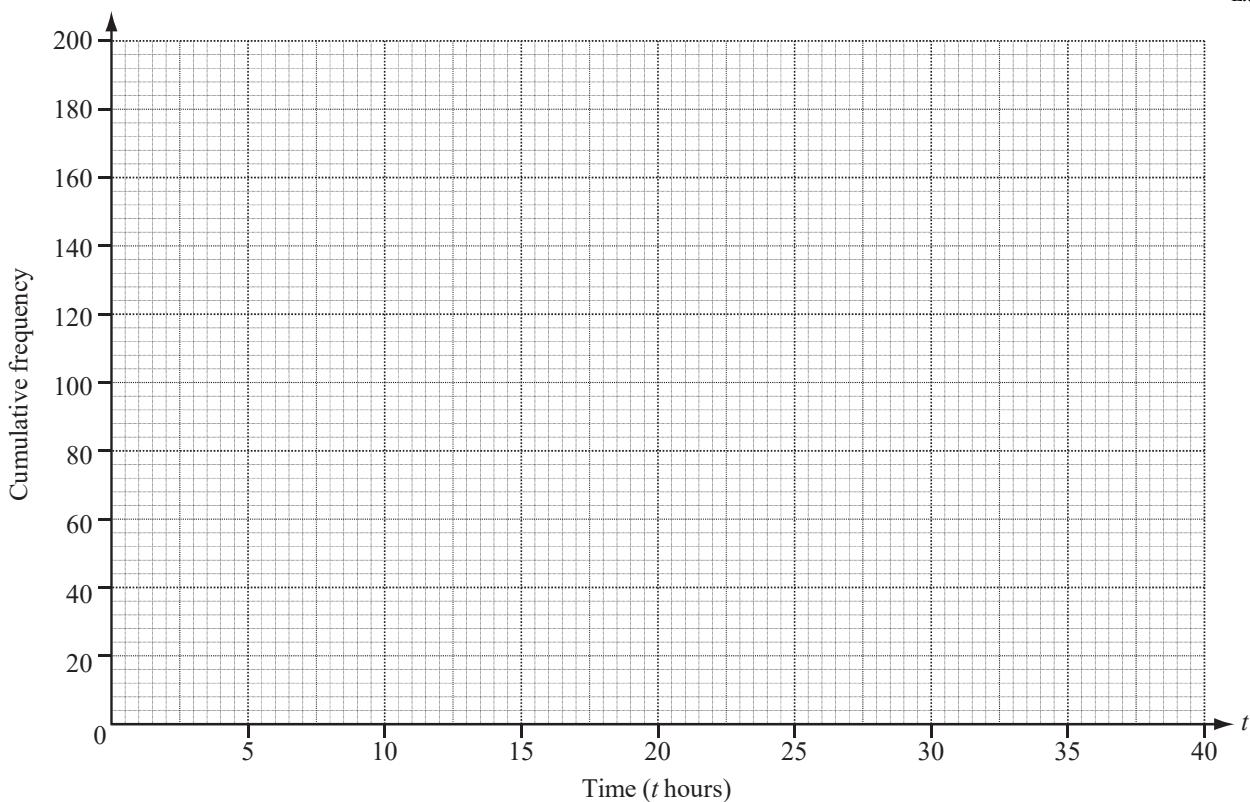
(a) Calculate an estimate of the mean.

[4]

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

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

[1]



- (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]

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 |

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CIE IGCSE Maths (0980)

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

Question 1

- (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 |

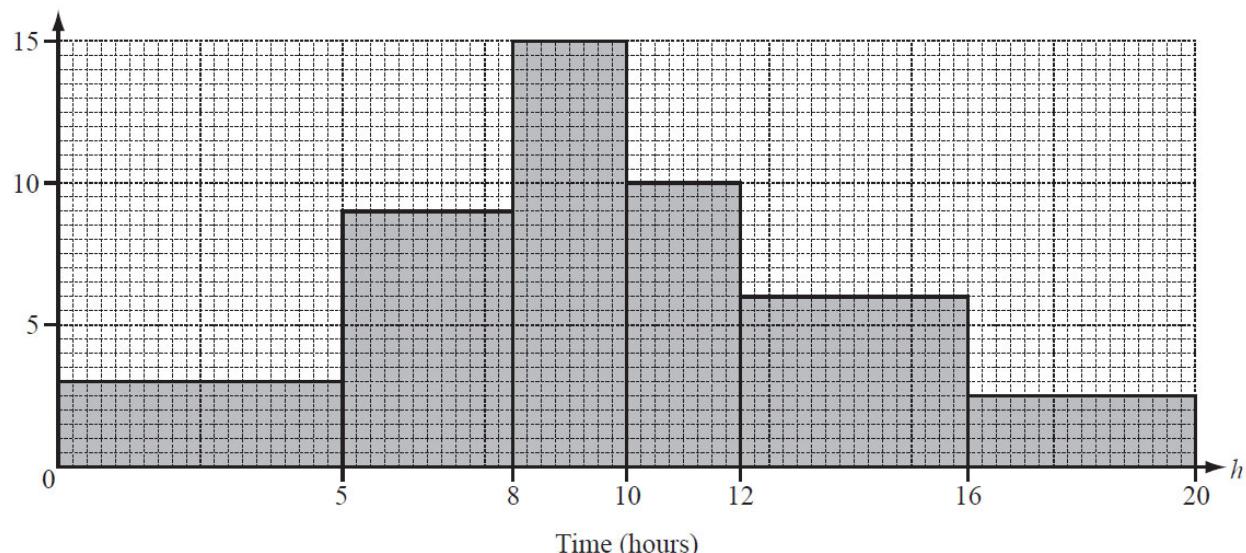
Find the mode, the median and the mean for the number of books borrowed.

[6]

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

The histogram shows the results.

Frequency
density



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

| Number of hours (h) | $0 < h \leq 5$ | $5 < h \leq 8$ | $8 < h \leq 10$ | $10 < h \leq 12$ | $12 < h \leq 16$ | $16 < h \leq 20$ |
|-------------------------|----------------|----------------|-----------------|------------------|------------------|------------------|
| 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) | $4.0 < t \leq 4.5$ | $4.5 < t \leq 5.0$ | $5.0 < t \leq 5.5$ | $5.5 < t \leq 6.0$ | $6.0 < t \leq 6.5$ | $6.5 < t \leq 7.0$ |
|------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Frequency | 2 | 7 | 8 | 18 | 10 | 5 |

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

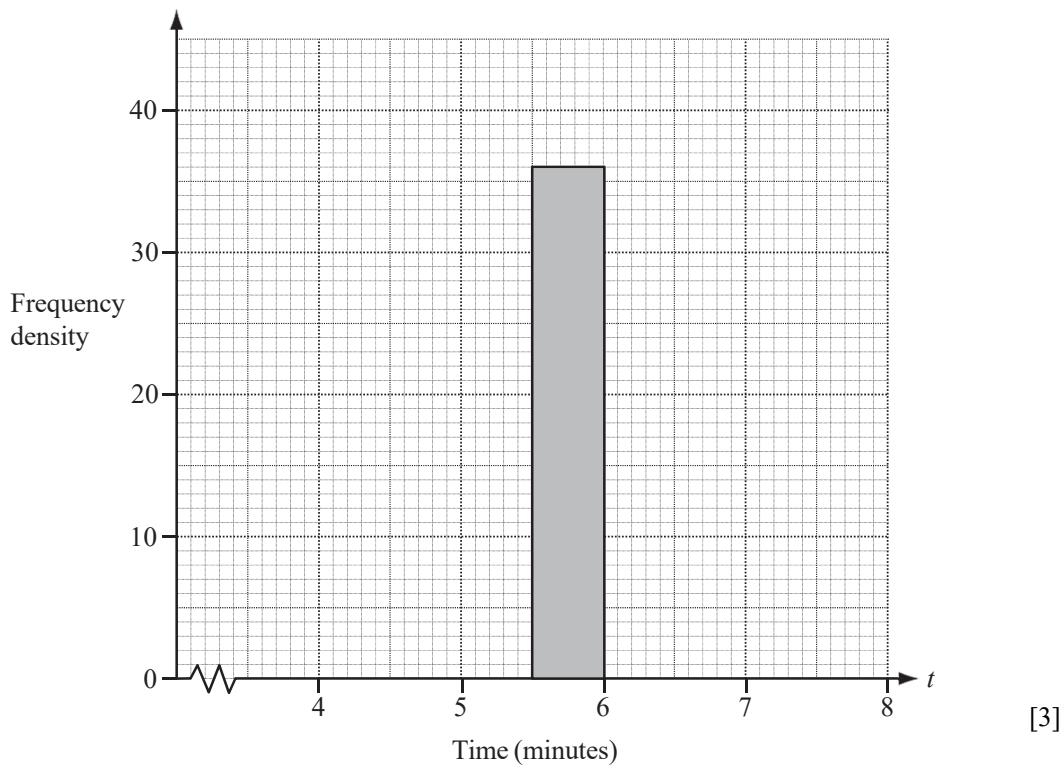
(b) Calculate an estimate of the mean time. [4]

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

| Time (t minutes) | $4.0 < t \leq 5.5$ | $5.5 < t \leq 6.0$ | $6.0 < t \leq 7.0$ |
|------------------------|--------------------|--------------------|--------------------|
| 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.



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

Question 3

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]

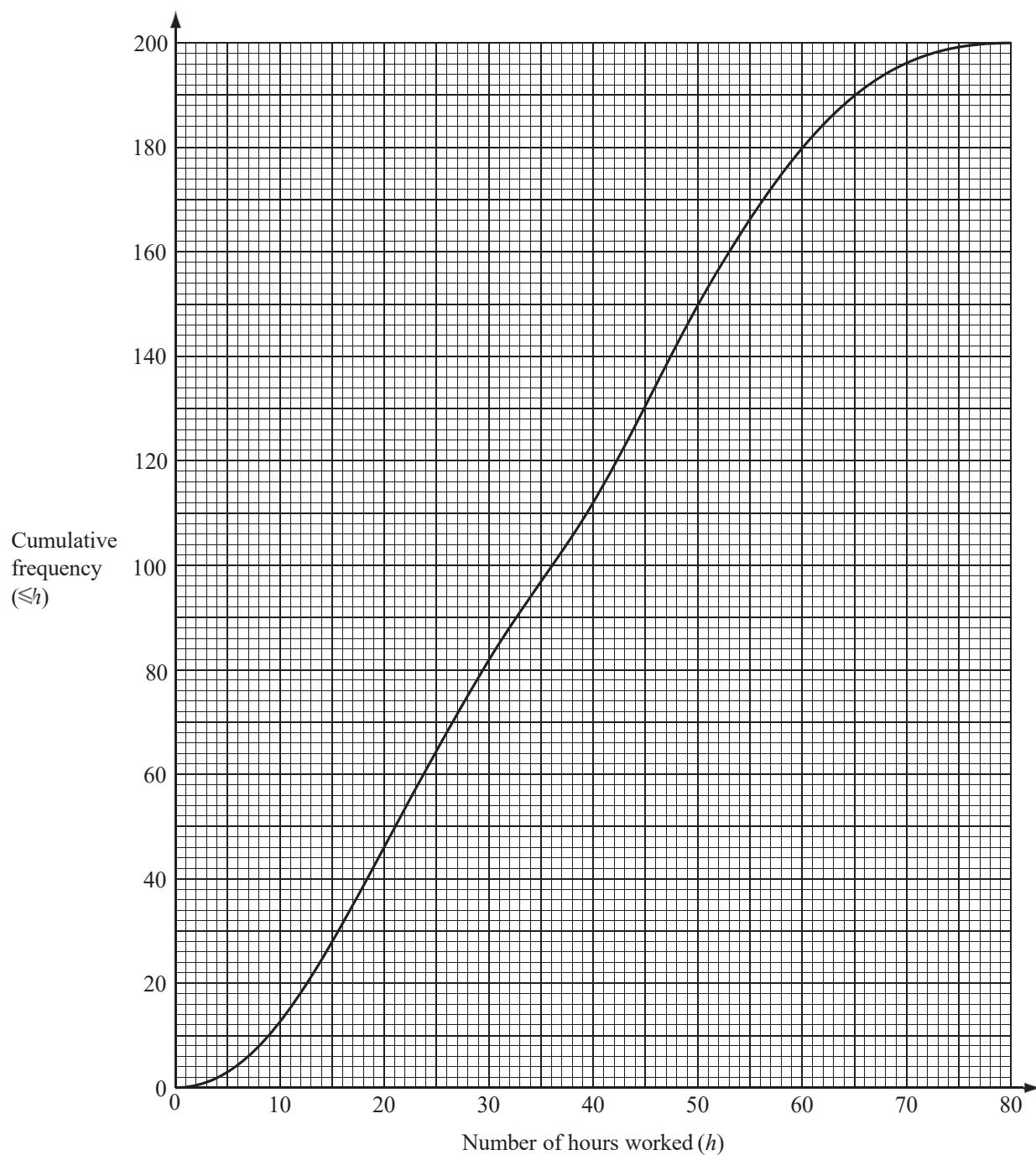
(d) The die is then rolled another 10 times.

The mean score for the 60 rolls is 2.95.

Calculate the mean score for the extra 10 rolls.

[3]

Question 4



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) | $0 < h \leq 10$ | $10 < h \leq 20$ | $20 < h \leq 30$ | $30 < h \leq 40$ | $40 < h \leq 50$ | $50 < h \leq 60$ | $60 < h \leq 70$ | $70 < h \leq 80$ |
|----------------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 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) | $0 < h \leq 30$ | $30 < h \leq 40$ | $40 < h \leq 50$ | $50 < h \leq 80$ |
|----------------------|-----------------|------------------|------------------|------------------|
| Frequency | 82 | 30 | 38 | 50 |

When she draws a histogram, the height of the column for the interval $30 < h \leq 40$ is 9 cm.

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

Question 5

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 |
|-------------------------------|------------------|
| $0 < x \leq 0.5$ | 8 |
| $0.5 < x \leq 1$ | 27 |
| $1 < x \leq 1.5$ | 45 |
| $1.5 < x \leq 2$ | 50 |
| $2 < x \leq 2.5$ | 39 |
| $2.5 < x \leq 3$ | 21 |
| $3 < x \leq 3.5$ | 7 |
| $3.5 < x \leq 4$ | 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 40th 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]

Question 6

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

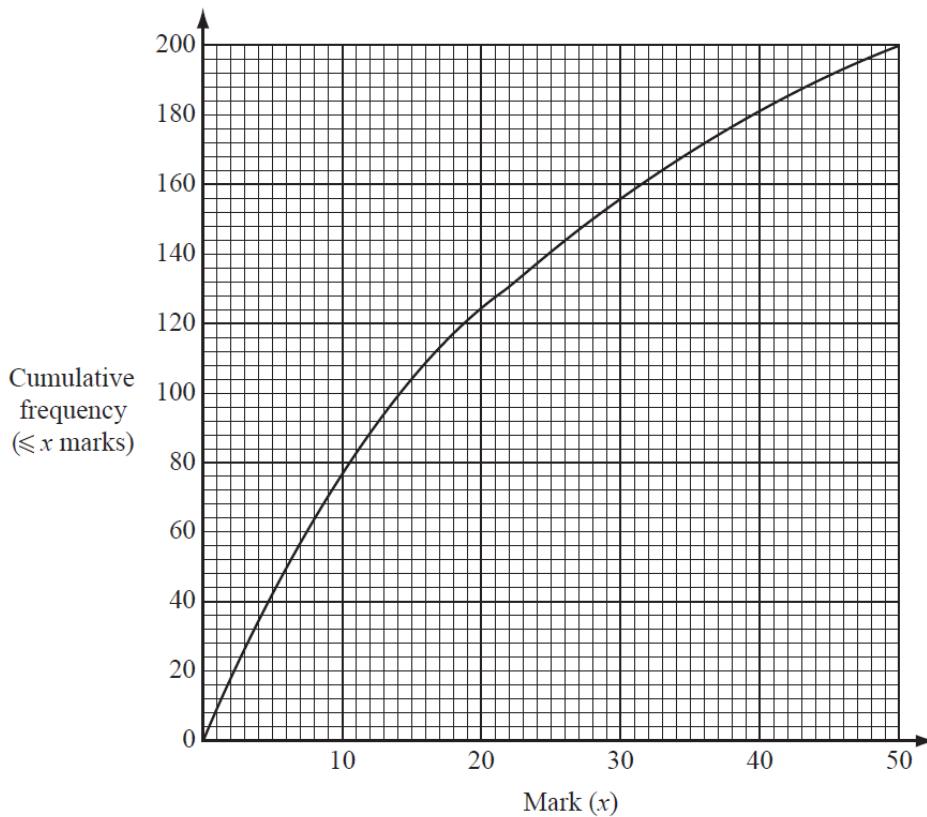
| | | | | |
|--------------------------------|---|---|-----|---|
| Quiz score | 6 | 7 | 8 | 9 |
| Frequency (number of students) | 9 | 3 | a | 5 |

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.

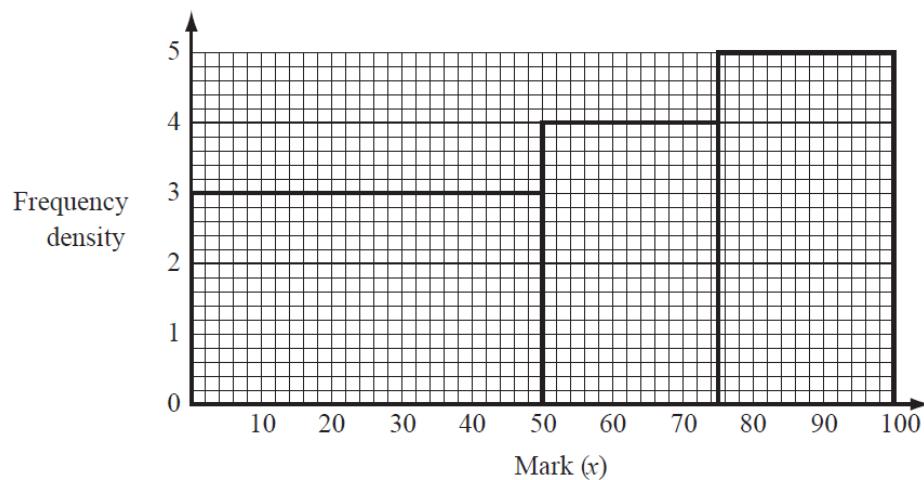


Write down

- (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 $0 < x \leq 50$? [1]
- (ii) How many students score marks in the range $75 < x \leq 100$? [1]
- (iii) Calculate an estimate of the mean mark of this group of students. [4]

Question 7

(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]

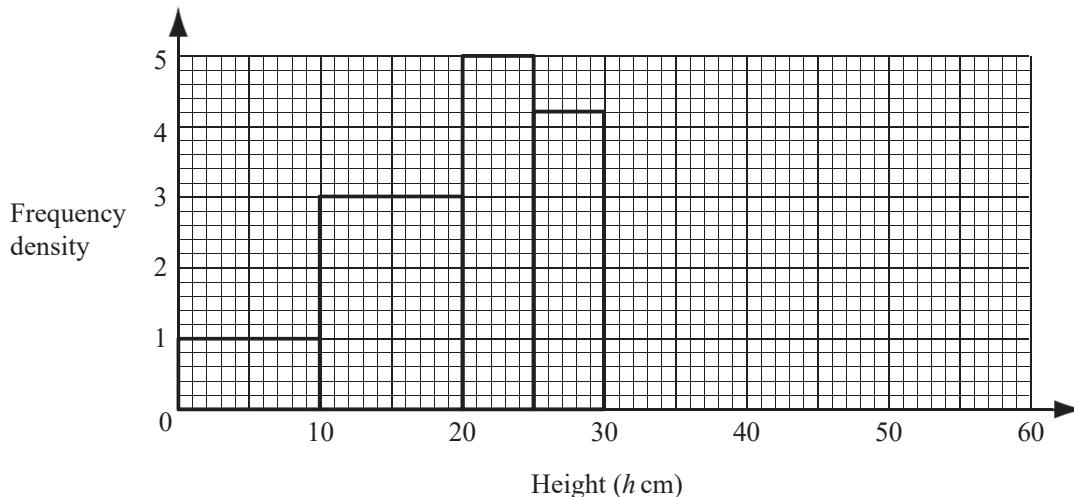
(ii) Write down the lower quartile mark.

[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 $20 < h \leq 25$.

How many flowers are there in the intervals

(a) $25 < h \leq 30$,

[1]

(b) $10 < h \leq 20$?

[1]

(ii) There are 42 flowers in the interval $30 < h \leq 60$.

This can be shown by a single bar on the histogram.

Calculate the height of this bar.

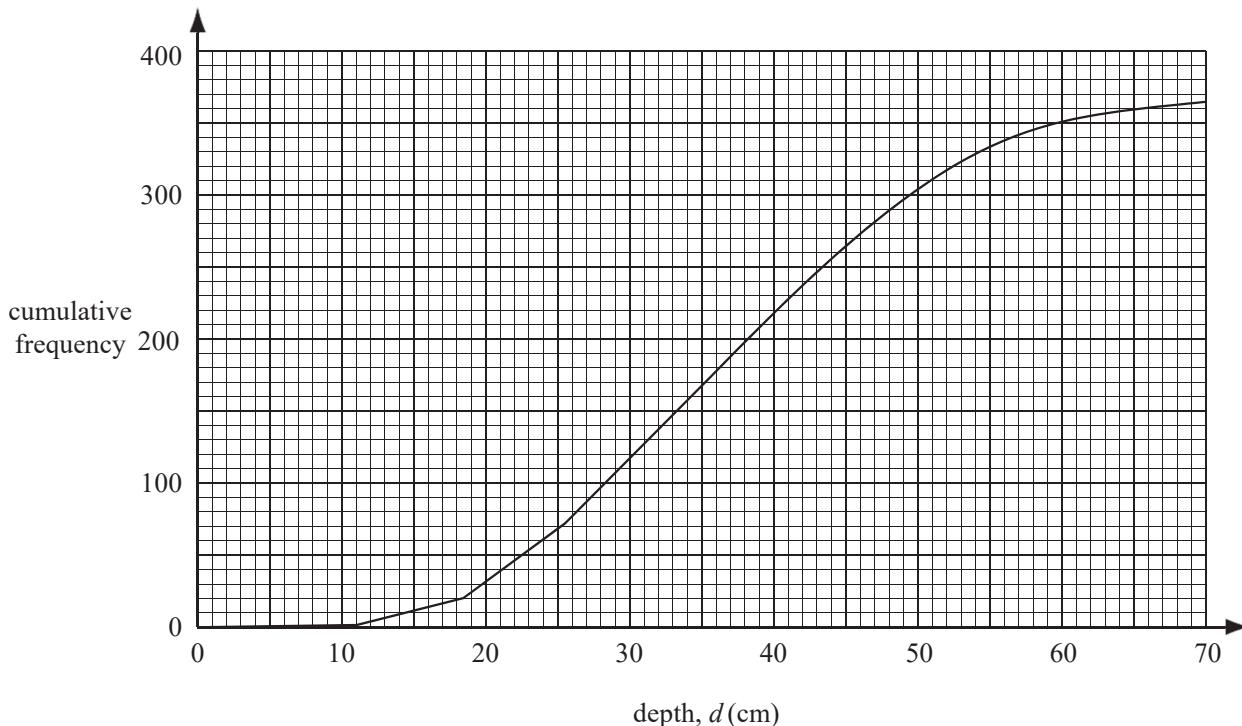
[2]

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

[3]

Question 8

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 | $0 < d \leq 10$ | $10 < d \leq 20$ | $20 < d \leq 30$ | $30 < d \leq 40$ | $40 < d \leq 50$ | $50 < d \leq 60$ | $60 < d \leq 70$ |
|----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 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 | $0 < d \leq 20$ | $20 < d \leq 40$ | $40 < d \leq 70$ |
|----------------|-----------------|------------------|------------------|
| Number of days | 58 | 160 | 147 |

A histogram was drawn to show this information.

The height of the column for the interval $20 < d \leq 40$ was 8cm.

Calculate the height of each of the other two columns.

[Do not draw the histogram.]

[3]

Statistics

Difficulty: Hard

Question Paper 1

| | |
|------------|-------------------|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Statistics |
| Paper | Paper 4 |
| Difficulty | Hard |
| Booklet | Question Paper 1 |

Time allowed: 107 minutes

Score: /93

Percentage: /100

Grade Boundaries:

CIE IGCSE Maths (0580)

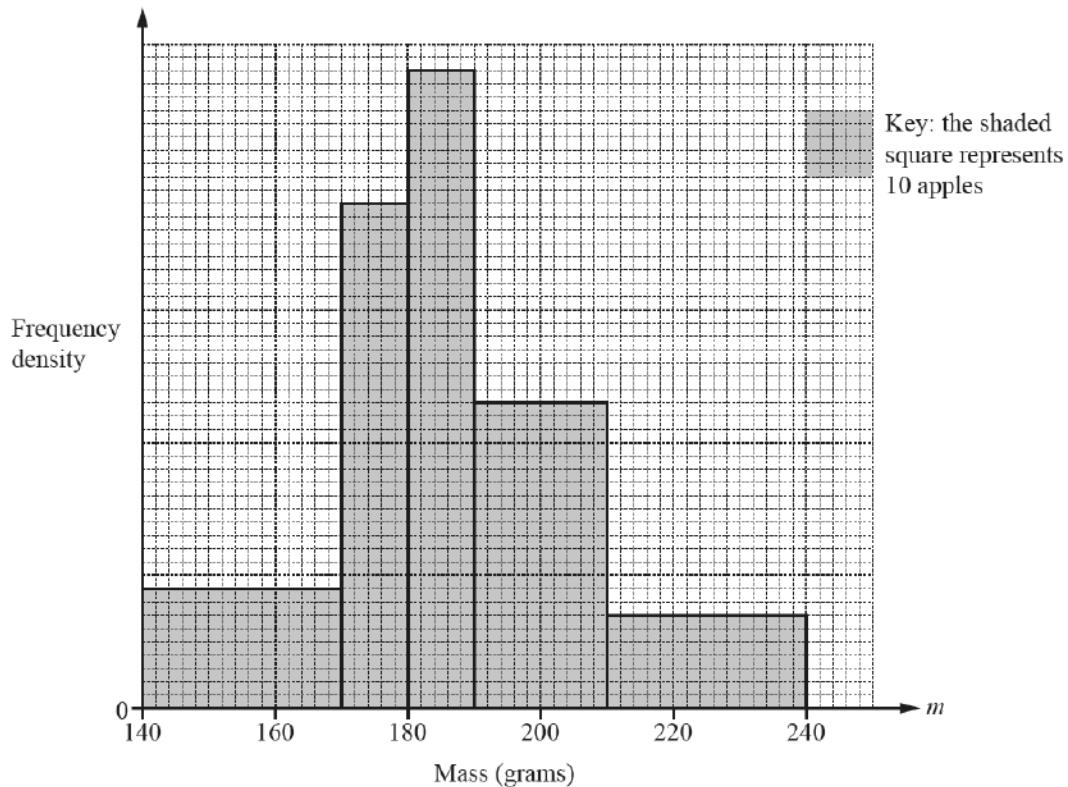
| A* | A | B | C | D |
|------|-----|-----|-----|-----|
| >83% | 67% | 51% | 41% | 31% |

CIE IGCSE Maths (0980)

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

Question 1

The histogram shows the distribution of the masses, m grams, of 360 apples.



(a) Use the histogram to complete the frequency table.

[3]

| Mass (m grams) | Number of apples |
|--------------------|------------------|
| $140 < m \leq 170$ | |
| $170 < m \leq 180$ | |
| $180 < m \leq 190$ | |
| $190 < m \leq 210$ | 92 |
| $210 < m \leq 240$ | 42 |

(b) Calculate an estimate of the mean mass of the 360 apples.

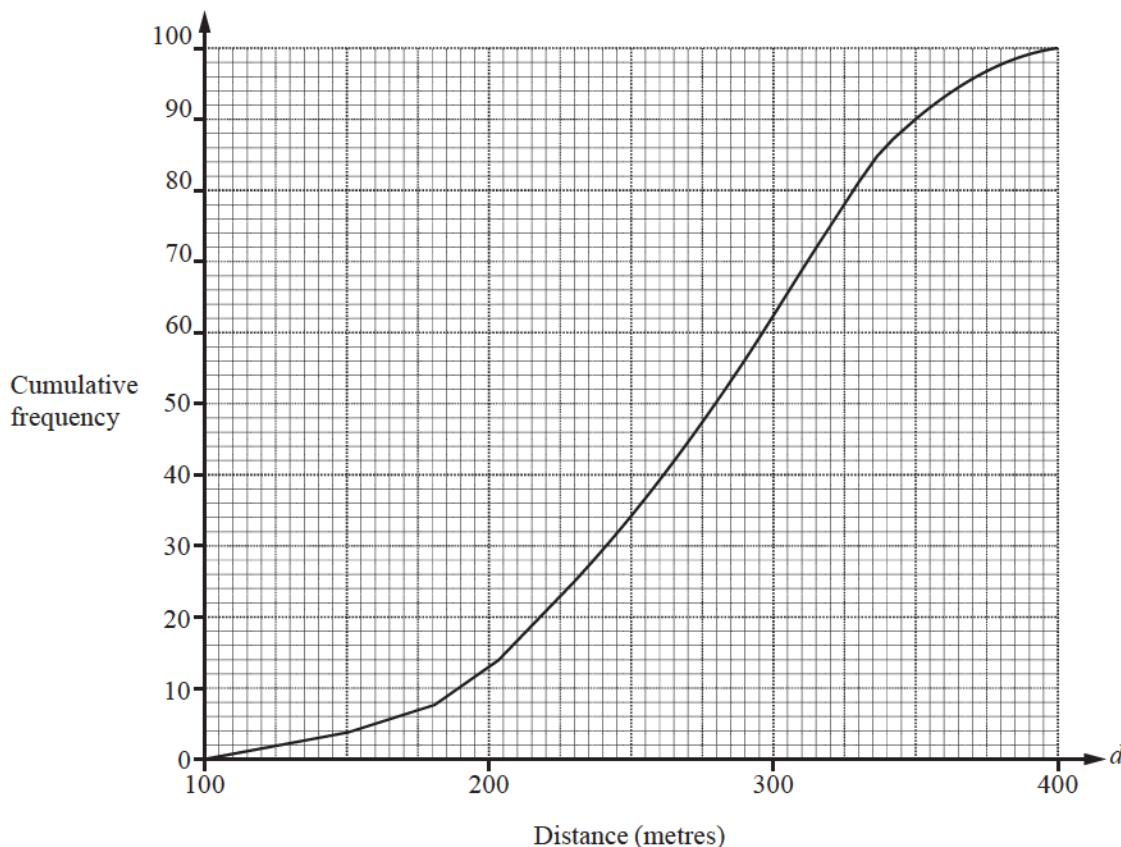
[4]

Question 2

- (a) There are 100 students in group A .

The teacher records the distance, d metres, each student runs in one minute.

The results are shown in the cumulative frequency diagram.



Find

- (i) the median, [1]

- (ii) the upper quartile, [1]

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

- (iv) the number of students who run more than 350m. [2]

(b) There are 100 students in group B .

The teacher records the distance, d metres, each of these students runs in one minute.

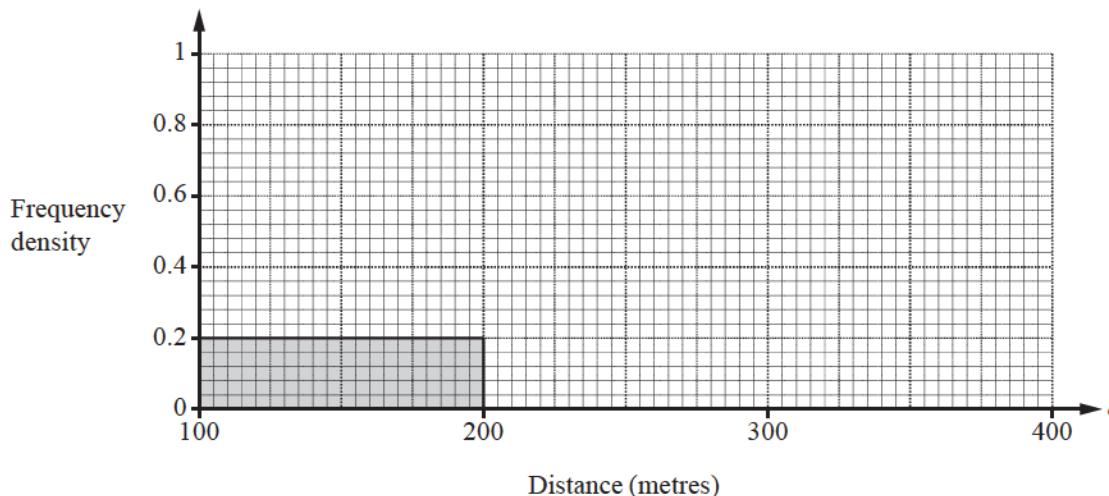
The results are shown in the frequency table.

| Distance (d metres) | $100 < d \leq 200$ | $200 < d \leq 250$ | $250 < d \leq 280$ | $280 < d \leq 320$ | $320 < d \leq 400$ |
|------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Number of students | 20 | 22 | 30 | 16 | 12 |

(i) Calculate an estimate of the mean distance for group B .

[4]

(ii) Complete the histogram to show the information in the frequency table.



[4]

(c) For the 100 students in group B , the median is 258m.

Complete the statement.

On average, the students in group A run than the students in group B .

[1]

Question 3

The time taken for each of 90 cars to complete one lap of a race track is shown in the table.

| Time (t seconds) | $70 < t \leq 71$ | $71 < t \leq 72$ | $72 < t \leq 73$ | $73 < t \leq 74$ | $74 < t \leq 75$ |
|---------------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 17 | 24 | 21 | 18 | 10 |

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

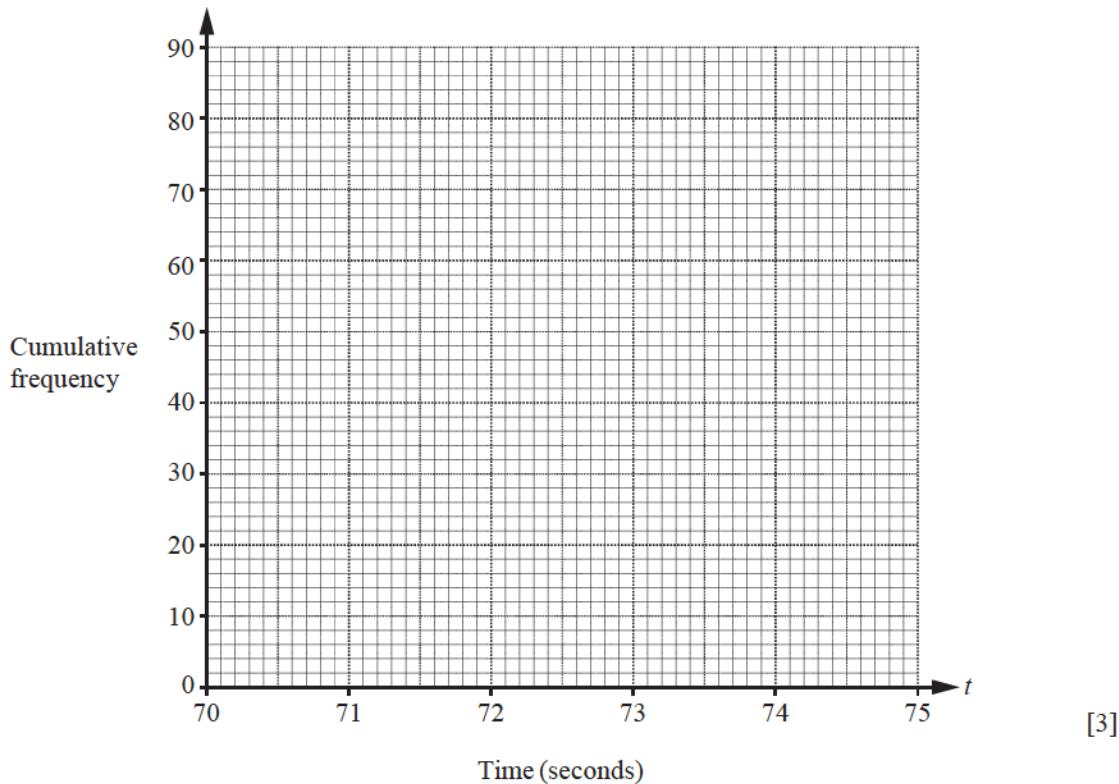
(b) Calculate an estimate of the mean time. [4]

(c) (i) Complete the cumulative frequency table.

| Time (t seconds) | $t \leq 71$ | $t \leq 72$ | $t \leq 73$ | $t \leq 74$ | $t \leq 75$ |
|----------------------|-------------|-------------|-------------|-------------|-------------|
| Cumulative frequency | 17 | | | | |

[2]

- (ii) On the grid, draw a cumulative frequency diagram to show this information.



- (iii) Find the median time.

[1]

- (iv) Find the inter-quartile range.

[2]

- (d) One lap of the race track measures 3720 metres, correct to the nearest 10 metres. A car completed the lap in 75 seconds, correct to the nearest second.

Calculate the upper bound for the average speed of this car. Give your answer in kilometres per hour.

[4]

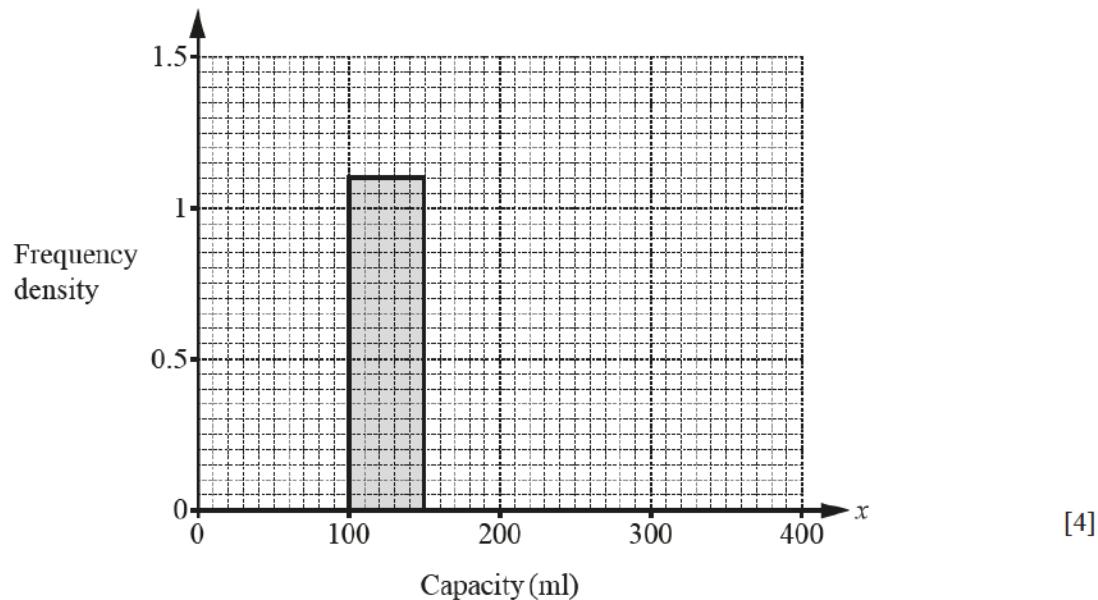
Question 4

- (a) 200 students estimate the capacity, x millilitres, of a cup.
The results are shown in the frequency table.

| Capacity (x ml) | $0 < x \leq 100$ | $100 < x \leq 150$ | $150 < x \leq 200$ | $200 < x \leq 250$ | $250 < x \leq 400$ |
|--------------------|------------------|--------------------|--------------------|--------------------|--------------------|
| Frequency | 20 | 55 | 66 | 35 | 24 |

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

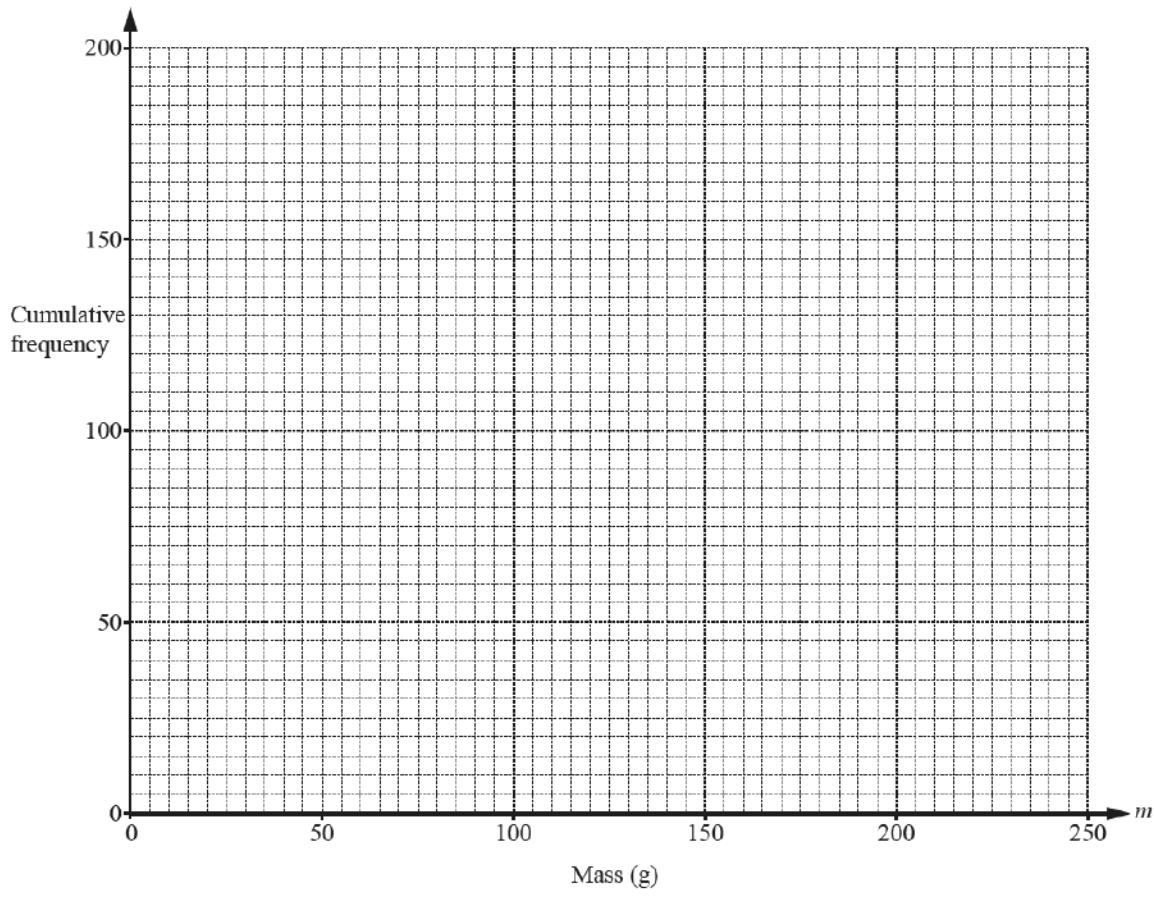
(ii) Complete the histogram.



- (b) The 200 students also estimate the mass, m grams, of a small rock.
 The results are shown in the cumulative frequency table.

| Mass (m grams) | $m \leq 50$ | $m \leq 100$ | $m \leq 150$ | $m \leq 200$ | $m \leq 250$ |
|----------------------|-------------|--------------|--------------|--------------|--------------|
| Cumulative frequency | 28 | 64 | 104 | 168 | 200 |

- (i) On the grid, draw a cumulative frequency diagram.



[3]

- (ii) Find

- (a) the 65th percentile,

[1]

- (b) the number of students who estimated more than 75 g.

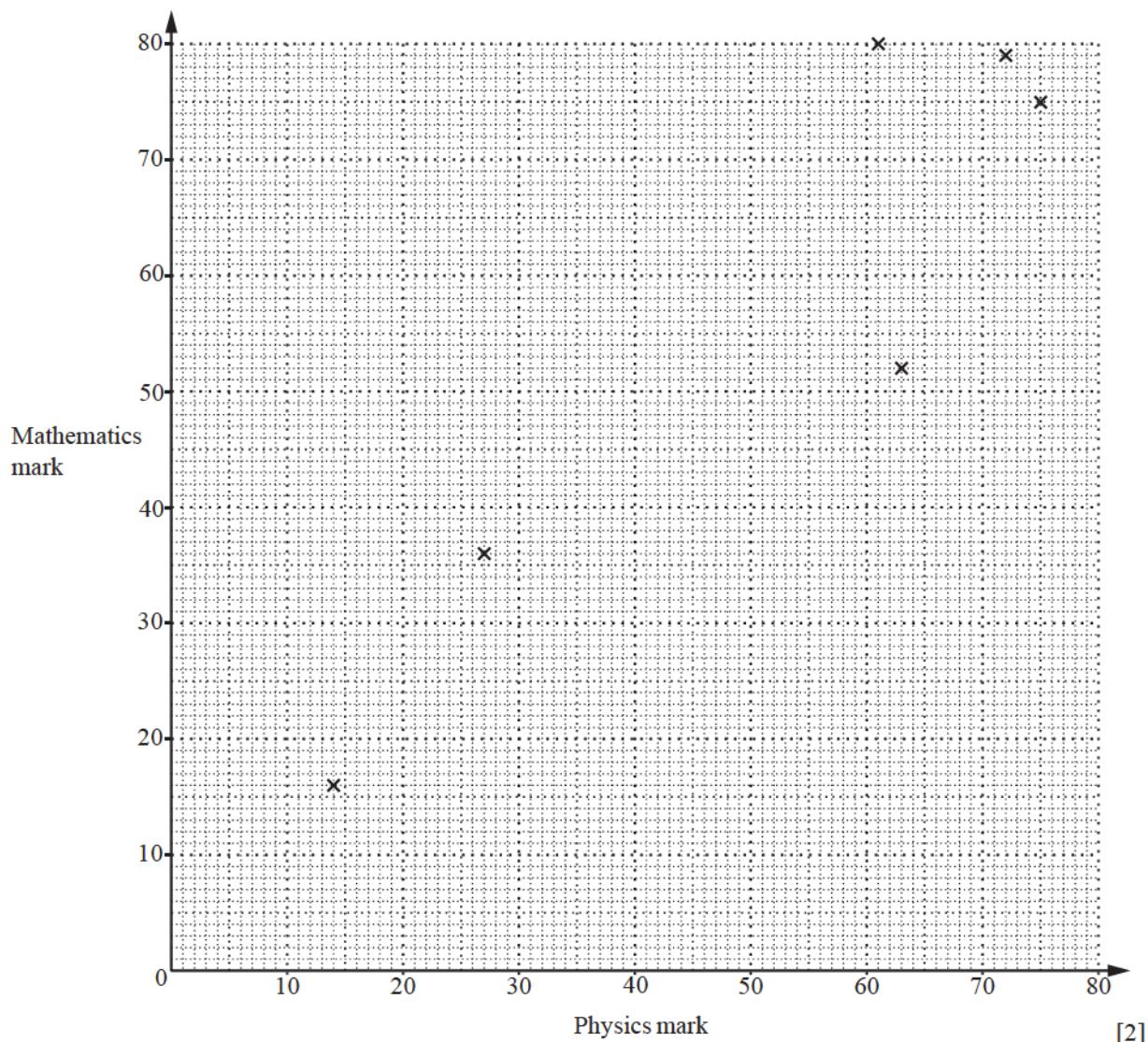
[2]

Question 5

(a) The table shows the marks gained by 10 students in their physics test and their mathematics test.

| | | | | | | | | | | |
|------------------|----|----|----|----|----|----|----|----|----|----|
| Physics mark | 63 | 61 | 14 | 27 | 72 | 75 | 44 | 40 | 28 | 50 |
| Mathematics mark | 52 | 80 | 16 | 36 | 79 | 75 | 51 | 35 | 24 | 63 |

- (i) Complete the scatter diagram below.
The first six points have been plotted for you.



[2]

- (ii) What type of correlation is shown in the scatter diagram?

[1]

- (b) The marks of 30 students in a spelling test are shown in the table below.

| Mark | 0 | 1 | 2 | 3 | 4 | 5 |
|-----------|---|---|---|---|---|---|
| Frequency | 2 | 4 | 5 | 5 | 6 | 8 |

Find the mean, median, mode and range of these marks.

[7]

- (c) The table shows the marks gained by some students in their English test.

| | | | |
|--------------------|-----|----|----|
| Mark | 52 | 75 | 91 |
| Number of students | x | 45 | 11 |

The mean mark for these students is 70.3 .

Find the value of x .

[3]

Question 6

The table shows information about the time taken by 400 people to complete a race.

| Time taken (m minutes) | $45 < m \leq 50$ | $50 < m \leq 60$ | $60 < m \leq 70$ | $70 < m \leq 90$ | $90 < m \leq 100$ | $100 < m \leq 120$ |
|------------------------------|------------------|------------------|------------------|------------------|-------------------|--------------------|
| Frequency | 23 | 64 | 122 | 136 | 26 | 29 |

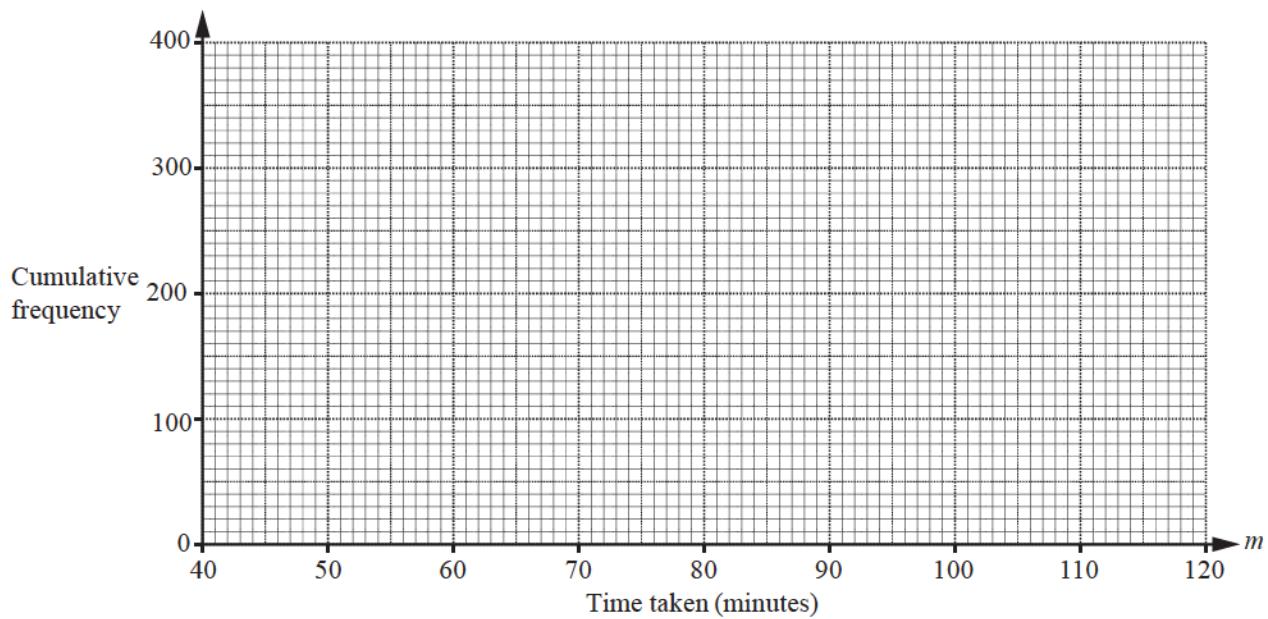
- (a) Calculate an estimate of the mean timetaken. [4]

- (b) (i) Complete the cumulative frequency table. [2]

| Time taken (m minutes) | $m \leq 50$ | $m \leq 60$ | $m \leq 70$ | $m \leq 90$ | $m \leq 100$ | $m \leq 120$ |
|------------------------------|-------------|-------------|-------------|-------------|--------------|--------------|
| Cumulative frequency | 23 | | | | | 400 |

- (ii) On the grid, draw a cumulative frequency diagram to show this information.

[3]



- (iii) Use your diagram to estimate

- (a) the median,

[1]

- (b) the inter-quartile range,

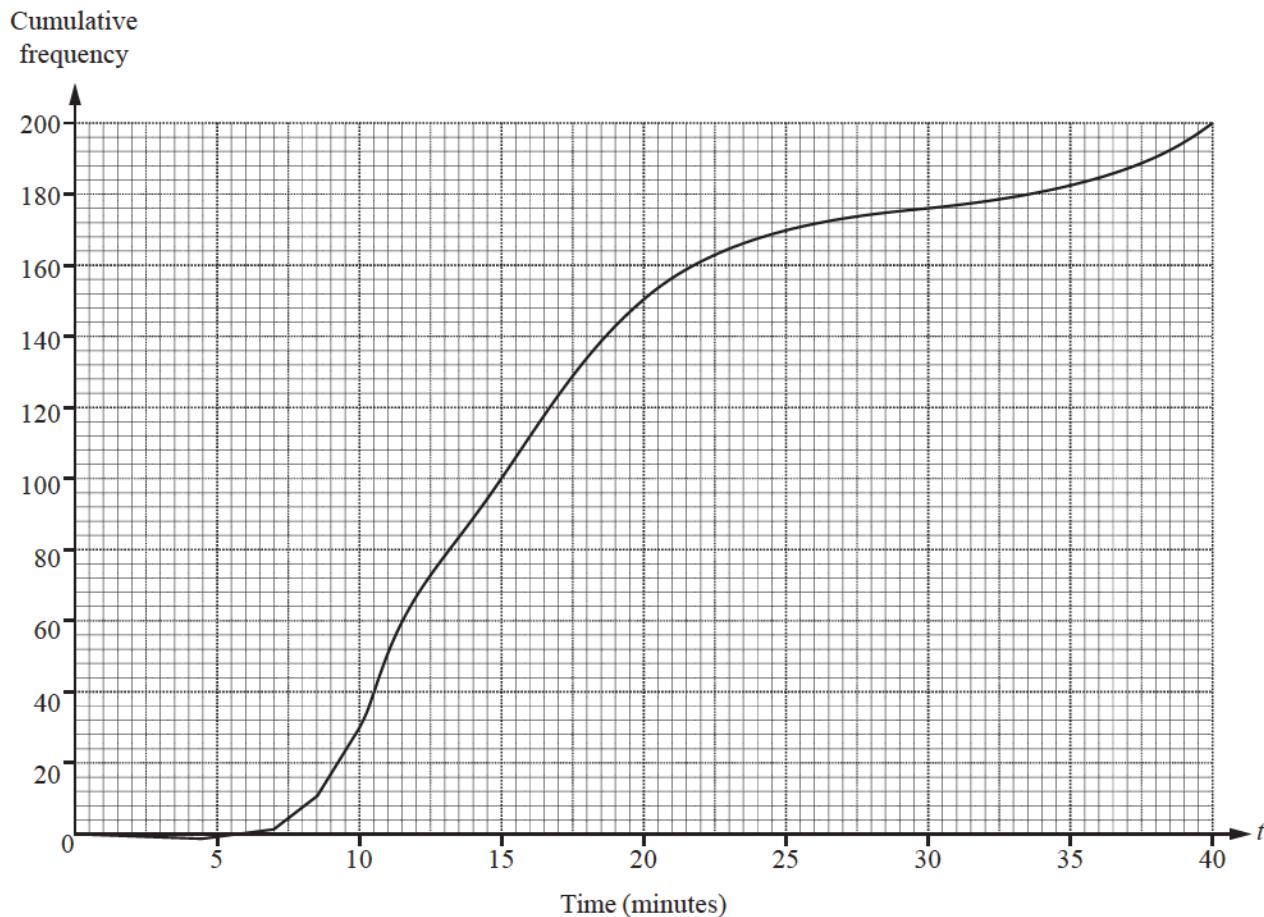
[2]

- (c) the 60th percentile.

[2]

Question 7

- (a) 200 students record the time, t minutes, for their journey from home to school.
The cumulative frequency diagram shows the results.



Find

(i) the median, [1]

(ii) the lower quartile, [1]

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

(iv) the 15th percentile, [1]

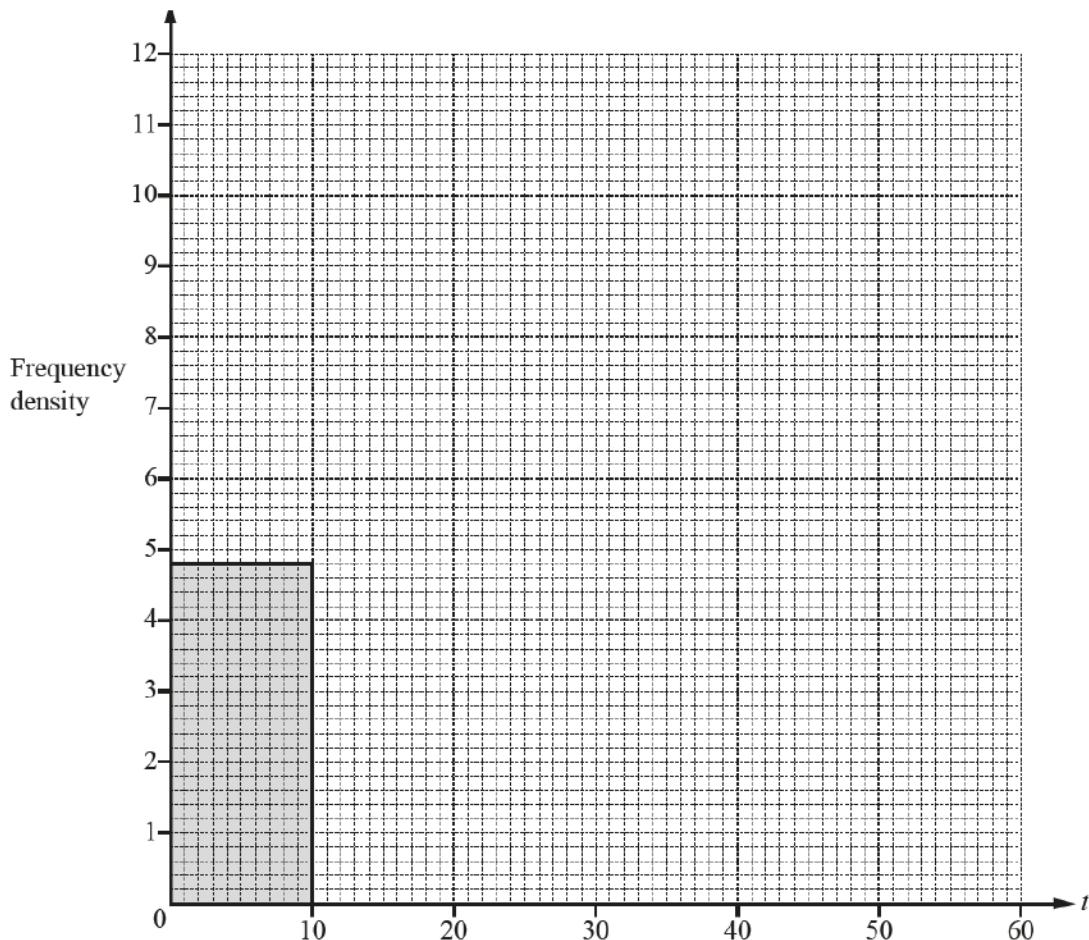
(v) the number of students whose journey time was more than 30 minutes. [2]

- (b) The 200 students record the time, t minutes, for their journey from school to home.
 The frequency table shows the results.

| Time (t minutes) | $0 < t \leq 10$ | $10 < t \leq 15$ | $15 < t \leq 20$ | $20 < t \leq 30$ | $30 < t \leq 60$ |
|---------------------|-----------------|------------------|------------------|------------------|------------------|
| Frequency | 48 | 48 | 60 | 26 | 18 |

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

- (ii) On the grid, complete the histogram to show the information in the frequency table.



Statistics

Difficulty: Hard

Question Paper 2

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

Time allowed: 105 minutes

Score: /91

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% |

Question 1

200 people run 10km.

The table shows some information about the times, t minutes, taken to run the 10km.

| Time (t minutes) | $30 < t \leq 40$ | $40 < t \leq 45$ | $45 < t \leq 50$ | $50 < t \leq 55$ | $55 < t \leq 60$ | $60 < t \leq 80$ |
|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 8 | 22 | 95 | 55 | 14 | 6 |

- (a) Howard takes 40 minutes to run the 10 km.

Calculate his average speed in kilometres per hour.

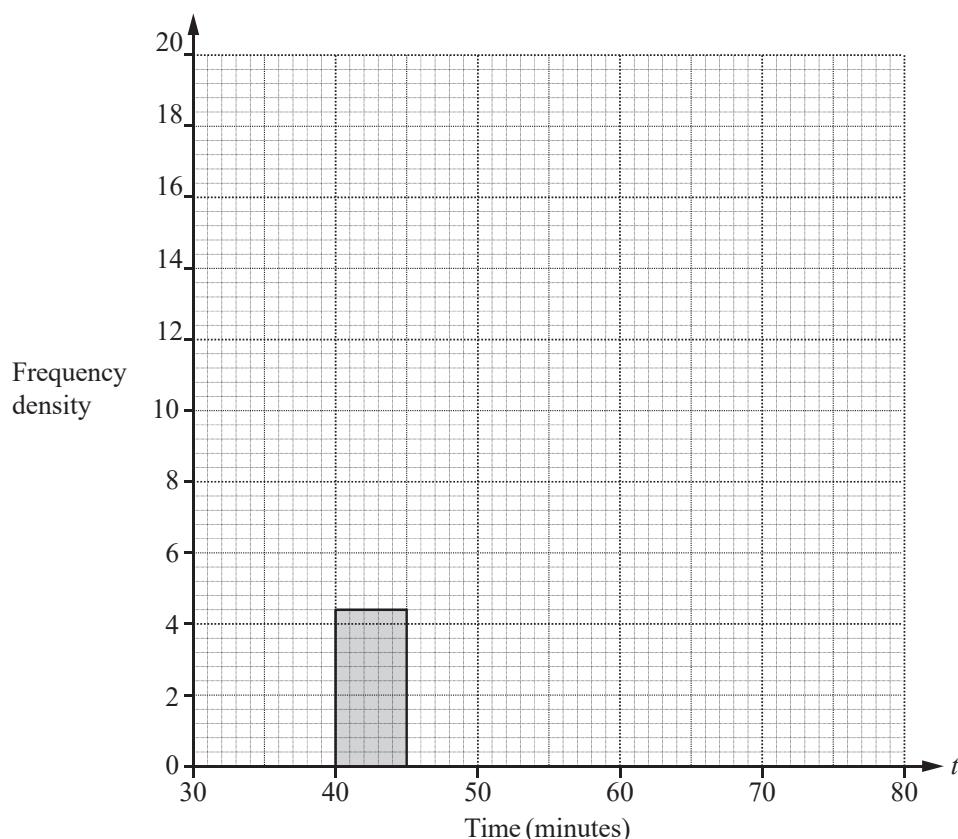
[2]

- (b) Calculate an estimate of the mean time.

[4]

- (c) Complete the histogram to show the information in the table.

[4]

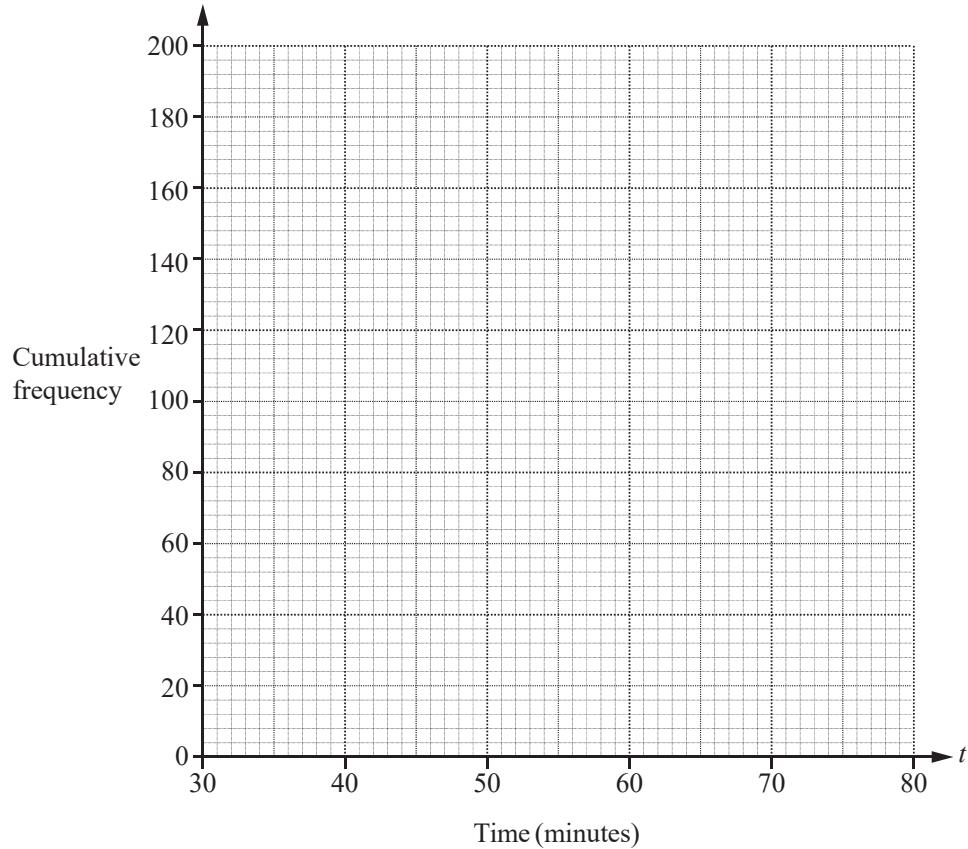


- (d) (i) Use the frequency table opposite to complete the cumulative frequency table.

| Time (t minutes) | $t \leq 40$ | $t \leq 45$ | $t \leq 50$ | $t \leq 55$ | $t \leq 60$ | $t \leq 80$ |
|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Cumulative frequency | 8 | 30 | | | 194 | 200 |

[1]

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



[3]

- (iii) Use your diagram to find

- (a) the median,

[1]

- (b) the 90th percentile,

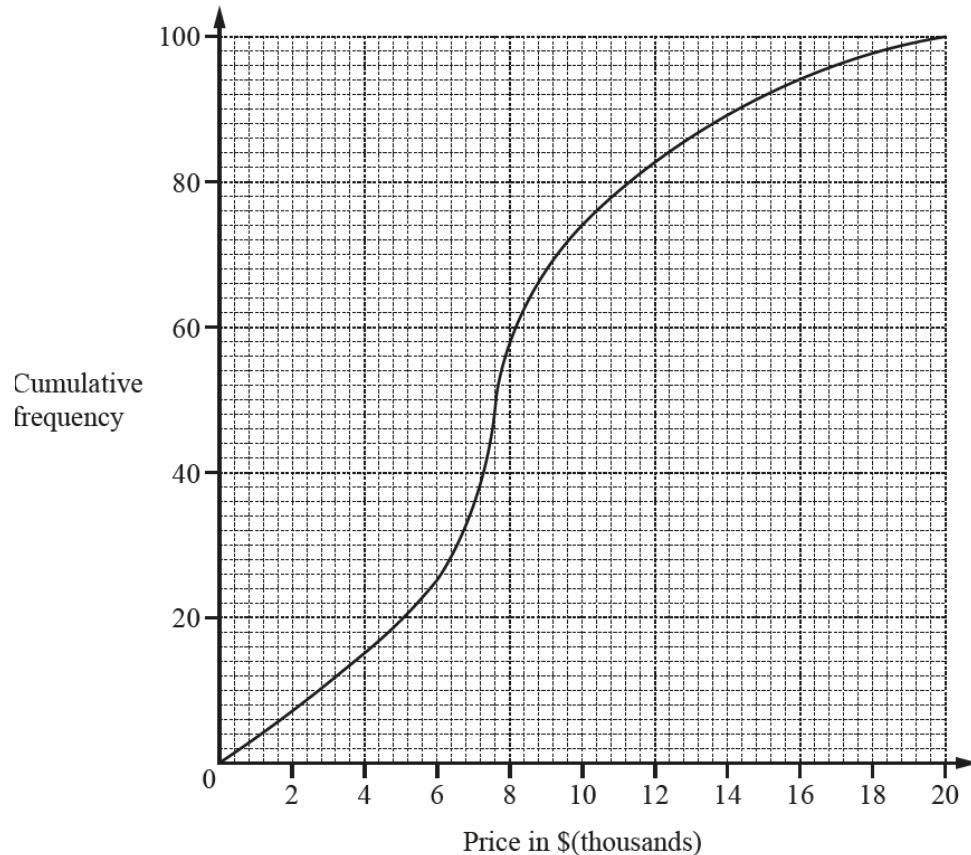
[1]

- (c) the number of people who took more than 58 minutes to run the 10 km.

[2]

Question 2

(a) (i)



The cumulative frequency diagram shows information about the prices of 100 cars on Website A.
Use the information to complete this table.

| Lower quartile | Median | Upper quartile | Inter-quartile range |
|----------------|--------|----------------|----------------------|
| \$ | \$7600 | \$ | \$ |

[2]

(ii) This table shows information about the prices of cars on Website B.

| Lower quartile | Median | Upper quartile | Inter-quartile range |
|----------------|----------|----------------|----------------------|
| \$7600 | \$10 800 | \$13 600 | \$6000 |

Here are two statements comparing the distributions of the prices of cars on Website A and Website B.

For each statement write True or False.

Give a reason for each answer, stating clearly which statistic you use to make your decision.

(a) The prices of cars on Website A are lower than the prices of cars on Website B.

..... because

..... [1]

- (b) A greater percentage of cars have a price more than \$13600 on Website A compared to Website B.

..... because

..... [1]

- (b) The table shows the prices of cars on Website B.

| Price (\$P) | Number of cars |
|------------------------|----------------|
| $0 < P \leq 6000$ | 9 |
| $6000 < P \leq 8000$ | 29 |
| $8000 < P \leq 10000$ | 20 |
| $10000 < P \leq 12000$ | 14 |
| $12000 < P \leq 14000$ | 21 |
| $14000 < P \leq 22000$ | 27 |

Calculate an estimate of the mean price of the 120 cars.

[4]

- (c) The price of a car is \$8760.

Bryan pays a deposit of 25% of this price and then 24 equal monthly payments.
After 24 months, he will have paid a total of \$9948.

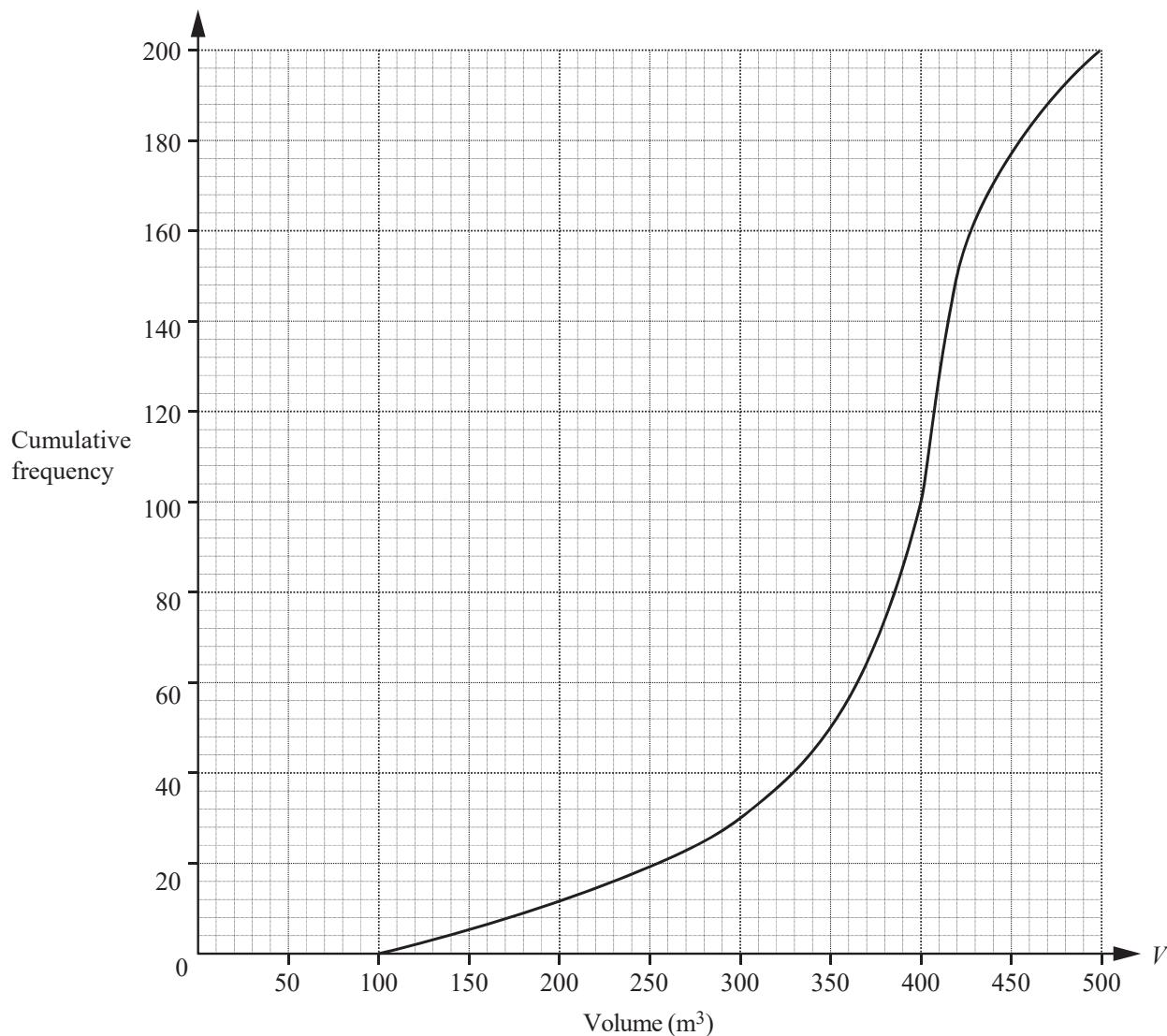
Calculate the cost of one monthly payment.

[3]

Question 3

- (a) 200 students estimate the volume, $V \text{ m}^3$, of a classroom.

The cumulative frequency diagram shows their results.



Find

- (i) the median, [1]

- (ii) the lower quartile, [1]

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

- (iv) the number of students who estimate that the volume is greater than 300m^3 . [2]

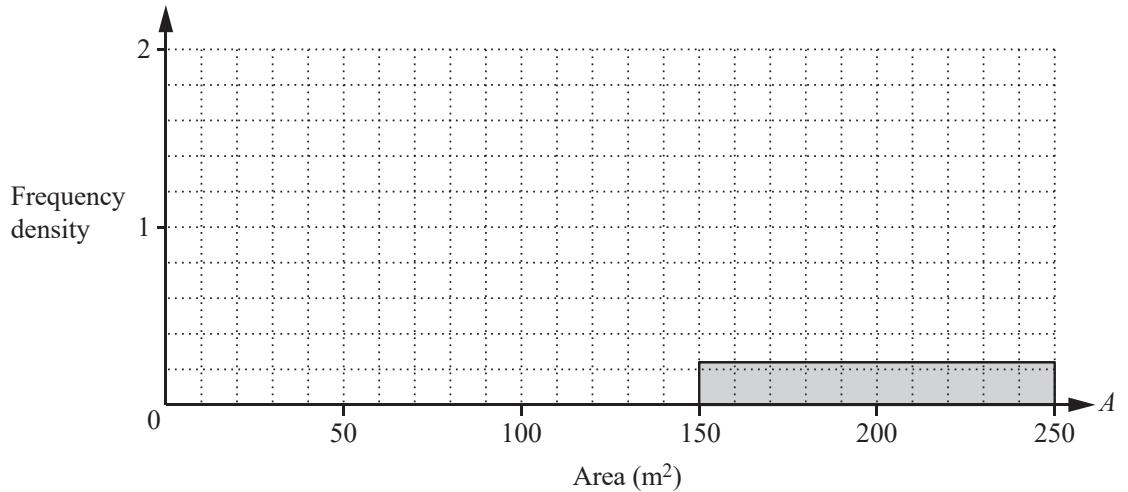
- (b) The 200 students also estimate the total area, $A \text{ m}^2$, of the windows in the classroom.
 The results are shown in the table.

| Area ($A \text{ m}^2$) | $20 < A \leq 60$ | $60 < A \leq 100$ | $100 < A \leq 150$ | $150 < A \leq 250$ |
|--------------------------|------------------|-------------------|--------------------|--------------------|
| Frequency | 32 | 64 | 80 | 24 |

- (i) Calculate an estimate of the mean.
 Show all your working.

[4]

- (ii) Complete the histogram to show the information in the table.



[4]

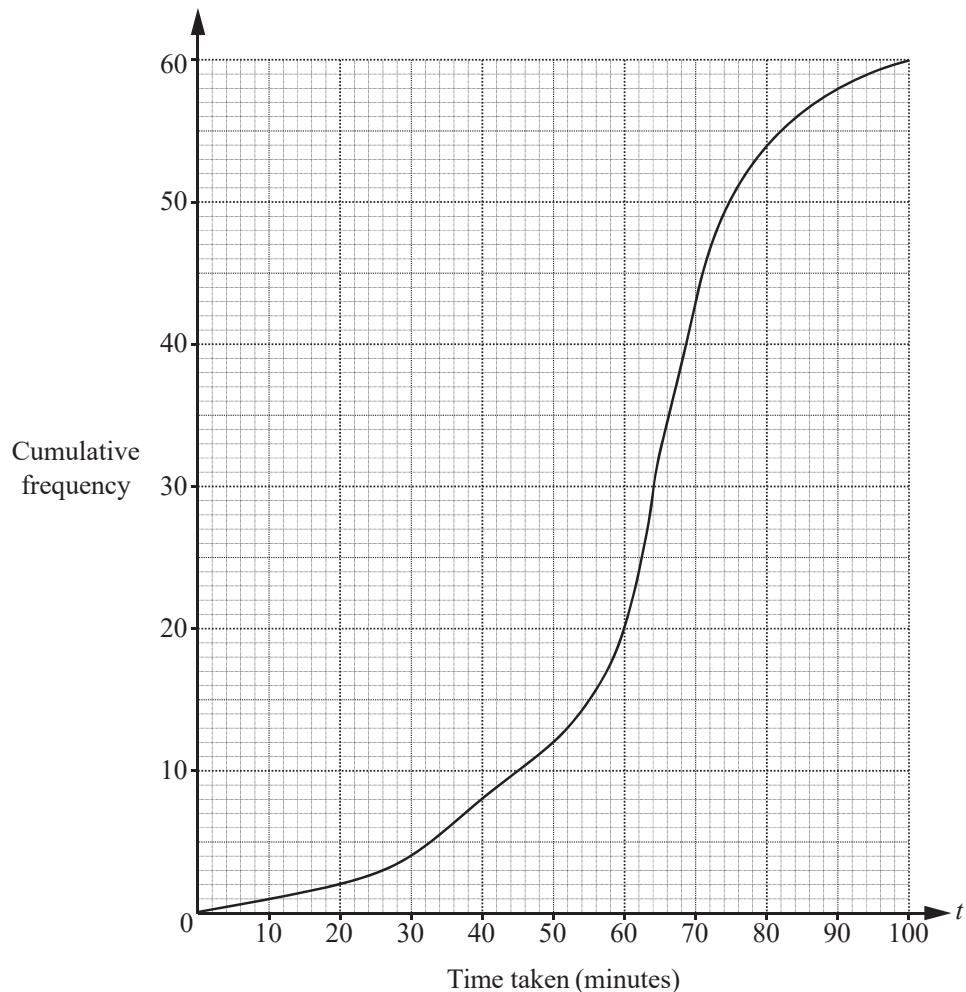
- (iii) Two of the 200 students are chosen at random.

Find the probability that they both estimate that the area is greater than 100m^2 .

[2]

Question 4

The cumulative frequency diagram shows information about the time taken, t minutes, by 60 students to complete a test.



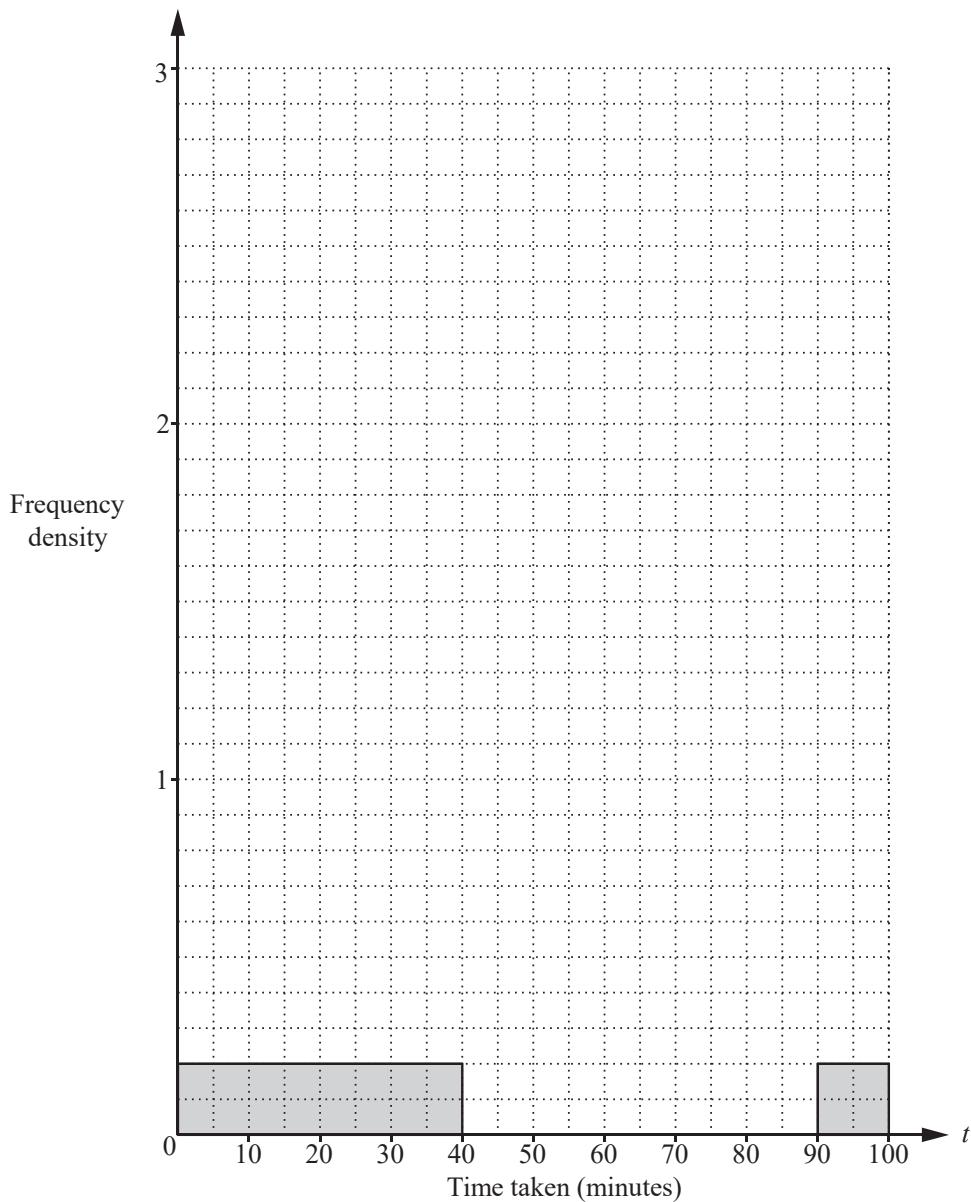
- (a) Find
- (i) the median, [1]
 - (ii) the inter-quartile range, [2]
 - (iii) the 40th percentile, [2]
 - (iv) the number of students who took more than 80 minutes to complete the test. [2]

(b) Use the cumulative frequency diagram to complete the frequency table below.

| Time taken (t minutes) | $0 < t \leq 40$ | $40 < t \leq 60$ | $60 < t \leq 70$ | $70 < t \leq 80$ | $80 < t \leq 90$ | $90 < t \leq 100$ |
|------------------------------|-----------------|------------------|------------------|------------------|------------------|-------------------|
| Frequency | 8 | | | | 4 | |

[3]

(c) On the grid below, complete the histogram to show the information in the table in **part (b)**.



[4]

Question 5

The table shows the time, t minutes, that 400 people take to complete a test.

| Time taken (t mins) | $0 < t \leq 10$ | $10 < t \leq 24$ | $24 < t \leq 30$ | $30 < t \leq 40$ | $40 < t \leq 60$ | $60 < t \leq 70$ |
|---------------------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 10 | 90 | 135 | 85 | 70 | 10 |

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

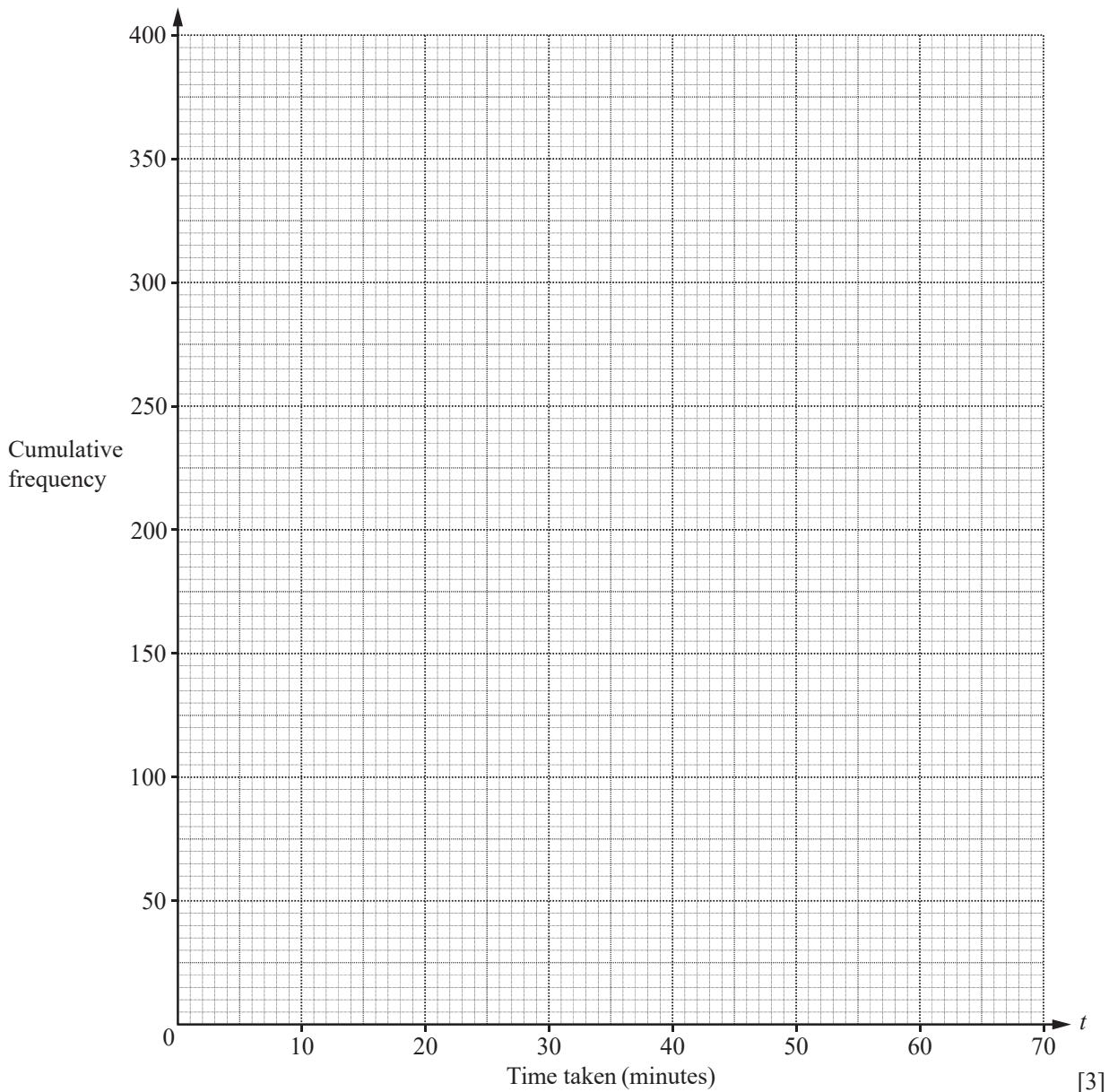
(ii) Calculate an estimate of the mean time taken to complete the test. [4]

(b) (i) Complete the table of cumulative frequencies.

| Time taken (t mins) | $t \leq 10$ | $t \leq 24$ | $t \leq 30$ | $t \leq 40$ | $t \leq 60$ | $t \leq 70$ |
|---------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Cumulative frequency | 10 | 100 | | | | 400 |

[2]

(ii) On the grid opposite, draw a cumulative frequency diagram to show this information.



(c) Use your graph to estimate

(i) the median time, [1]

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

(iii) the 15th percentile, [2]

(iv) the number of people who took more than 50 minutes. [2]

Question 6

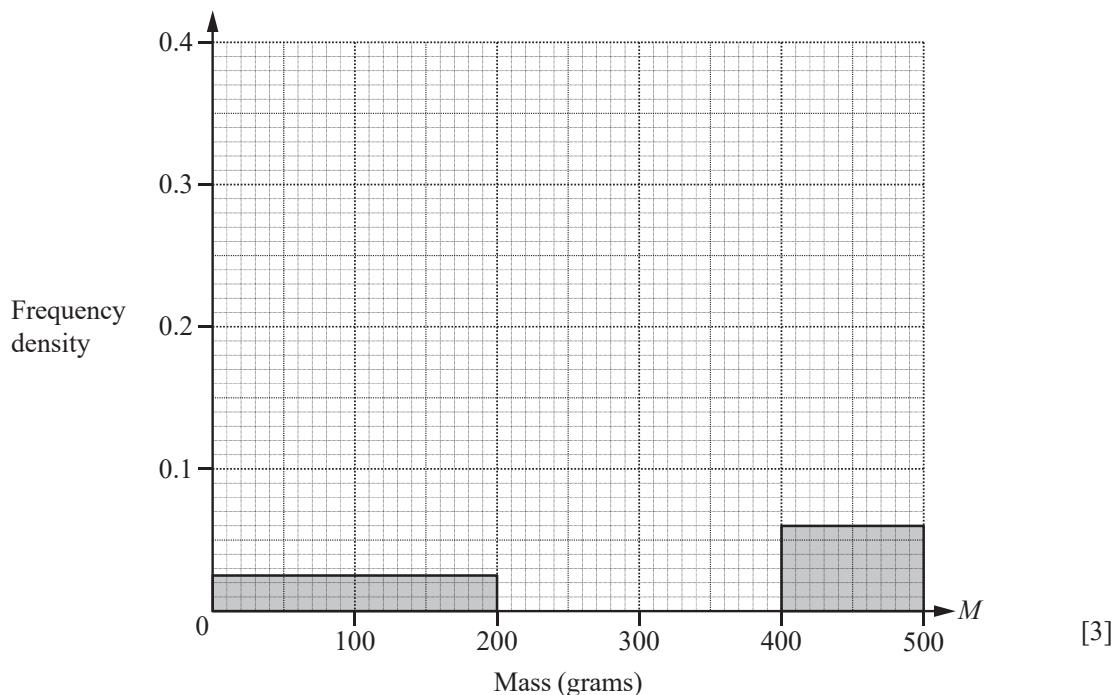
- (a) A group of 50 students estimated the mass, M grams, of sweets in a jar.
The results are shown in the table.

| Mass (M grams) | Number of students |
|--------------------|--------------------|
| $0 < M \leq 200$ | 5 |
| $200 < M \leq 300$ | 9 |
| $300 < M \leq 350$ | 18 |
| $350 < M \leq 400$ | 12 |
| $400 < M \leq 500$ | 6 |

- (i) Calculate an estimate of the mean.

[4]

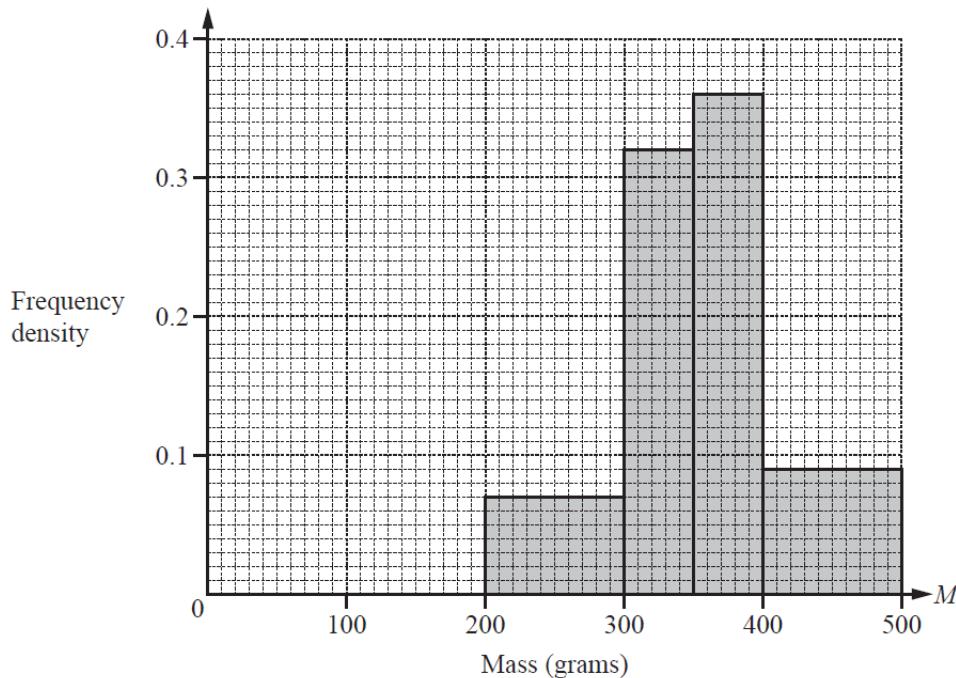
- (ii) Complete this histogram to show the information in the table.



[3]

- (b) A group of 50 adults also estimated the mass, M grams, of the sweets in the jar.
The histogram below shows information about their estimates.

Use the histograms to make two comparisons between the distributions of the estimates of the students and the adults.



[2]

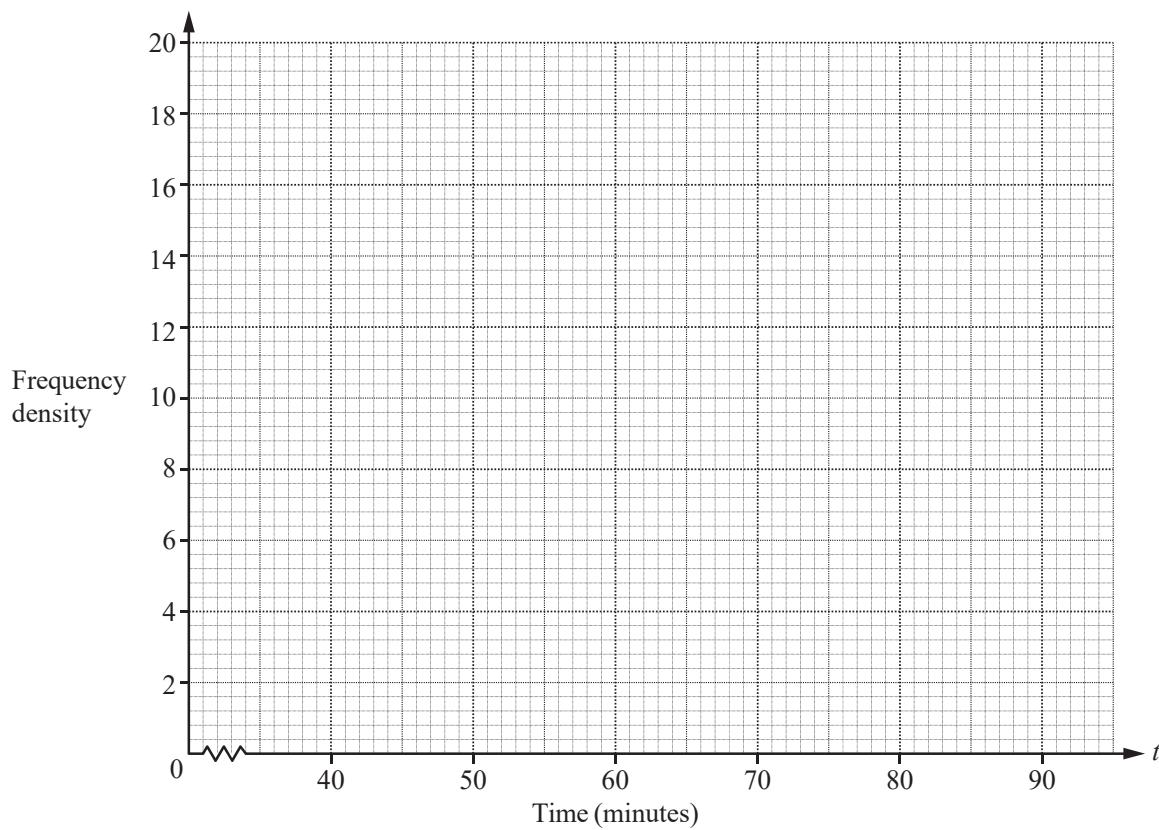
Question 7

The table shows the times, t minutes, taken by 200 students to complete an IGCSE paper.

| Time (t minutes) | $40 < t \leq 60$ | $60 < t \leq 70$ | $70 < t \leq 75$ | $75 < t \leq 90$ |
|---------------------|------------------|------------------|------------------|------------------|
| Frequency | 10 | 50 | 80 | 60 |

(a) By using mid-interval values, calculate an estimate of the mean time. [3]

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



[4]

Statistics

Difficulty: Hard

Question Paper 3

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

Time allowed: 90 minutes

Score: /78

Percentage: /100

Grade Boundaries:

CIE IGCSE Maths (0580)

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

CIE IGCSE Maths (0980)

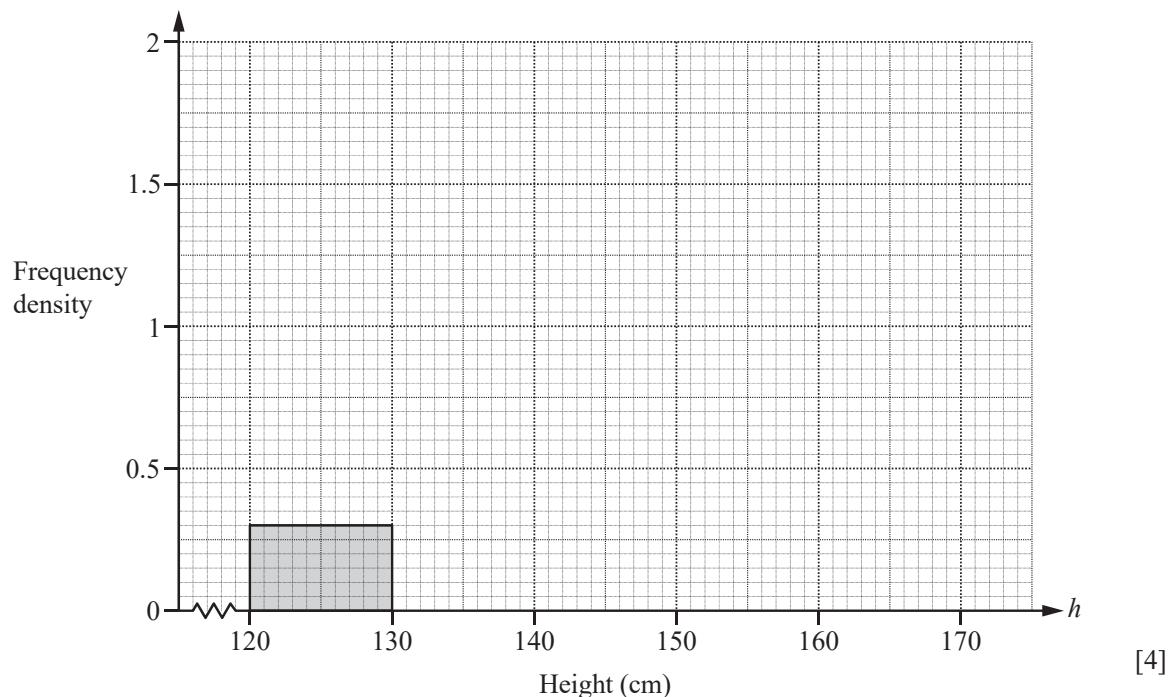
| | | | | | |
|------|-----|-----|-----|-----|-----|
| 9 | 8 | 7 | 6 | 5 | 4 |
| >95% | 87% | 80% | 69% | 58% | 46% |

Question 1

The table shows the height, h cm, of 40 children in a class.

| Height (h cm) | $120 < h \leq 130$ | $130 < h \leq 140$ | $140 < h \leq 144$ | $144 < h \leq 150$ | $150 < h \leq 170$ |
|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Frequency | 3 | 14 | 4 | 6 | 13 |

- (a) Write down the class interval containing the median. [1]
- (b) Calculate an estimate of the mean height. [4]
- (c) Complete the histogram.



Question 2

A company tested 200 light bulbs to find the lifetime, T hours, of each bulb. The results are shown in the table.

| Lifetime (T hours) | Number of bulbs |
|--------------------------|--------------------|
| $0 < T \leq 1000$ | 10 |
| $1000 < T \leq 1500$ | 30 |
| $1500 < T \leq 2000$ | 55 |
| $2000 < T \leq 2500$ | 72 |
| $2500 < T \leq 3500$ | 33 |

- (a) Calculate an estimate of the mean lifetime for the 200 light bulbs.

[4]

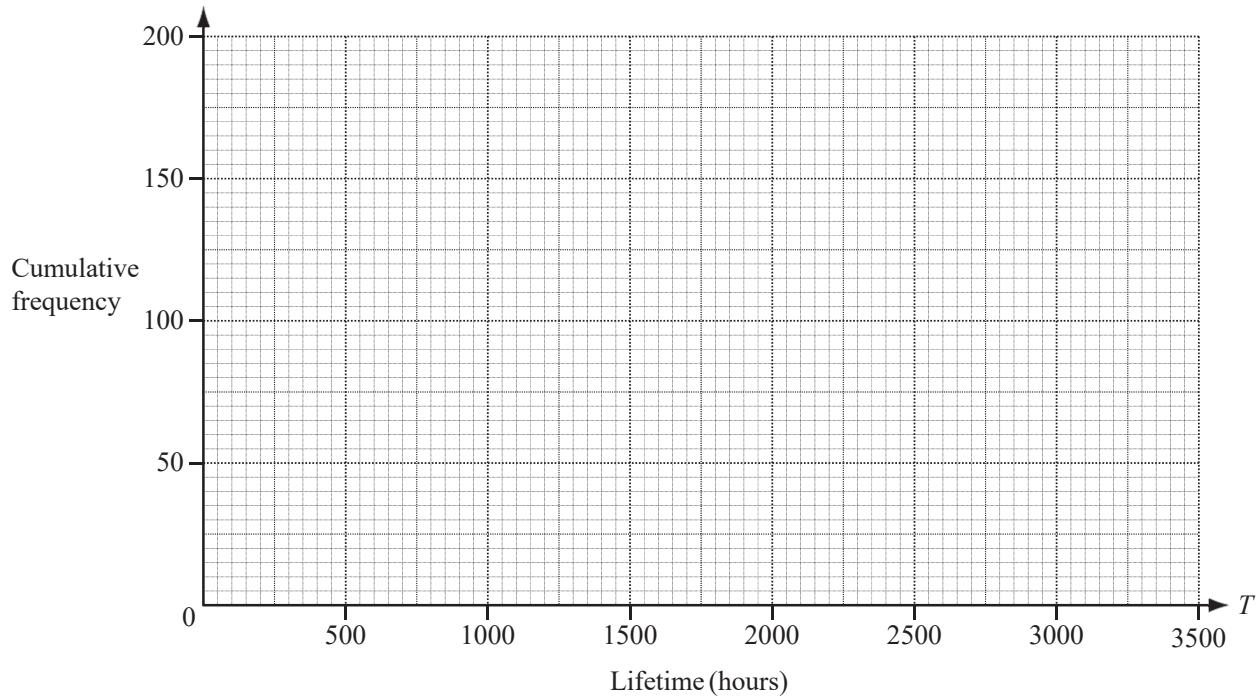
- (b) (i) Complete the cumulative frequency table.

[2]

| Lifetime (T hours) | $T \leq 1000$ | $T \leq 1500$ | $T \leq 2000$ | $T \leq 2500$ | $T \leq 3500$ |
|-----------------------|---------------|---------------|---------------|---------------|---------------|
| Number of bulbs | | | | | |

(ii) On the grid, draw a cumulative frequency diagram to show this information.

[3]



(iii) The company says that the average lifetime of a bulb is 2200 hours.

Estimate the number of bulbs that lasted longer than 2200 hours.

[2]

(c) Robert buys one energy saving bulb and one halogen bulb.

The probability that the energy saving bulb lasts longer than 3500 hours is $\frac{9}{10}$.

The probability that the halogen bulb lasts longer than 3500 hours is $\frac{3}{5}$.

Work out the probability that exactly one of the bulbs will last longer than 3500 hours.

[4]

Question 3

The time, t seconds, taken for each of 50 chefs to cook an omelette is recorded.

| Time (t seconds) | $20 < t \leq 25$ | $25 < t \leq 30$ | $30 < t \leq 35$ | $35 < t \leq 40$ | $40 < t \leq 45$ | $45 < t \leq 50$ |
|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 2 | 6 | 7 | 19 | 9 | 7 |

(a) Write down the modal time interval.

[1]

(b) Calculate an estimate of the mean time.

Show all your working.

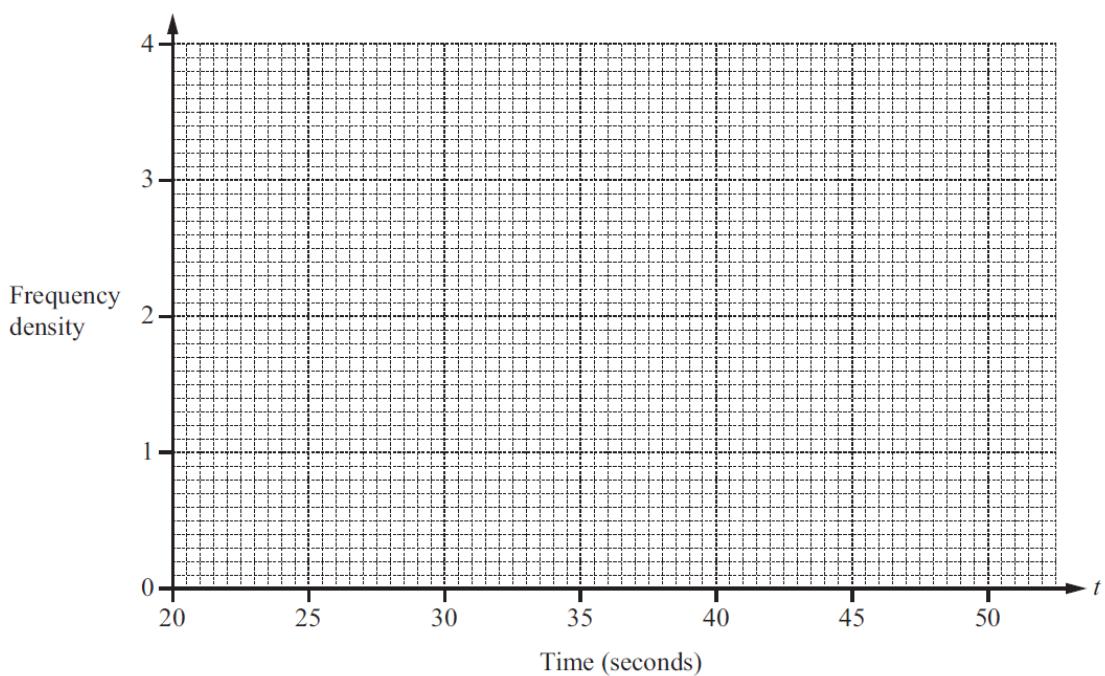
[4]

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

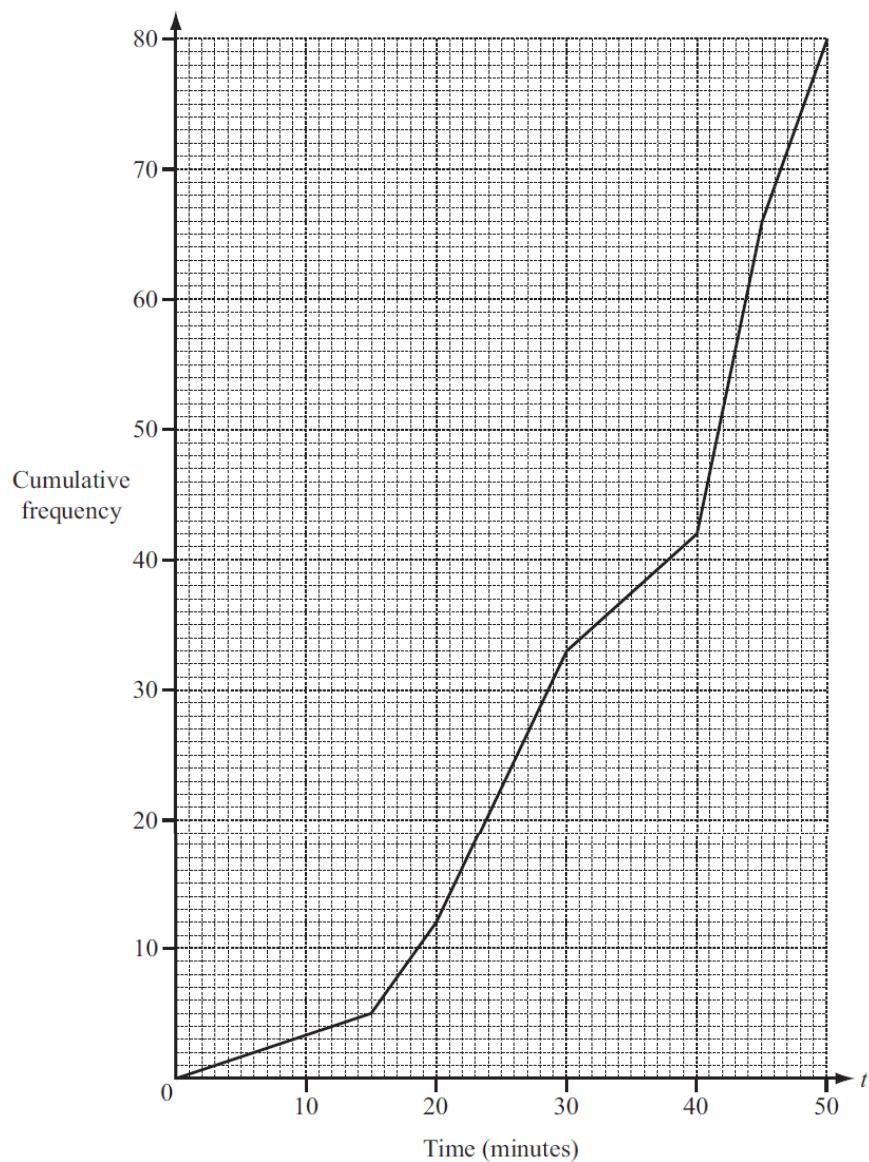
| Time (t seconds) | $20 < t \leq 35$ | $35 < t \leq 40$ | $40 < t \leq 50$ |
|------------------------|------------------|------------------|------------------|
| Frequency | | | |

(i) Complete the table. [1]

(ii) On the grid, draw a histogram to show the information in this new table. [3]



Question 4



The times (t minutes) taken by 80 people to complete a charity swim were recorded.
The results are shown in the cumulative frequency diagram above.

(a) Find

(i) the median,

[1]

(ii) the inter-quartile range,

[2]

(iii) the 70th percentile.

[2]

(b) The times taken by the 80 people are shown in this grouped frequency table.

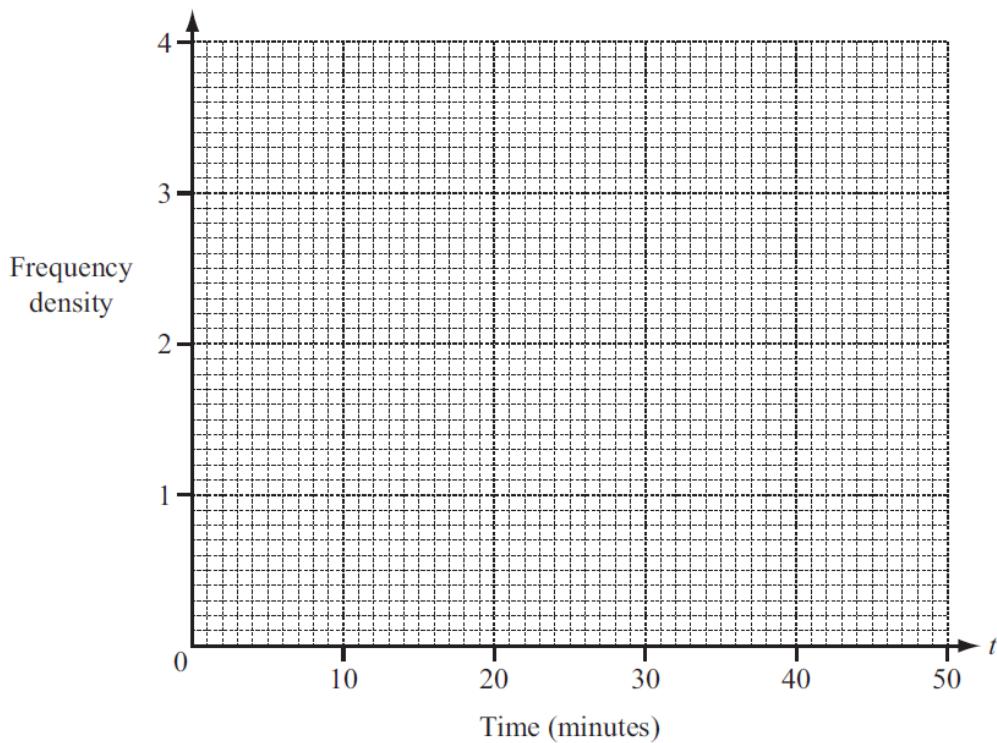
| Time (t minutes) | $0 < t \leq 20$ | $20 < t \leq 30$ | $30 < t \leq 45$ | $45 < t \leq 50$ |
|---------------------|-----------------|------------------|------------------|------------------|
| Frequency | 12 | 21 | 33 | 14 |

(i) Calculate an estimate of the mean time.

[4]

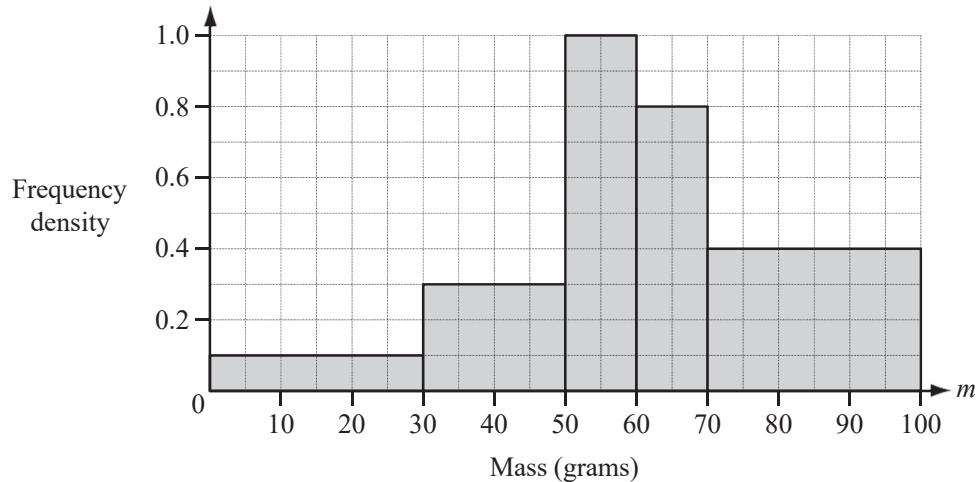
(ii) Draw a histogram to represent the grouped frequency table.

[4]



Question 5

(a)



The histogram shows some information about the masses (m grams) of 39 apples.

(i) Show that there are 12 apples in the interval $70 < m \leq 100$.

[1]

(ii) Calculate an estimate of the mean mass of the 39 apples.

[5]

(b) The mean mass of 20 oranges is 70 g.

One orange is eaten.

The mean mass of the remaining oranges is 70.5g.

Find the mass of the orange that was eaten.

[3]

Question 6

(a) 80 students were asked how much time they spent on the internet in one day.

This table shows the results.

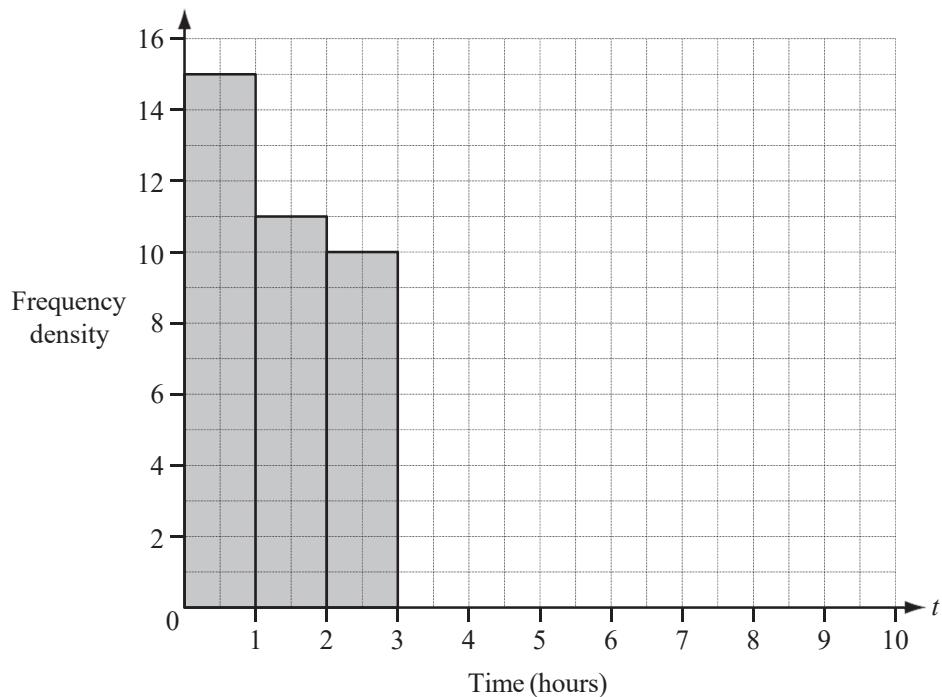
| Time (t hours) | $0 < t \leq 1$ | $1 < t \leq 2$ | $2 < t \leq 3$ | $3 < t \leq 5$ | $5 < t \leq 7$ | $7 < t \leq 10$ |
|--------------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| Number of students | 15 | 11 | 10 | 19 | 13 | 12 |

(i) Calculate an estimate of the mean time spent on the internet by the 80 students.

[4]

(ii) On the grid, complete the histogram to show this information.

[4]

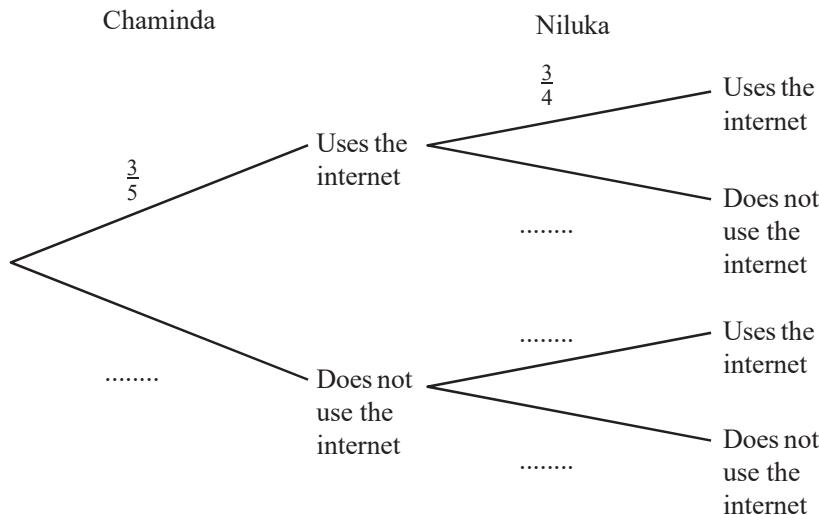


(b) The probability that Chaminda uses the internet on any day is $\frac{3}{5}$.

The probability that Niluka uses the internet on any day is $\frac{3}{4}$.

(i) Complete the tree diagram.

[2]



(ii) Calculate the probability, that on any day, at least one of the two students uses the internet.

[3]

(iii) Calculate the probability that Chaminda uses the internet on three consecutive days. [2]

Question 7

| Height (h cm) | $150 < h \leq 160$ | $160 < h \leq 165$ | $165 < h \leq 180$ | $180 < h \leq 190$ |
|------------------|--------------------|--------------------|--------------------|--------------------|
| Frequency | 5 | 9 | 18 | 10 |

The table shows information about the heights of a group of 42 students.

- (a) Using mid-interval values, calculate an estimate of the mean height of the students.
Show your working.

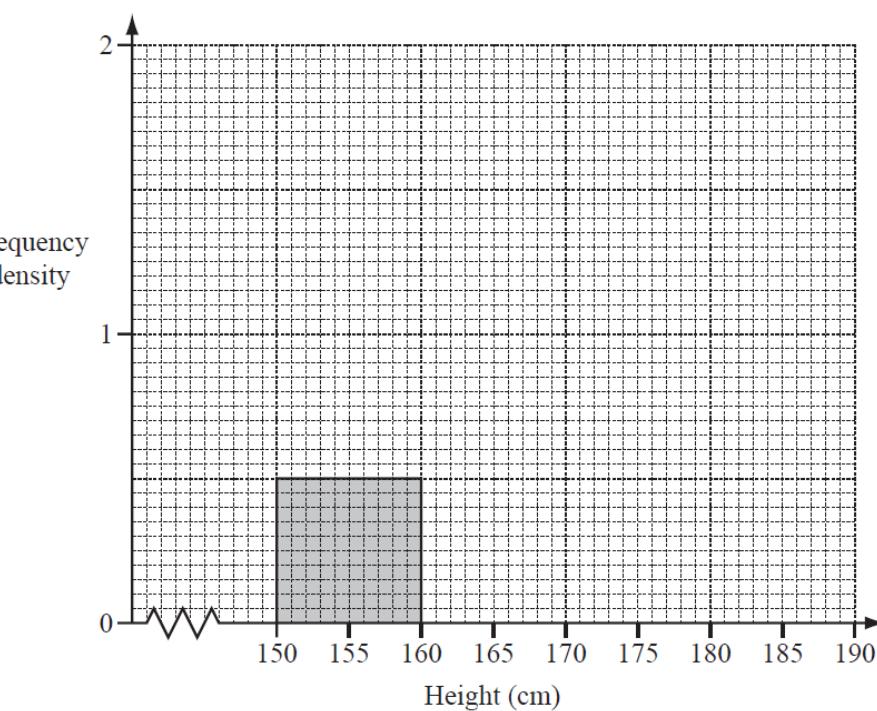
[3]

- (b) Write down the interval which contains the lower quartile.

[1]

- (c) Complete the histogram to show the information in the table.

[4]



Statistics

Difficulty: Hard

Question Paper 4

| | |
|------------|-------------------|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Statistics |
| Paper | Paper 4 |
| Difficulty | Hard |
| Booklet | Question Paper 4 |

Time allowed: 107 minutes

Score: /93

Percentage: /100

Grade Boundaries:

CIE IGCSE Maths (0580)

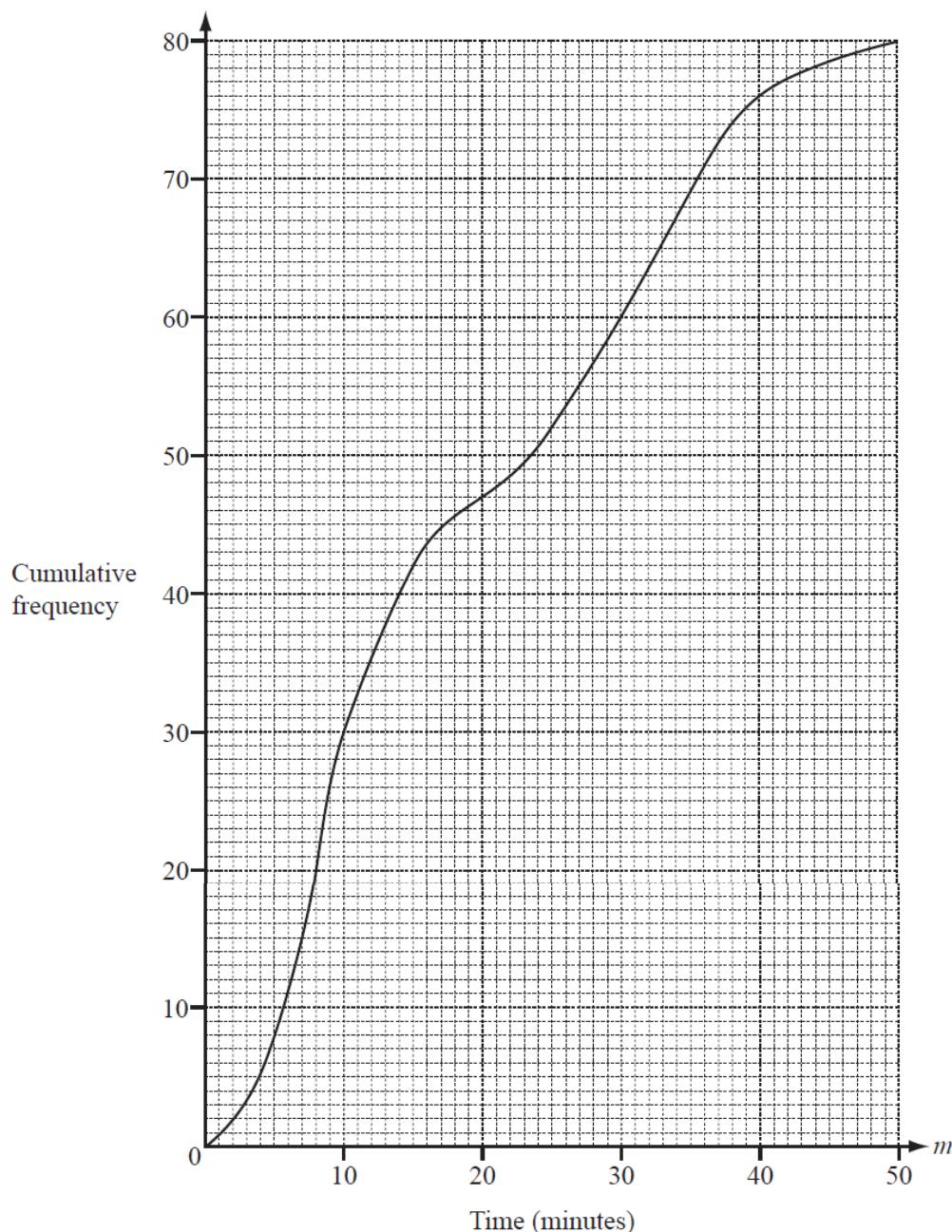
| A* | A | B | C | D |
|------|-----|-----|-----|-----|
| >83% | 67% | 51% | 41% | 31% |

CIE IGCSE Maths (0980)

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

Question 1

Sam asked 80 people how many minutes their journey to work took on one day.
The cumulative frequency diagram shows the times taken (m minutes).



(a) Find

(i) the median, [1]

(ii) the lower quartile, [1]

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

(b) One of the 80 people is chosen at random.

Find the probability that their journey to work took more than 35 minutes.

Give your answer as a fraction.

[2]

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

[2]

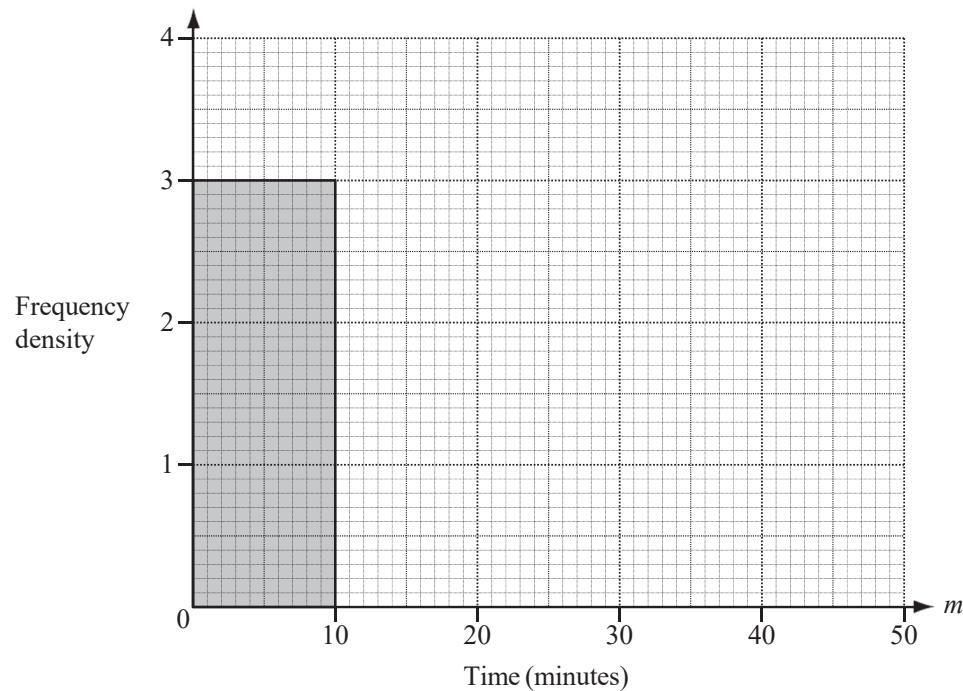
| Time (m minutes) | $0 < m \leq 10$ | $10 < m \leq 15$ | $15 < m \leq 30$ | $30 < m \leq 40$ | $40 < m \leq 50$ |
|---------------------|-----------------|------------------|------------------|------------------|------------------|
| Frequency | 30 | 12 | 18 | | |

(d) Using mid-interval values, calculate an estimate of the mean journey time for the 80 people. [3]

(e) Use the table in **part (c)** to complete the histogram to show the times taken by the 80 people.

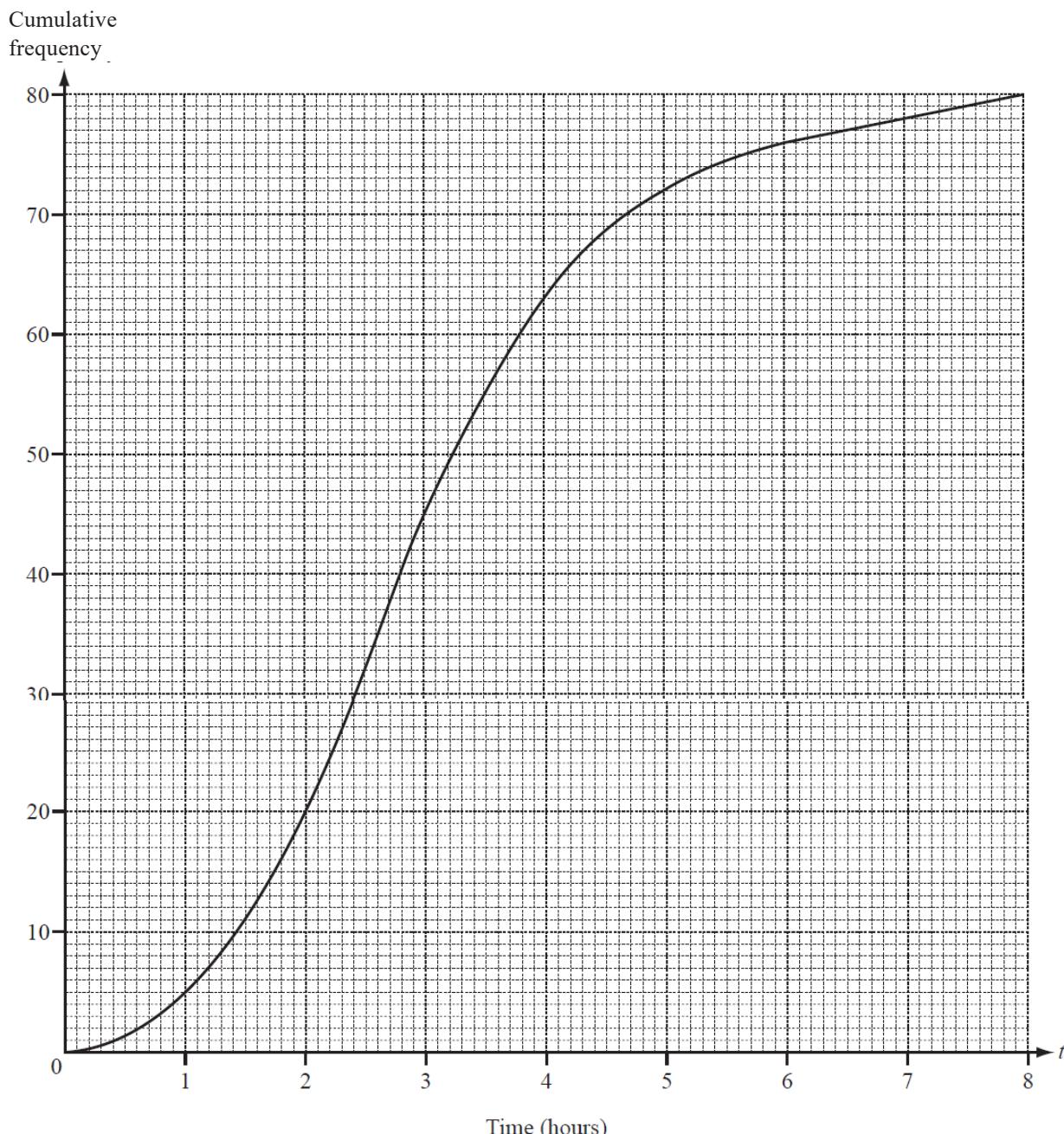
One column has already been completed for you.

[5]



Question 2

Felix asked 80 motorists how many hours their journey took that day.
He used the results to draw a cumulative frequency diagram.



(a) Find

- (i) the median, [1]
- (ii) the upper quartile, [1]
- (iii) the inter-quartile range. [1]

- (b) Find the number of motorists whose journey took more than 5 hours but no more than 7 hours.

[1]

- (c) The frequency table shows some of the information about the 80 journeys.

| Time in hours (t) | $0 < t \leq 2$ | $2 < t \leq 3$ | $3 < t \leq 4$ | $4 < t \leq 5$ | $5 < t \leq 6$ | $6 < t \leq 8$ |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Frequency | 20 | 25 | 18 | | | |

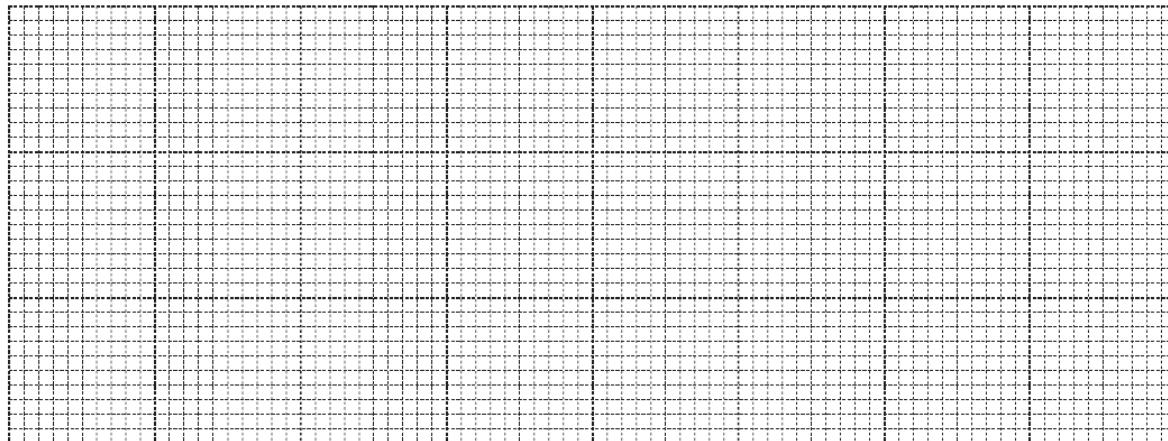
- (i) Use the cumulative frequency diagram to complete the table above.

[2]

- (ii) Calculate an estimate of the mean number of hours the 80 journeys took.

[4]

- (d) On the grid, draw a histogram to represent the information in your table in **part (c)**.



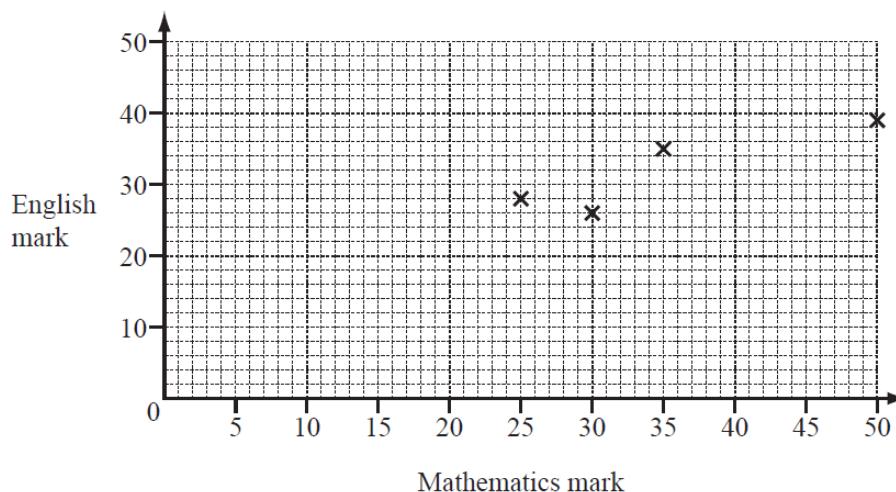
[5]

Question 3

| | | | | | | | | | | |
|------------------|----|----|----|----|---|----|----|----|----|----|
| Mathematics mark | 30 | 50 | 35 | 25 | 5 | 39 | 48 | 40 | 10 | 15 |
| English mark | 26 | 39 | 35 | 28 | 9 | 37 | 45 | 33 | 16 | 12 |

The table shows the test marks in Mathematics and English for 10 students.

- (a) (i) On the grid, complete the scatter diagram to show the Mathematics and English marks for the 10 students. The first four points have been plotted for you.



[2]

- (ii) What type of correlation does your scatter diagram show? [1]

- (iii) Draw a line of best fit on the grid. [1]

- (iv) Ann missed the English test but scored 22 marks in the Mathematics test.
Use your line of best fit to estimate a possible English mark for Ann. [1]

- (b) Show that the mean English mark for the 10 students is 28. [2]

- (c) Two new students do the English test. They both score the **same** mark.

The mean English mark for the 12 students is 31.

Calculate the English mark for the new students. [3]

Question 4

The table shows information about the heights of 120 girls in a swimming club.

| Height (h metres) | Frequency |
|----------------------|-----------|
| $1.3 < h \leq 1.4$ | 4 |
| $1.4 < h \leq 1.5$ | 13 |
| $1.5 < h \leq 1.6$ | 33 |
| $1.6 < h \leq 1.7$ | 45 |
| $1.7 < h \leq 1.8$ | 19 |
| $1.8 < h \leq 1.9$ | 6 |

(a) (i) Write down the modal class. [1]

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

(b) Girls from this swimming club are chosen at random to swim in a race.

Calculate the probability that

(i) the height of the first girl chosen is more than 1.8 metres, [1]

(ii) the heights of **both** the first and second girl chosen are 1.8 metres or less. [3]

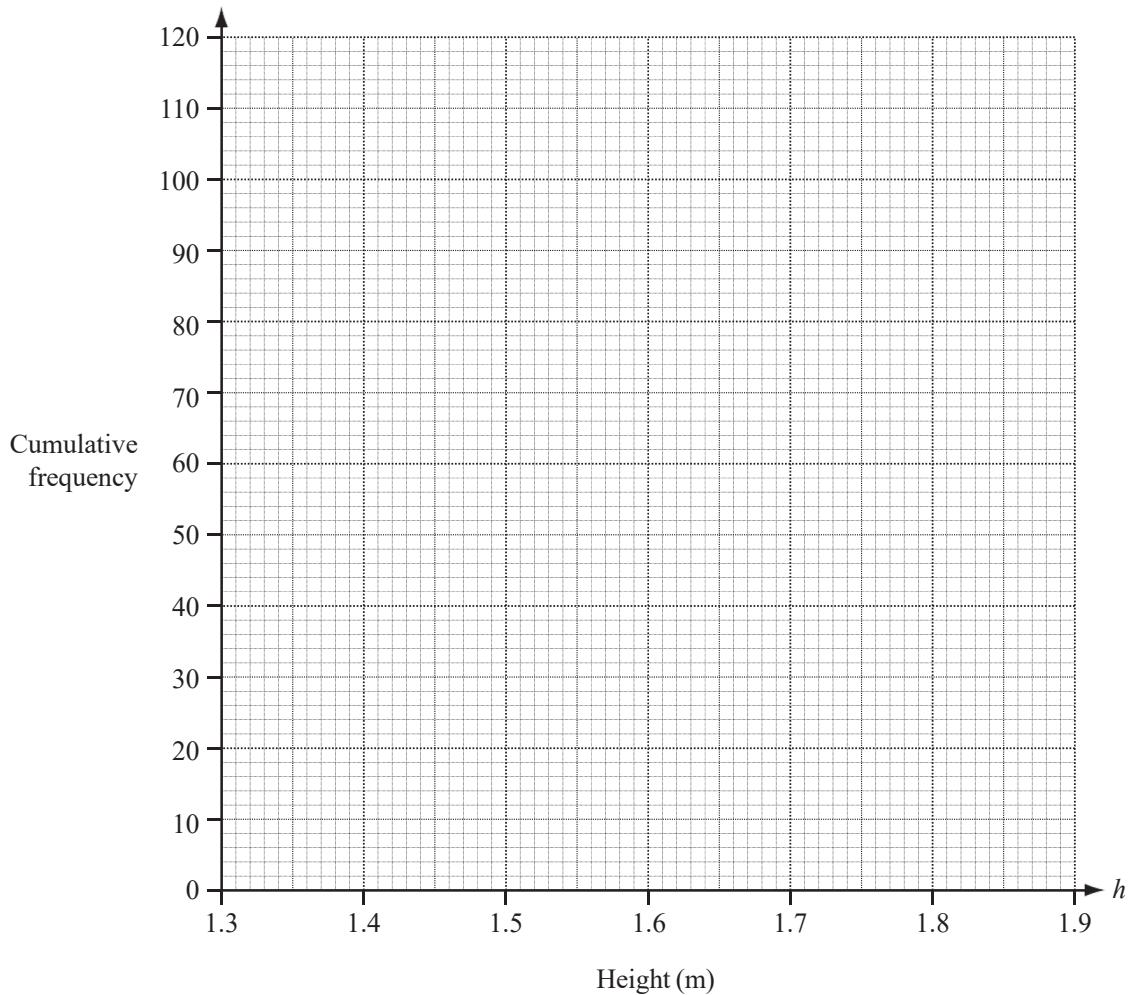
- (c) (i) Complete the cumulative frequency table for the heights.

[1]

| Height (h metres) | Cumulative frequency |
|----------------------|----------------------|
| $h \leq 1.3$ | 0 |
| $h \leq 1.4$ | 4 |
| $h \leq 1.5$ | 17 |
| $h \leq 1.6$ | 50 |
| $h \leq 1.7$ | |
| $h \leq 1.8$ | 114 |
| $h \leq 1.9$ | |

- (ii) Draw the cumulative frequency graph on the grid.

[3]



- (d) Use your graph to find

- (i) the median height,

[1]

- (ii) the 30th percentile.

[1]

Question 5

The table below shows the marks scored by a group of students in a test.

| Mark | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-----------|----|----|----|----|----|----|----|----|
| Frequency | 10 | 8 | 16 | 11 | 7 | 8 | 6 | 9 |

- (a) Find the mean, median and mode. [6]

- (b) The table below shows the time (t minutes) taken by the students to complete the test.

| Time (t) | $0 < t \leq 10$ | $10 < t \leq 20$ | $20 < t \leq 30$ | $30 < t \leq 40$ | $40 < t \leq 50$ | $50 < t \leq 60$ |
|--------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 2 | 19 | 16 | 14 | 15 | 9 |

- (i) Cara rearranges this information into a new table.

Complete her table. [2]

Complete her table.

| Time (t) | $0 < t \leq 20$ | $20 < t \leq 40$ | $40 < t \leq 50$ | $50 < t \leq 60$ |
|--------------|-----------------|------------------|------------------|------------------|
| Frequency | | | | 9 |

- (ii) Cara wants to draw a histogram to show the information in part (b)(i).

Complete the table below to show the interval widths and the frequency densities. [3]

| | $0 < t \leq 20$ | $20 < t \leq 40$ | $40 < t \leq 50$ | $50 < t \leq 60$ |
|-------------------|-----------------|------------------|------------------|------------------|
| Interval width | | | | 10 |
| Frequency density | | | | 0.9 |

(c) **Some** of the students were asked how much time they spent revising for the test.

10 students revised for 2.5 hours, 12 students revised for 3 hours and n students revised for 4 hours.

The mean time that **these** students spent revising was 3.1 hours.

Find n .

Show all your working.

[4]

Question 6

(a) For a set of six integers, the mode is 8, the median is 9 and the mean is 10.

The smallest integer is greater than 6 and the largest integer is 16.

Find the two possible sets of six integers.

[5]

(b) One day Ahmed sells 160 oranges.

He records the mass of each orange.

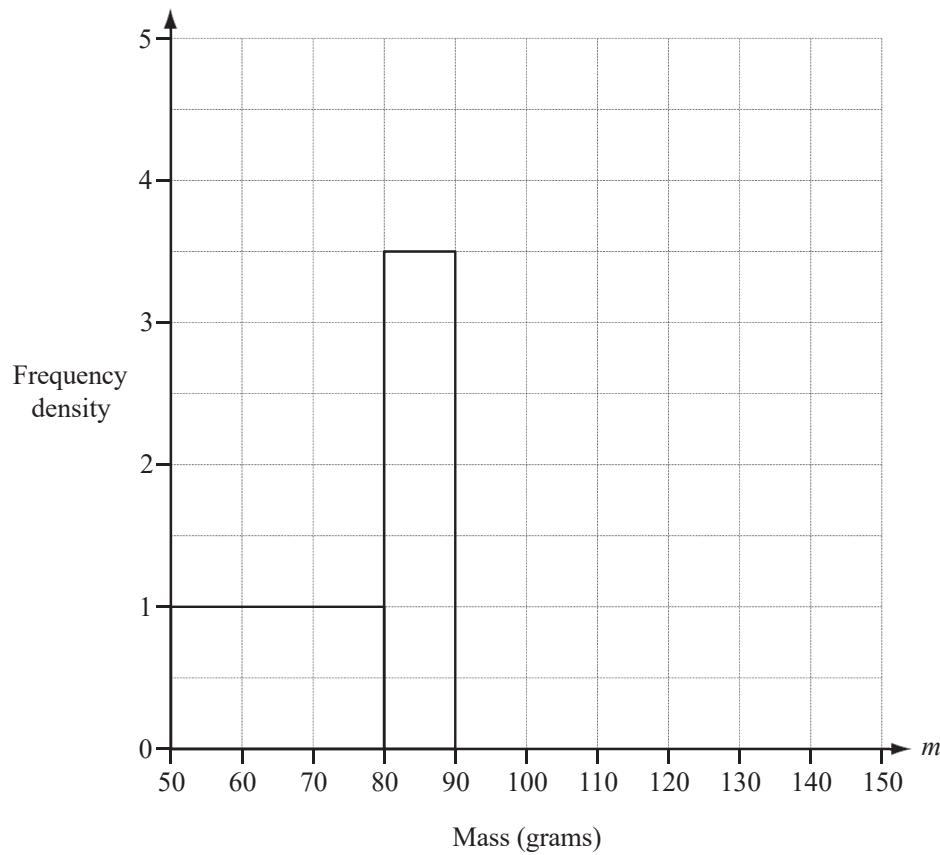
The results are shown in the table.

| Mass (m grams) | $50 < m \leq 80$ | $80 < m \leq 90$ | $90 < m \leq 100$ | $100 < m \leq 120$ | $120 < m \leq 150$ |
|-------------------|------------------|------------------|-------------------|--------------------|--------------------|
| Frequency | 30 | 35 | 40 | 40 | 15 |

(i) Calculate an estimate of the mean mass of the 160 oranges.

[4]

(ii) On the grid, complete the histogram to show the information in the table.

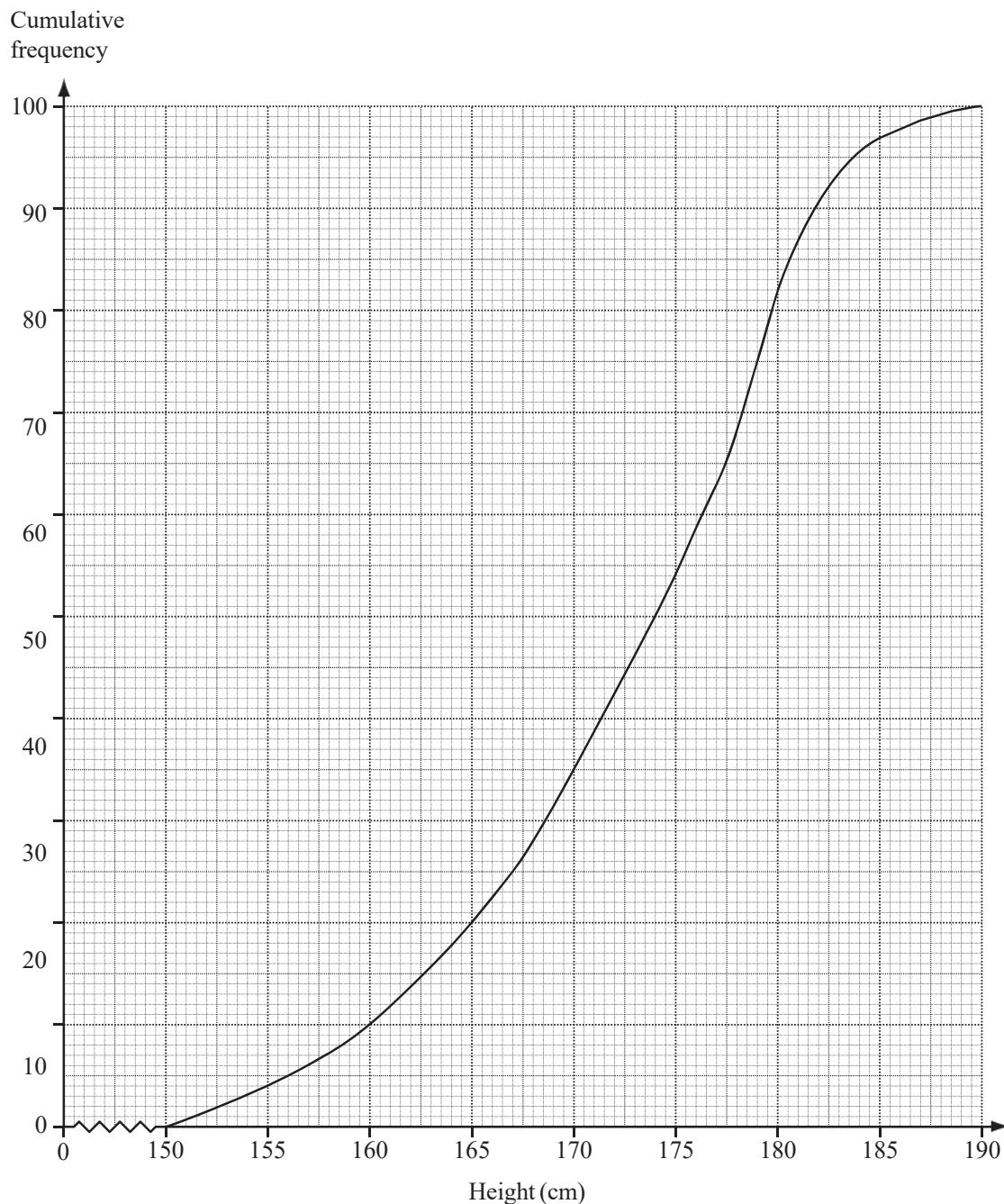


[4]

Question 7

The heights of 100 students are measured.

The results have been used to draw this cumulative frequency diagram.



(a) Find

(i) the median height, [1]

(ii) the lower quartile, [1]

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

(iv) the number of students with a height greater than 177 cm. [2]

(b) The frequency table shows the information about the 100 students who were measured.

| Height (h cm) | $150 < h \leq 160$ | $160 < h \leq 170$ | $170 < h \leq 180$ | $180 < h \leq 190$ |
|------------------|--------------------|--------------------|--------------------|--------------------|
| Frequency | | | 47 | 18 |

(i) Use the cumulative frequency diagram to complete the table above. [1]

(ii) Calculate an estimate of the mean height of the 100 students. [4]

Statistics

Difficulty: Hard

Question Paper 5

| | |
|------------|-------------------|
| Level | IGCSE |
| Subject | Maths (0580/0980) |
| Exam Board | CIE |
| Topic | Statistics |
| Paper | Paper 4 |
| Difficulty | Hard |
| Booklet | Question Paper 5 |

Time allowed: 90 minutes

Score: /78

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% |

Question 1

(a) Each student in a class is given a bag of sweets.

The students note the number of sweets in their bag.

The results are shown in the table, where $0 \leq x < 10$.

| | | | |
|----------------------------|----|----|-----|
| Number of sweets | 30 | 31 | 32 |
| Frequency (number of bags) | 10 | 7 | x |

(i) State the mode. [1]

(ii) Find the possible values of the median. [3]

(iii) The mean number of sweets is 30.65.

Find the value of x . [3]

(b) The mass, m grams, of each of 200 chocolates is noted and the results are shown in the table.

| | | | | |
|-------------------|------------------|------------------|------------------|------------------|
| Mass (m grams) | $10 < m \leq 20$ | $20 < m \leq 22$ | $22 < m \leq 24$ | $24 < m \leq 30$ |
| Frequency | 35 | 115 | 26 | 24 |

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

(ii) On a histogram, the height of the column for the $20 < m \leq 22$ interval is 11.5 cm.

Calculate the heights of the other three columns.

Do not draw the histogram. [5]

Question 2

(a) The numbers 0, 1, 1, 1, 2, k , m , 6, 9, 9 are in order ($k \neq m$).

Their median is 2.5 and their mean is 3.6.

(i) Write down the mode. [1]

(ii) Find the value of k . [1]

(iii) Find the value of m . [2]

(iv) Maria chooses a number at random from the list.

The probability of choosing this number is $\frac{1}{5}$. Which number does she choose?

[1]

(b) 100 students are given a question to answer.

The time taken (t seconds) by each student is recorded and the results are shown in the table.

| t | $0 < t \leq 20$ | $20 < t \leq 30$ | $30 < t \leq 35$ | $35 < t \leq 40$ | $40 < t \leq 50$ | $50 < t \leq 60$ | $60 < t \leq 80$ |
|-----------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 10 | 10 | 15 | 28 | 22 | 7 | 8 |

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

(ii) Two students are picked at random.

What is the probability that they both took more than 50 seconds?

Give your answer as a fraction in its lowest terms. [3]

Answer part (c) on a sheet of graph paper.

(c) The data in part (b) is re-grouped to give the following table.

| t | $0 < t \leq 30$ | $30 < t \leq 60$ | $60 < t \leq 80$ |
|-----------|-----------------|------------------|------------------|
| Frequency | p | q | 8 |

(i) Write down the values of p and q . [2]

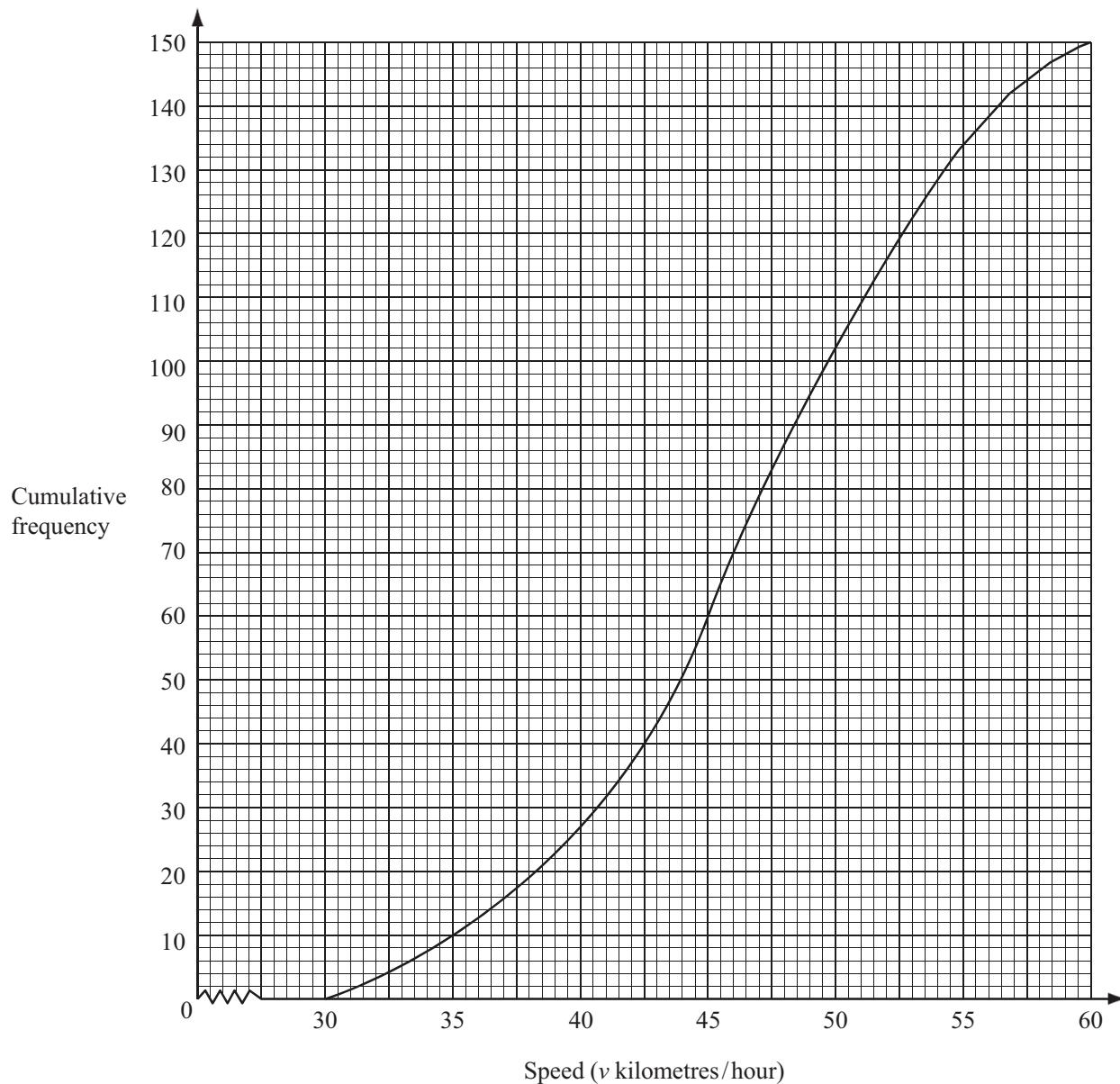
(ii) Draw an accurate histogram to show these results.

Use a scale of 1 cm to represent 5 seconds on the horizontal time axis.

Use a scale of 1 cm to 0.2 units of frequency density (so that 1 cm² on your histogram represents 1 student). [4]

Question 3

The speeds (v kilometres/hour) of 150 cars passing a 50 km/h speed limit sign are recorded.
A cumulative frequency curve to show the results is drawn below.



(a) Use the graph to find

- (i) the median speed, [1]
- (ii) the inter-quartile range of the speeds, [2]
- (iii) the number of cars travelling with speeds of more than 50 km/h. [2]

(b) A frequency table showing the speeds of the cars is

| Speed (v km/h) | $30 < v \leq 35$ | $35 < v \leq 40$ | $40 < v \leq 45$ | $45 < v \leq 50$ | $50 < v \leq 55$ | $55 < v \leq 60$ |
|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Frequency | 10 | 17 | 33 | 42 | n | 16 |

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

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

(c) Answer this part of this question on a sheet of graph paper.

Another frequency table for the same speeds is

| Speed (v km/h) | $30 < v \leq 40$ | $40 < v \leq 55$ | $55 < v \leq 60$ |
|-------------------|------------------|------------------|------------------|
| Frequency | 27 | 107 | 16 |

Draw an accurate histogram to show this information.

Use 2 cm to represent 5 units on the speed axis and 1 cm to represent 1 unit on the frequency density axis (so that 1 cm^2 represents 2.5 cars). [5]

Question 4

Answer the whole of this question on a sheet of graph paper.

120 passengers on an aircraft had their baggage weighed. The results are shown in the table.

| Mass of baggage (M kg) | $0 < M \leq 10$ | $10 < M \leq 15$ | $15 < M \leq 20$ | $20 < M \leq 25$ | $25 < M \leq 40$ |
|---------------------------|-----------------|------------------|------------------|------------------|------------------|
| Number of passengers | 12 | 32 | 28 | 24 | 24 |

(a) (i) Write down the modal class. [1]

(ii) Calculate an estimate of the mean mass of baggage for the 120 passengers. Show all your working. [4]

(iii) Sophia draws a pie chart to show the data. [1]

What angle should she have in the $0 < M \leq 10$ sector?

(b) Using a scale of 2 cm to represent 5 kg, draw a horizontal axis for $0 < M \leq 40$.

Using an area scale of 1 cm^2 to represent 1 passenger, draw a histogram for this data. [7]

Question 5

In a survey, 200 shoppers were asked how much they had just spent in a supermarket. The results are shown in the table.

| Amount(\$x) | $0 < x \leq 20$ | $20 < x \leq 40$ | $40 < x \leq 60$ | $60 < x \leq 80$ | $80 < x \leq 100$ | $100 < x \leq 140$ |
|--------------------|-----------------|------------------|------------------|------------------|-------------------|--------------------|
| Number of shoppers | 10 | 32 | 48 | 54 | 36 | 20 |

- (a) (i) Write down the modal class. [1]
- (ii) Calculate an estimate of the mean amount, giving your answer correct to 2 decimal places. [4]
- (b) (i) Make a cumulative frequency table for these 200 shoppers. [2]
- (ii) Using a scale of 2 cm to represent \$20 on the horizontal axis and 2 cm to represent 20 shoppers on the vertical axis, draw a cumulative frequency diagram for this data. [4]
- (c) Use your cumulative frequency diagram to find
- (i) the median amount, [1]
 - (ii) the upper quartile, [1]
 - (iii) the interquartile range, [1]
 - (iv) how many shoppers spent at least \$75. [2]