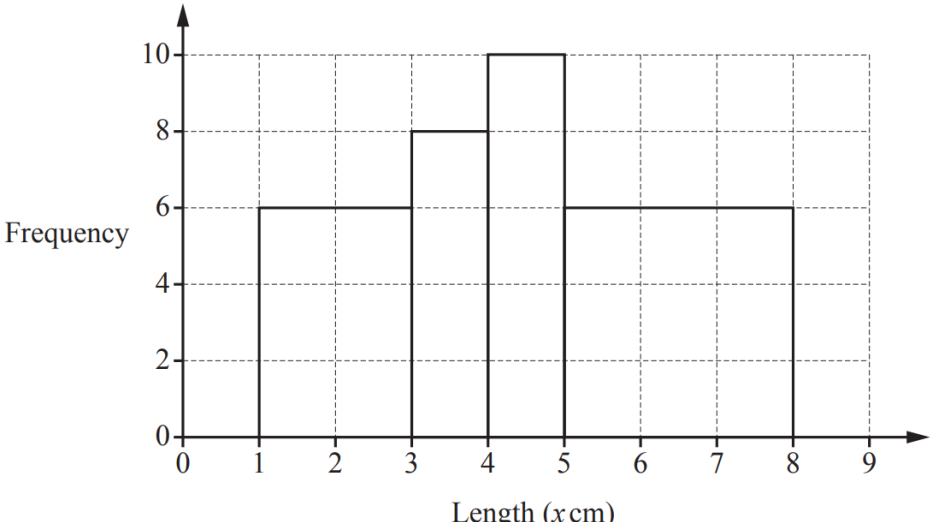
1. 4024/11/M/J/16 Q18

Henri did a survey of the lengths of the leaves on a plant.
The results are summarised in the table.

Length (x cm)	$1 < x \leqslant 3$	$3 < x \leqslant 4$	$4 < x \leqslant 5$	$5 < x \leqslant 8$
Frequency	6	8	10	6

(a) When asked to draw a histogram to illustrate the results, Henri drew the following diagram.

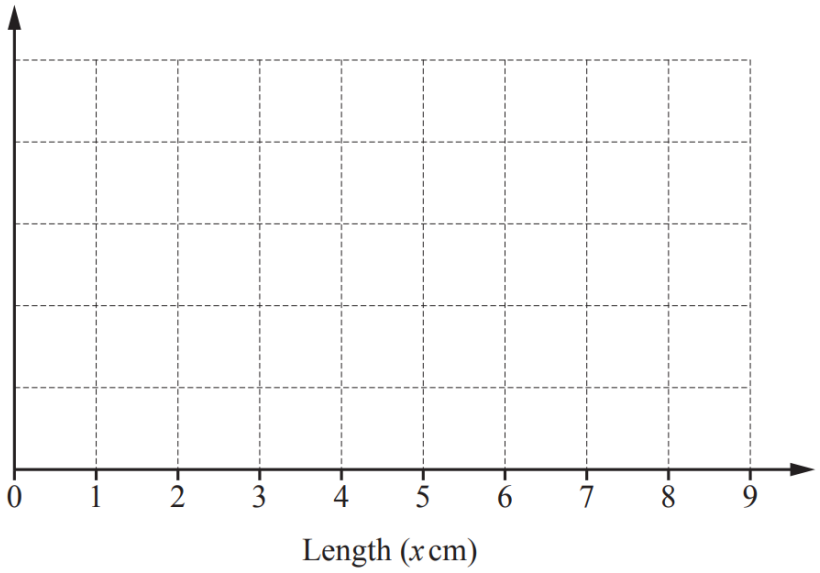


Explain why this diagram is incorrect.

.....

..... [1]

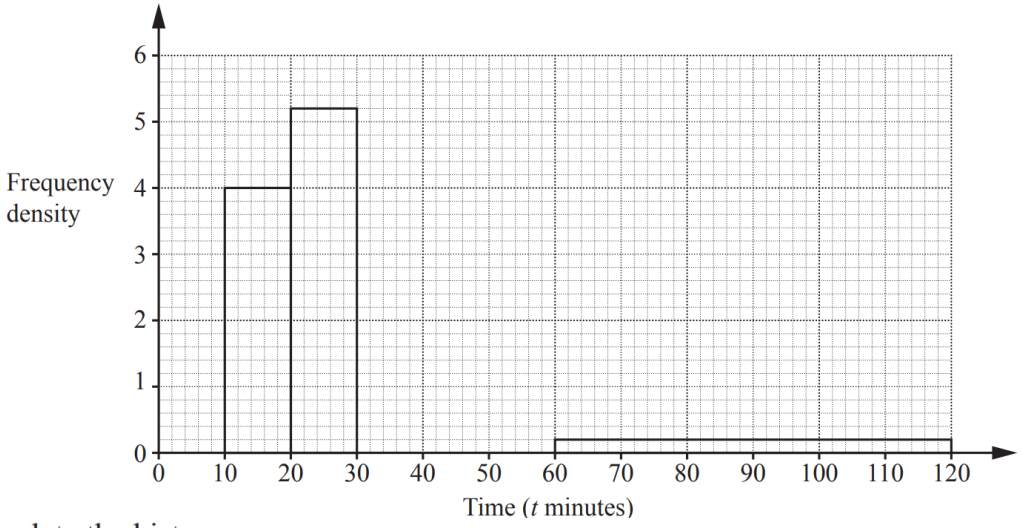
(b) On the grid below, draw a correct histogram for Henri's results.



2. 4024/12/M/J/16 Q23

The table and histogram show some information about the times taken by a group of students to travel to school one day.

Time (t minutes)	$0 < t \leqslant 10$	$10 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 60$	$60 < t \leqslant 120$
Frequency	28	40	52	18	m



(a) Complete the histogram. [2]

(b) Find the value of m.

Answer $m =$ ..... [1]

(c) Work out the fraction of students who took more than half an hour to travel to school.

Answer ..... [2]

3. 4024/21/M/J/16 Q10

100 electric light bulbs of Brand A were tested to find how long each bulb lasted.
The results are summarised in the table below.

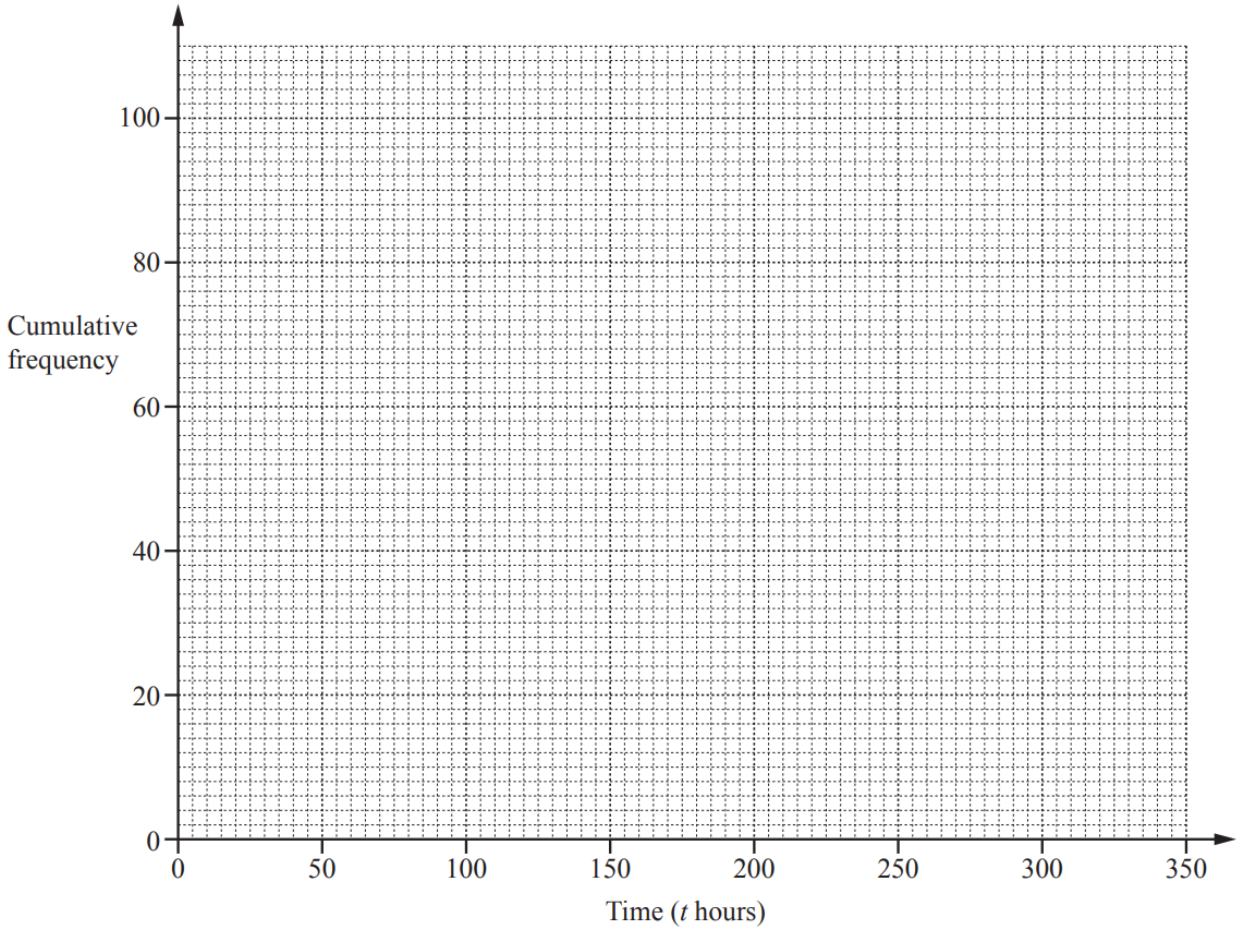
Time (t hours)	$t \leqslant 50$	$50 < t \leqslant 100$	$100 < t \leqslant 150$	$150 < t \leqslant 200$	$200 < t \leqslant 250$	$250 < t \leqslant 300$	$300 < t \leqslant 350$
Number of bulbs	2	2	10	40	30	14	2

(a) Complete the cumulative frequency table.

Time (t hours)	$t \leqslant 50$	$t \leqslant 100$	$t \leqslant 150$	$t \leqslant 200$	$t \leqslant 250$	$t \leqslant 300$	$t \leqslant 350$
Cumulative frequency	2	4					100

[1]

(b) On the grid, draw a smooth cumulative frequency curve to represent this information.
Label this curve Brand A.



[2]

(c) **(i)** Use your graph to estimate the median.

Answer ..... hours [1]

(ii) Use your graph to estimate the interquartile range.

Answer ..... hours [2]

(d) 100 Brand B bulbs gave the following results.
4 bulbs lasted 50 hours or less.
The longest time any bulb lasted was 300 hours.
The median is 250 hours.
The upper quartile is 275 hours.
The interquartile range is 75 hours.

On the grid, draw and label the cumulative frequency curve for the Brand B bulbs. [4]

(e) Using your graph, estimate the number of Brand A bulbs that lasted 275 hours or less.

Answer ..... [1]

(f) Complete the statement below.

Brand ..... had ..... more bulbs that lasted longer than 275 hours than Brand ..... . [1]

4. 4024/22/M/J/16 Q3

Steven asked 25 women how many children they have.
The results are summarised in the table below.

Number of children	Frequency
0	7
1	5
2	6
3	4
4	3

(a) Find

(i) the mean,

Answer ..... [2]

(ii) the median,

Answer ..... [1]

(iii) the mode.

Answer ..... [1]

(b) Steven says that the mode is the average that best represents the data.

Explain why Steven is wrong.

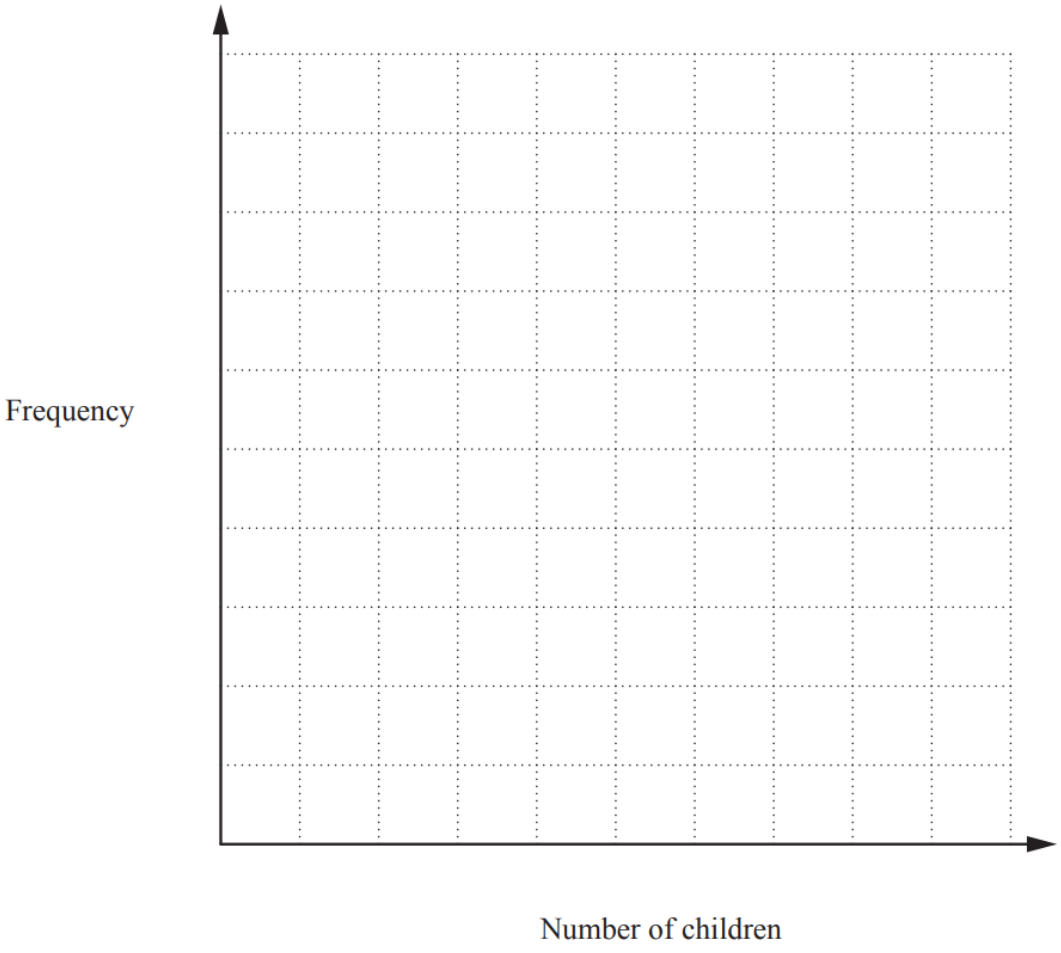
Answer ..... [1]

(c) Steven chooses two women at random from the group.

Calculate the probability that **both** of them have just one child.
Give your answer as a fraction in its simplest form.

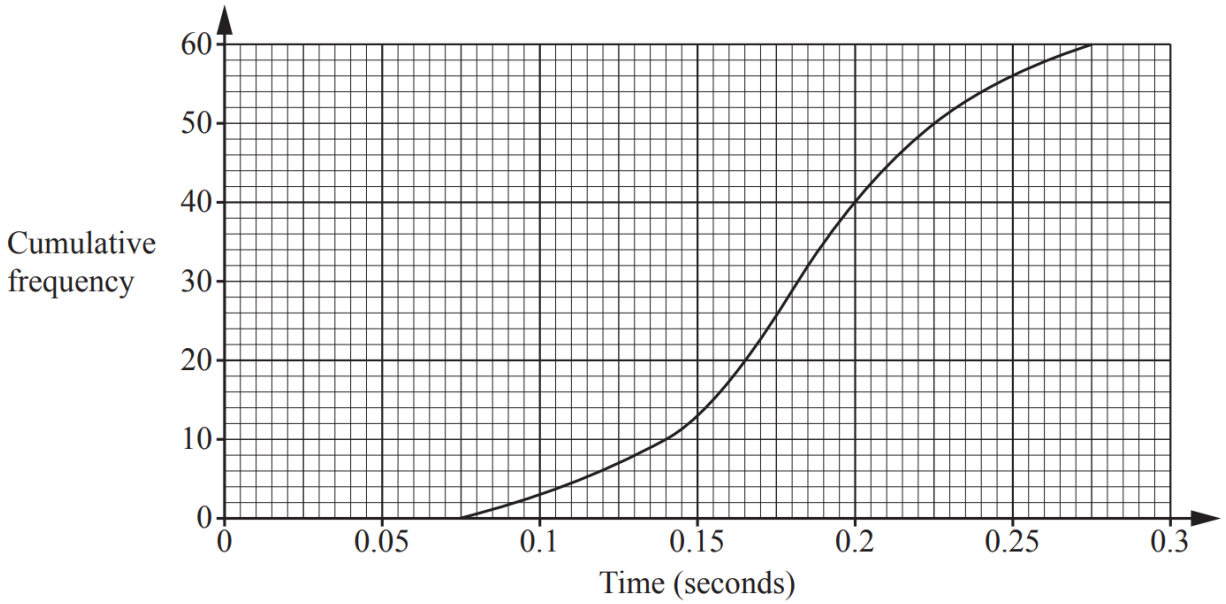
Answer ..... [2]

(d) Draw a bar chart to represent this data.



5. 4024/11/O/N/16 Q9

The cumulative frequency graph shows information about the reaction times of 60 people.



Use the graph to estimate

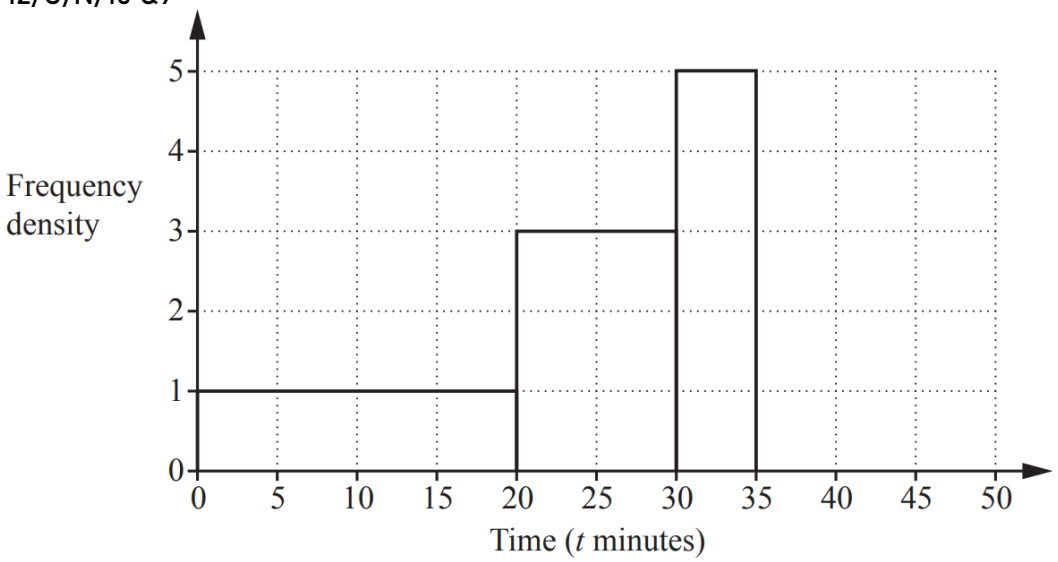
(a) the lower quartile,

Answer ..... [1]

(b) the number of people who have a reaction time of more than 0.2 seconds.

Answer ..... [1]

6. 4024/12/O/N/16 Q9



The diagram shows part of the histogram which represents the distribution of times taken by some people to travel to work.

(a) Complete the table.

Time (t minutes)	$0 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 35$	$35 < t \leqslant 50$
Frequency		30		30

[2]

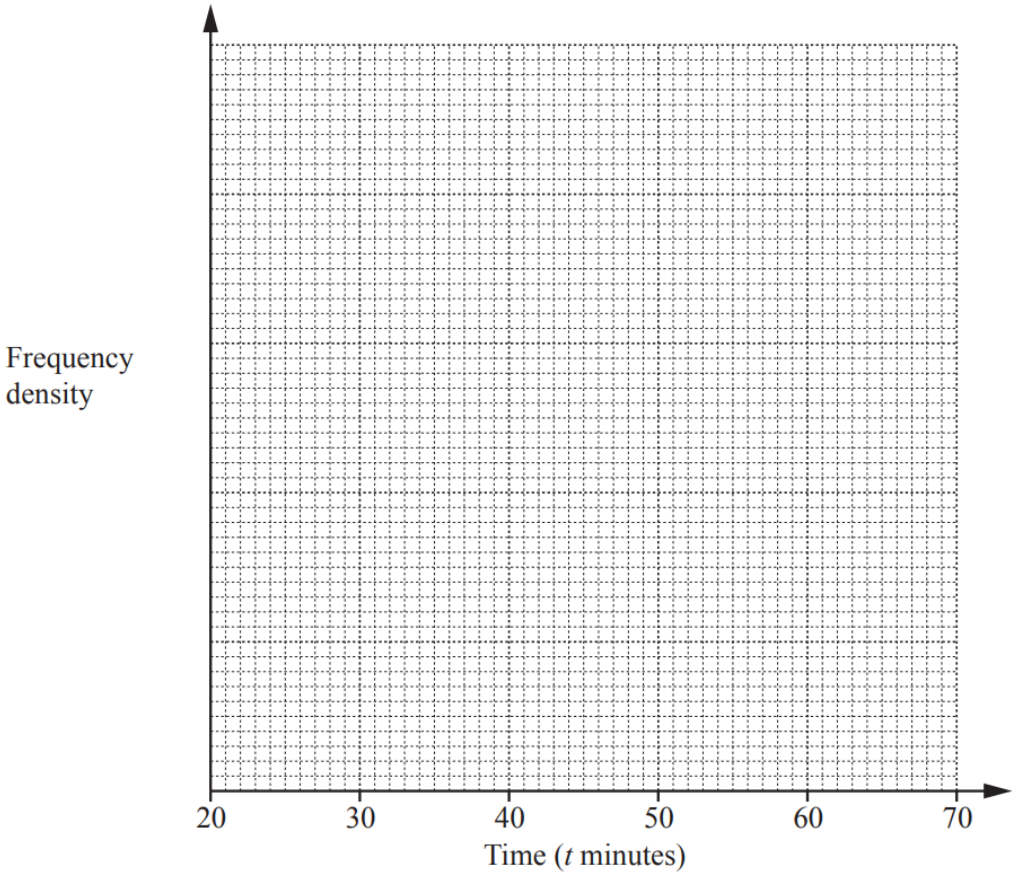
(b) Complete the histogram. [1]

7. 4024/21/O/N/16 Q10

(a) The times taken by 135 runners to complete a cross-country course were recorded. The results are summarised in the table.

Time (t minutes)	$20 < t \leqslant 30$	$30 < t \leqslant 35$	$35 < t \leqslant 40$	$40 < t \leqslant 50$	$50 < t \leqslant 70$
Number of runners	15	30	40	35	15

(i) On the grid, draw a histogram to represent this information.



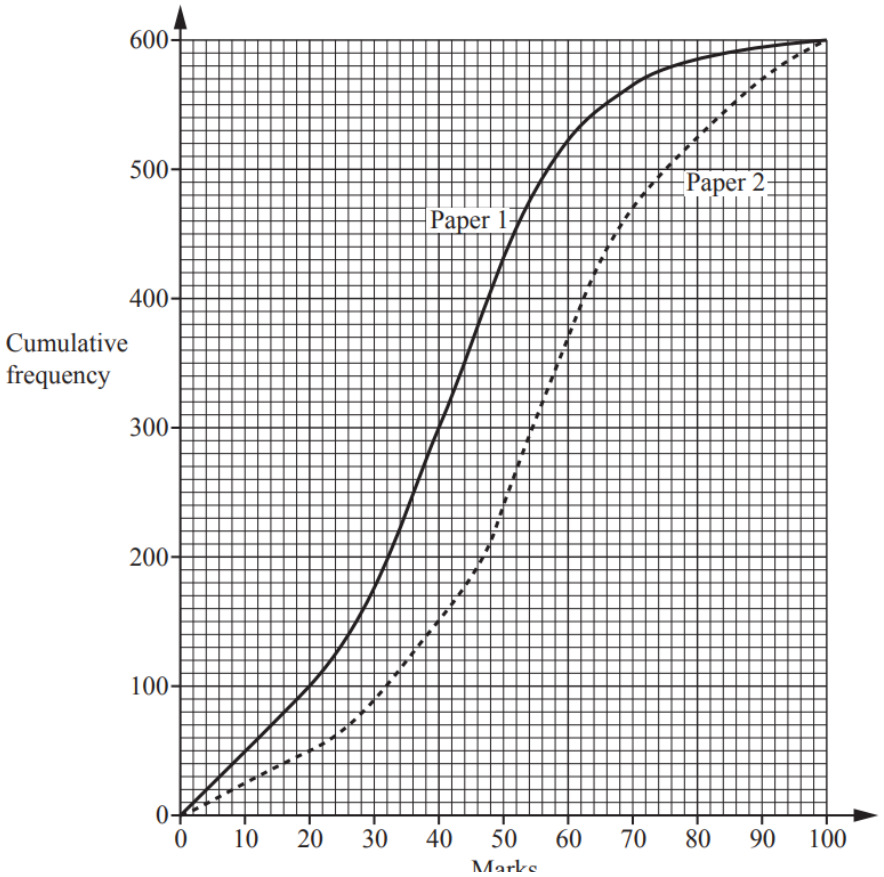
[3]

(ii) Calculate an estimate of the mean time.

Answer ..... minutes [3]

8. 4024/22/O/N/16 Q11

(a) Six hundred candidates took a mathematics examination which consisted of two papers.
Each paper was marked out of 100.
The diagram shows, on the same grid, the cumulative frequency curves for Paper 1 and Paper 2.



(i) Use the cumulative frequency curve for **Paper 1** to find an estimate of

(a) the median,

Answer ..... [1]

(b) the interquartile range,

Answer ..... [2]

(c) the number of candidates who scored more than 45.

Answer ..... [1]

(ii) A candidate scored 60 on Paper 1.

Using both graphs, estimate this candidate's mark on Paper 2.

Answer ..... [1]

(iii) State, with a reason, which you think was the more difficult paper.

Answer Paper ..... because .....

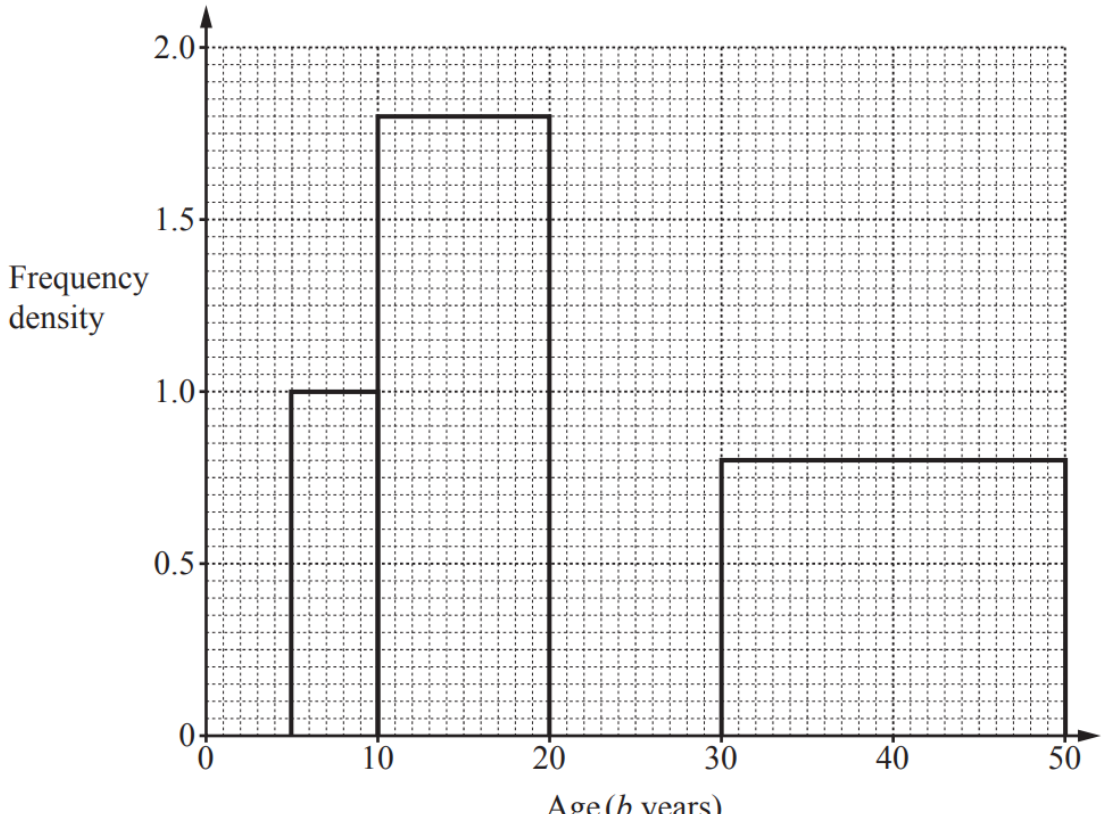
..... [1]

9. 4024/11/M/J/17 Q12

The ages of guests at a family party were recorded.
The results are summarised in the table.

Age (b years)	$5 < b \leqslant 10$	$10 < b \leqslant 20$	$20 < b \leqslant 30$	$30 < b \leqslant 50$
Frequency	p	18	14	q

The histogram below shows some of these results.



(a) Use the histogram to find the value of

(i) p,

Answer $p =$ ..... [1]

(ii) q.

Answer $q =$ ..... [1]

(b) Complete the histogram. [1]

10. 4024/21/M/J/17 Q11

80 people were each asked how much they spent on clothes last month.
The results are summarised in the table below.

Amount spent ($ c)	Frequency
$0 < c \leqslant 20$	3
$20 < c \leqslant 40$	8
$40 < c \leqslant 60$	14
$60 < c \leqslant 80$	21
$80 < c \leqslant 100$	18
$100 < c \leqslant 120$	9
$120 < c \leqslant 140$	5
$140 < c \leqslant 160$	2

(a) Calculate an estimate of the mean amount spent on clothes last month.

Answer $ ..... [3]

(b) Complete the cumulative frequency table below.

Amount spent ($ c)	$c \leqslant 20$	$c \leqslant 40$	$c \leqslant 60$	$c \leqslant 80$	$c \leqslant 100$	$c \leqslant 120$	$c \leqslant 140$	$c \leqslant 160$
Cumulative frequency	3	11						80

[1]

(c) On the grid opposite, draw a cumulative frequency curve to represent this data. [2]

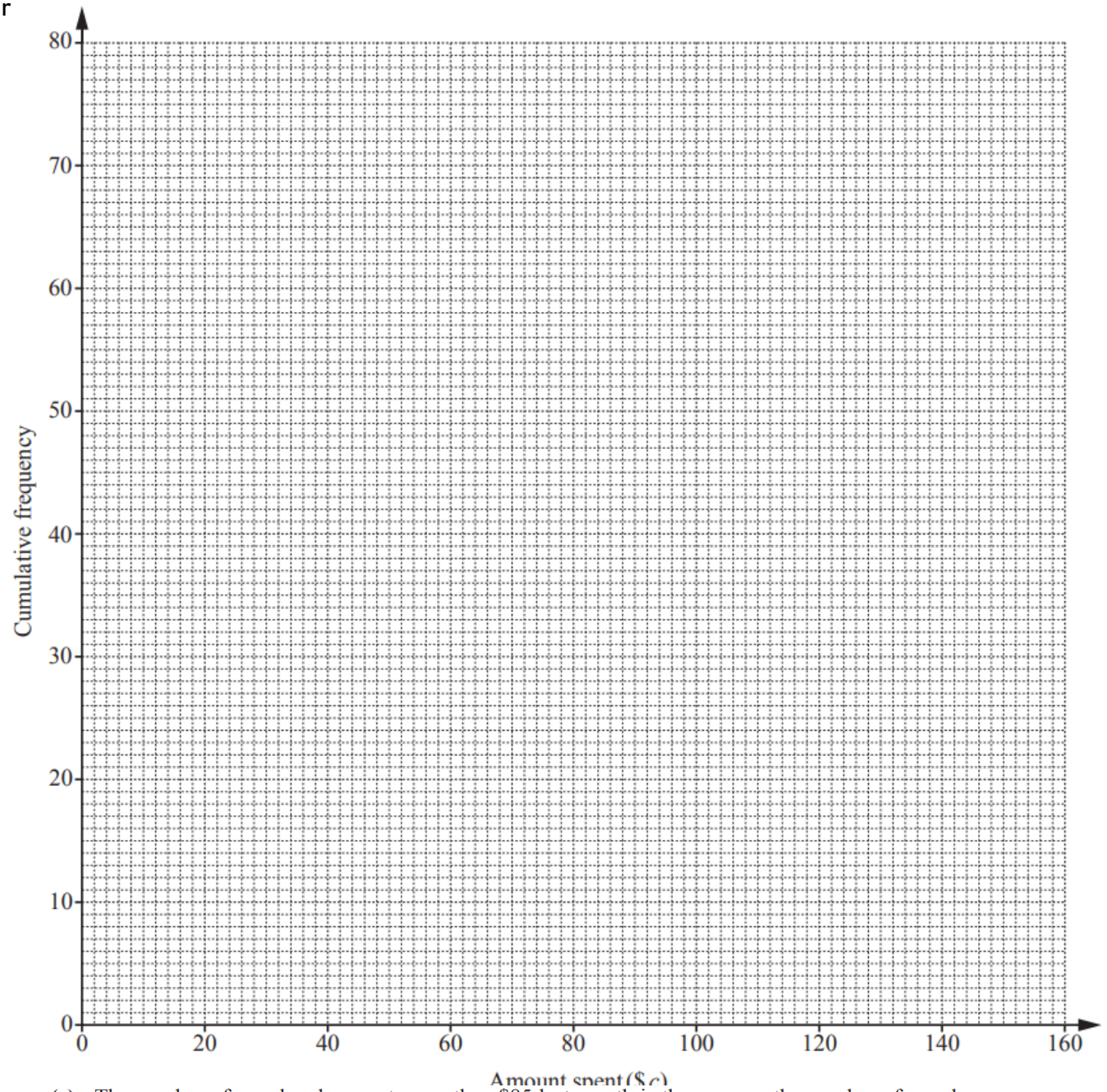
(d) **(i)** Use your graph to estimate the median.

Answer $ ..... [1]

(ii) Use your graph to estimate the interquartile range.

Answer $ ..... [2]

For



(e) The number of people who spent more than \$85 last month is the same as the number of people who spent between \$$k$ and \$85.

Given that k is less than 85, use your graph to estimate the value of k.

Answer $k =$ ..... [3]

11. 4024/22/M/J/17 Q11

(a) The table below summarises the times taken by 50 athletes to run 400 m.

Time (t seconds)	$50 \leqslant t < 55$	$55 \leqslant t < 60$	$60 \leqslant t < 65$	$65 \leqslant t < 70$	$70 \leqslant t < 75$
Frequency	7	16	15	11	1

(i) State the modal class.

Answer ..... [1]

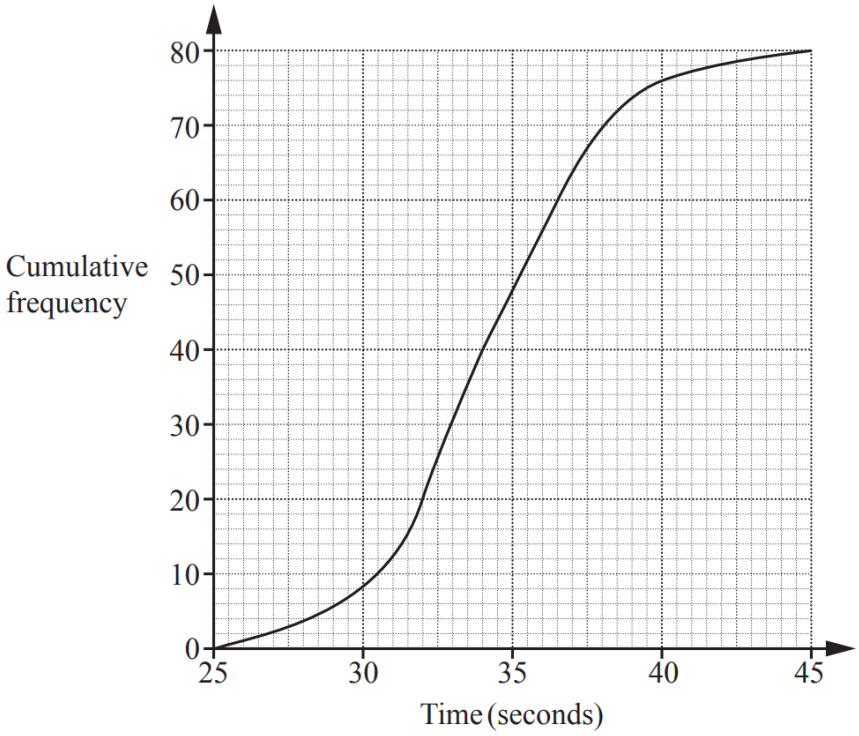
(ii) Calculate an estimate of the mean time taken by these athletes.

Answer ..... s [3]

(iii) Calculate the probability that an athlete chosen at random took less than 60 seconds to run the 400 m.

Answer ..... [2]

(b) The cumulative frequency curve summarises the times taken by 80 boys to run 200 m.



(i) Find the median time.

Answer ..... s [1]

(ii) Find the interquartile range.

Answer ..... s [2]

(iii) 60 girls also ran 200 m.

The girl who took the longest time ran 200 m in 40 seconds.
The girl who took the shortest time ran 200 m in 28 seconds.

The lower quartile for the boys and the girls is the same.
The interquartile range for the girls is 4 seconds.

Draw the cumulative frequency curve on the grid above. [3]

12. 4024/11/O/N/17 Q10

One week the temperatures, in degrees Celsius, at midnight were recorded.
The results are given below.

$$-1 \quad -3 \quad 2 \quad 5 \quad -2 \quad 1 \quad -2$$

Use these results to find

(a) the mode,

Answer ..... [1]

(b) the median,

Answer ..... [1]

(c) the mean.

Answer ..... [1]

13. 4024/12/O/N/17 Q2

The masses, in kilograms, of 20 parcels sent by a dispatch centre are given in the table.

4.2	5.3	5.1	7.8	8.2	7.5	3.2	5.7	4.1	5.9
8.4	5.6	8.0	3.2	4.8	6.9	6.2	3.2	5.4	4.7

(a) By using tally marks, or otherwise, complete the grouped frequency distribution for these masses.

Mass (m kilograms)	Tally marks	Frequency
$3 < m \leqslant 5$		
$5 < m \leqslant 7$		
$7 < m \leqslant 9$		

[1]

(b) The results are to be shown in a pie chart.

Calculate the angle of the sector representing the group with the smallest frequency.

Answer ..... [1]

14. 4024/21/O/N/17 Q2

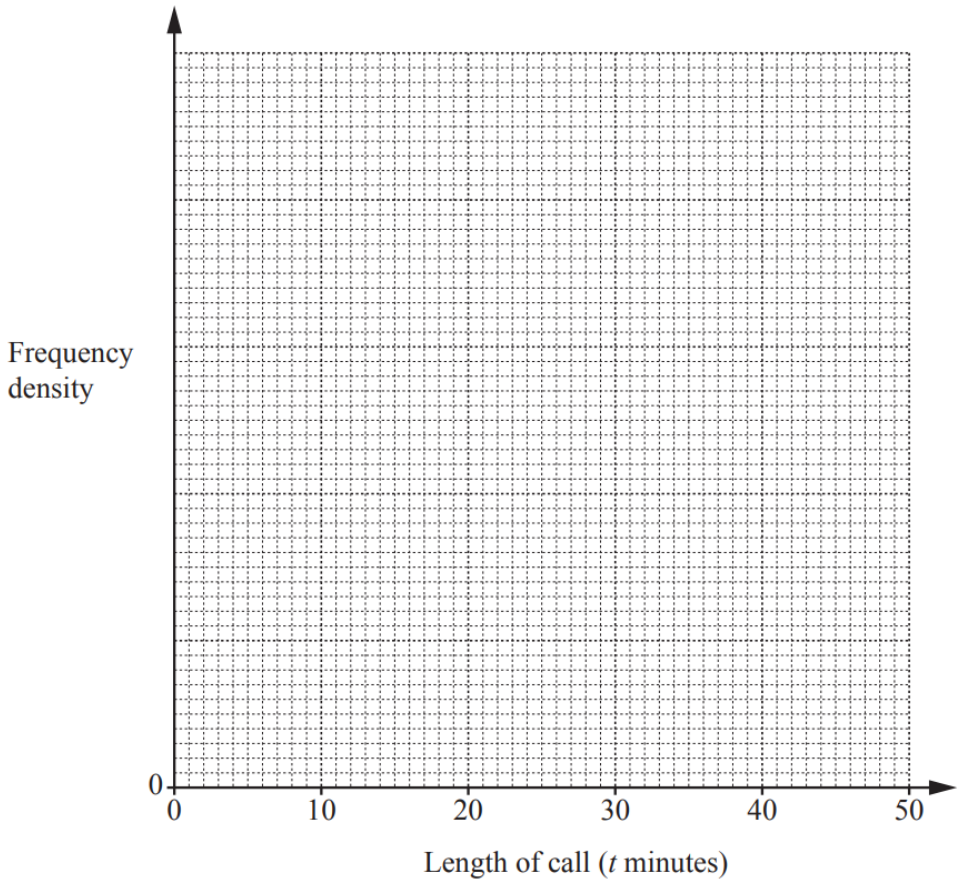
Sunil recorded the lengths, in minutes, of the 150 phone calls he made one month.
His results are summarised in the table.

Length of call (t minutes)	$0 < t \leqslant 5$	$5 < t \leqslant 10$	$10 < t \leqslant 20$	$20 < t \leqslant 30$	$30 < t \leqslant 50$
Frequency	35	42	30	28	15

(a) Calculate an estimate of the mean length of a call.

Answer ..... minutes [3]

(b) On the grid below, draw a histogram to represent this data.



[3]

(c) Find an estimate for the percentage of Sunil's calls that were longer than 25 minutes.

Answer ..... % [2]

15. 4024/22/O/N/17 Q2

A company asked their employees how long they took to travel to work one day.
The table summarises the times for 120 employees.

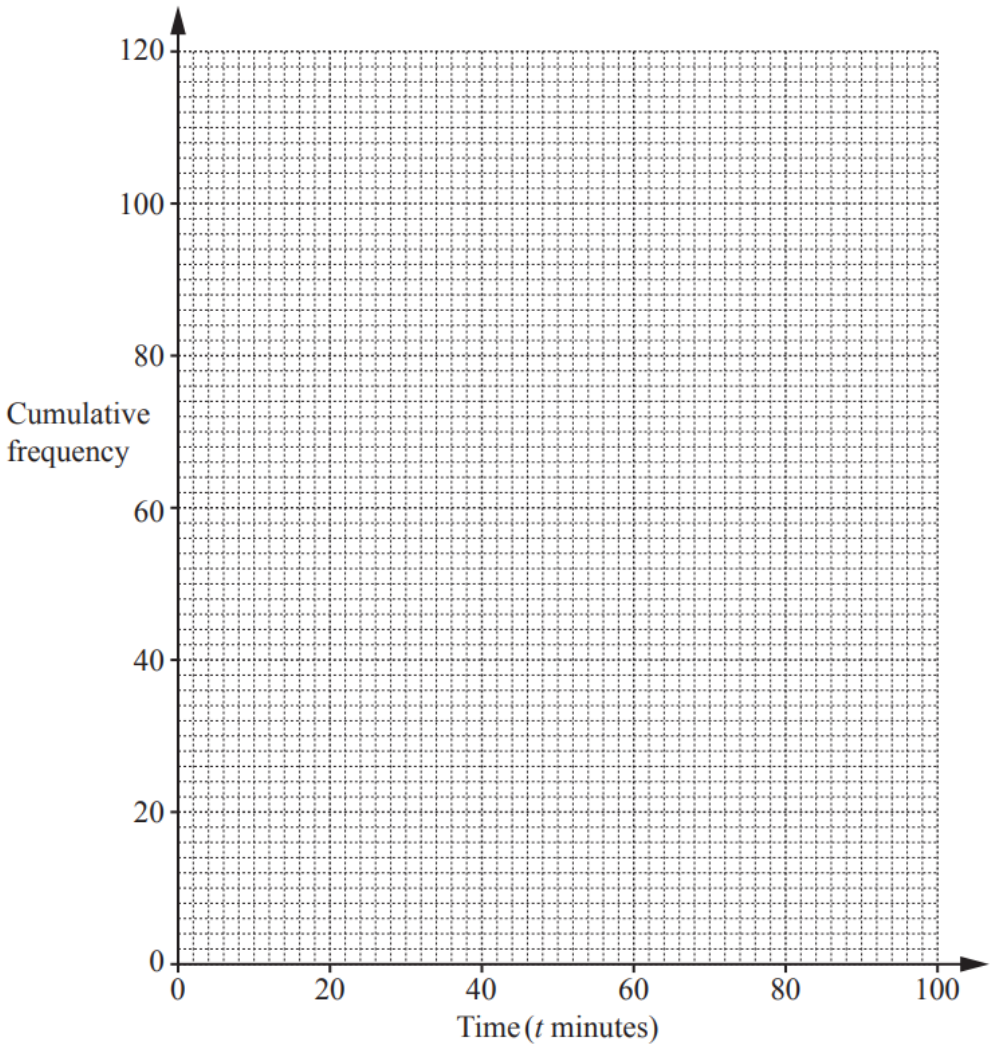
Time (t minutes)	$0 < t \leqslant 20$	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 80$	$80 < t \leqslant 100$
Frequency	12	28	45	22	13

(a) (i) Complete the cumulative frequency table below.

Time (t minutes)	$t \leqslant 0$	$t \leqslant 20$	$t \leqslant 40$	$t \leqslant 60$	$t \leqslant 80$	$t \leqslant 100$
Cumulative frequency	0					120

[1]

(ii) On the grid, draw a smooth cumulative frequency curve to represent these results.



[2]

(b) Use your curve to estimate

(i) the median time,

Answer ..... minutes [1]

(ii) the interquartile range of the times.

Answer ..... minutes [2]

(c) Calculate an estimate of the mean time taken for the employees to travel to work.

Answer ..... minutes [3]

16. 4024/11/M/J/18 Q7

Usama recorded the number of items bought by each of 20 customers at a shop.
The results are shown in the table.

Number of items bought	1	2	3	4	5	6
Number of customers	3	0	5	3	7	2

(a) Write down the mode.

Answer ..... [1]

(b) Find the median number of items bought.

Answer ..... [1]

(c) Calculate the mean number of items bought.

Answer ..... [2]

(d) Usama draws a pie chart to show the data.

Calculate the angle of the sector on the pie chart which represents the number of people who bought 3 items.

Answer ..... [1]

17. 4024/12/M/J/18 Q12

A dice is thrown 400 times.
The results are shown in the table.

Number thrown	1	2	3	4	5	6
Frequency	65	80	70	75	50	60

(a) Find the relative frequency of throwing the number 2.

Answer ..... [1]

(b) Imran throws the dice 1000 times.

How many times would you expect the number 2 to be thrown?

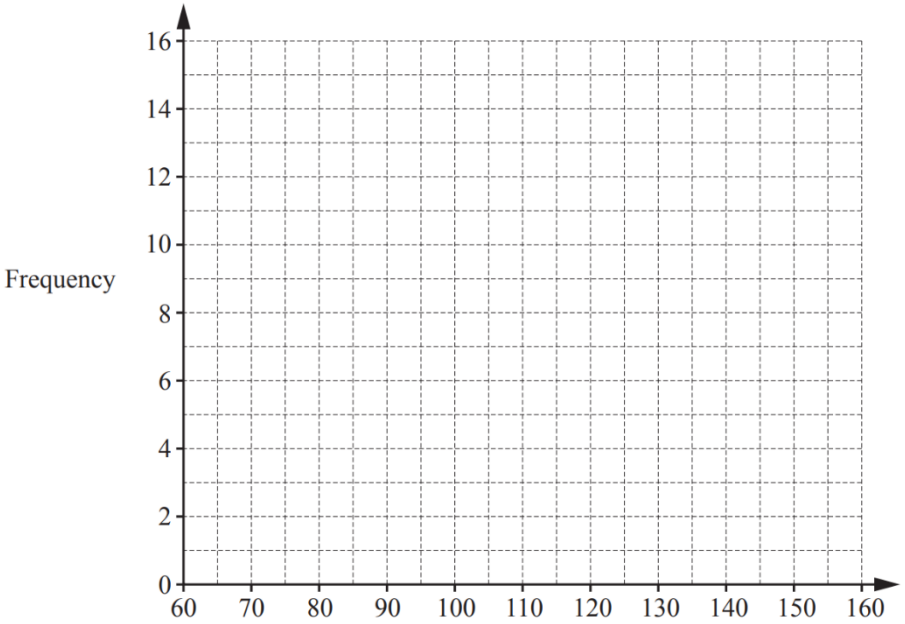
Answer ..... [1]

18. 4024/22/M/J/18 Q2

(a) Jenny recorded the time, in minutes, of 40 movies.
The table summarises her results.

Time (t minutes)	$60 < t \leqslant 80$	$80 < t \leqslant 100$	$100 < t \leqslant 120$	$120 < t \leqslant 140$	$140 < t \leqslant 160$
Frequency	2	7	15	11	5

On the grid, draw a frequency polygon to represent this information.



(b) Jenny asked 60 people how many movies they had each watched in the last month.
The table summarises her results.

Number of movies	0	1	2	3	4	5	6
Frequency	p	14	15	7	q	5	2

The mean number of movies watched is 2.3 .

Find the value of p and the value of q.

Answer $p =$ .....

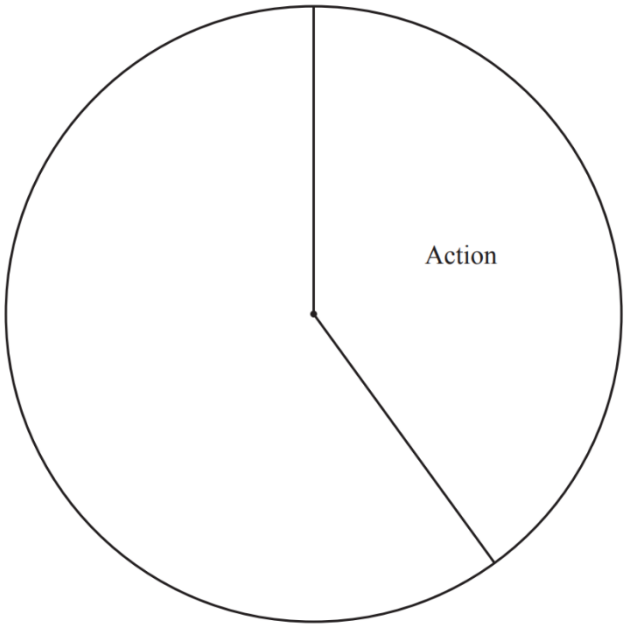
$q =$ ..... [3]

(c) Jenny also asked which type of movie each of the 60 people preferred.

The table summarises her results.

Type of movie	Action	Comedy	Drama	Horror
Frequency	24	15	9	12

(i) Complete the pie chart to represent the results.



(ii) One of the 60 people is chosen at random.

Find the probability that this person preferred drama or horror movies.

Answer ..... [1]

(iii) Two of the 60 people are chosen at random.

Calculate the probability that they both preferred comedy movies.

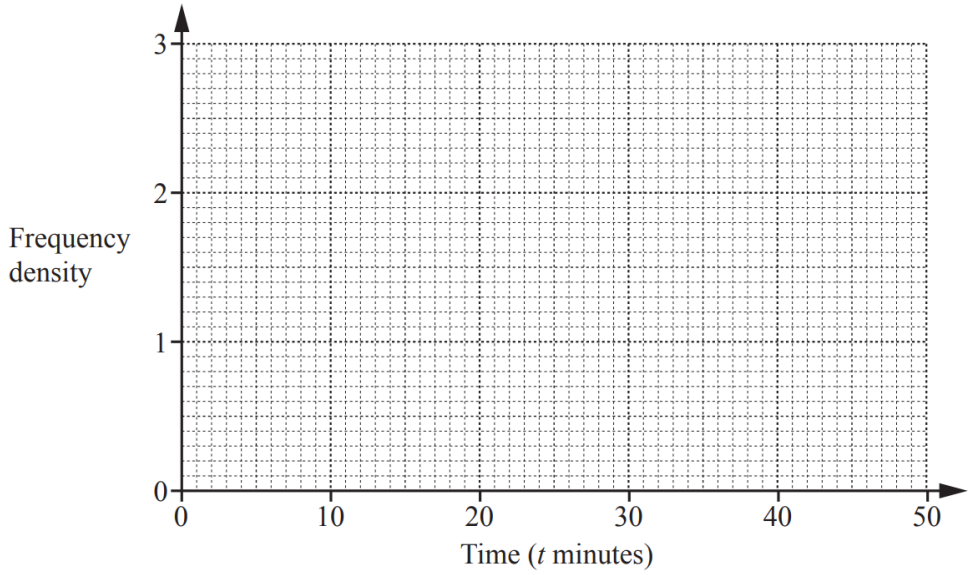
Answer ..... [2]

19. 4024/11/O/N/18 Q13

The lengths of the times of telephone calls made by Ellie during one week are summarised in the table.

Time (t minutes)	$0 < t \leqslant 10$	$10 < t \leqslant 20$	$20 < t \leqslant 25$	$25 < t \leqslant 30$	$30 < t \leqslant 50$
Frequency	10	15	10	12	16

On the grid, draw a histogram to illustrate the distribution of these times.



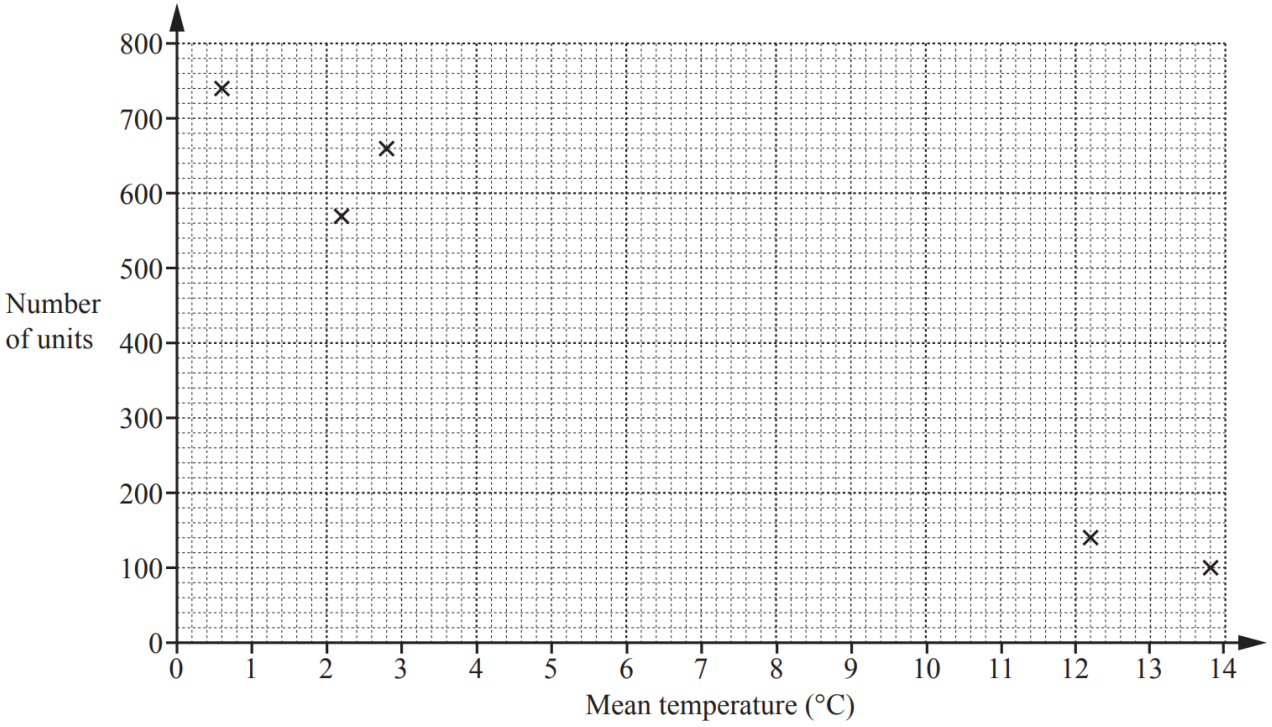
[3]

20. 4024/12/O/N/18 Q15

Each week, Henri records the number of units of gas used in his house and the mean temperature outside.
Ten of his results are shown in the table.

Mean temperature (°C)	12.2	13.8	0.6	2.2	2.8	4.4	5.6	6.8	9.0	10.6
Number of units	140	100	740	570	660	600	500	560	410	320

(a) On the grid, complete the scatter diagram.
The first five results have been plotted for you.



[2]

(b) What type of correlation does your scatter diagram show?

Answer ..... [1]

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

(d) Use your line of best fit to estimate the number of units used for one week when the mean temperature outside is 7.6 °C.

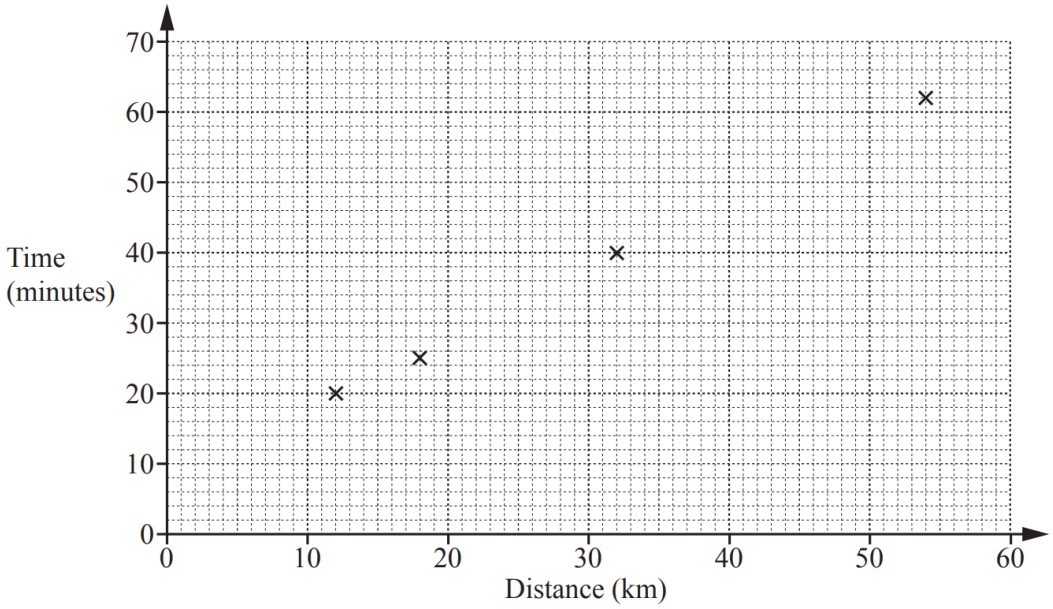
Answer ..... [1]

21. 4024/21/O/N/18 Q1

(a) The table shows the distances 10 people drive to work and the times they take.

Distance (km)	12	32	18	54	26	36	29	15	20	42
Time (minutes)	20	40	25	62	35	34	32	18	32	50

(i) On the grid, complete the scatter diagram to show this information.
The first four points have been plotted for you.



[2]

(ii) What type of correlation does the scatter diagram show?

Answer ..... [1]

(iii) One of these 10 people is selected at random.

Find the probability that this person drove less than 30 km to work.
Give your answer as a fraction in its simplest form.

Answer ..... [2]

(iv) Ateeq drives 48 km to work.

By drawing a line of best fit on the scatter diagram, estimate the time Ateeq takes to travel to work.

Answer ..... minutes [2]

(b) The table summarises the times taken by the 120 employees in a company to travel to work.

Time (t minutes)	$0 < t \leqslant 20$	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 80$	$80 < t \leqslant 100$
Frequency	29	38	26	21	6

(i) Write down the modal class.

Answer ..... [1]

(ii) Calculate an estimate of the mean time.

Answer ..... minutes [3]

(iii) Work out the percentage of employees who took more than 1 hour to travel to work.

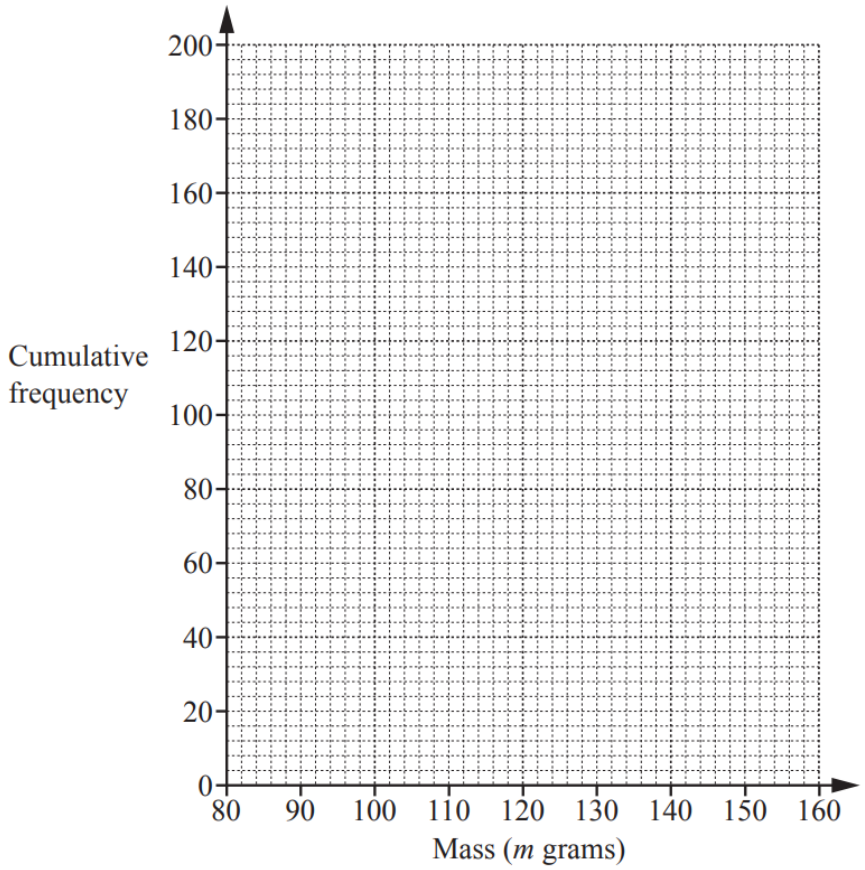
Answer ..... % [2]

22. 4024/22/O/N/18 Q2

Lim grows tomatoes.
The masses, m grams, of 200 of her tomatoes are recorded.
The cumulative frequency table shows the results.

Mass (m grams)	$m \leqslant 80$	$m \leqslant 100$	$m \leqslant 110$	$m \leqslant 120$	$m \leqslant 130$	$m \leqslant 140$	$m \leqslant 160$
Cumulative frequency	0	20	48	112	158	184	200

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



[2]

(b) Use your diagram to estimate

(i) the median,

Answer ..... g [1]

(ii) the interquartile range.

Answer ..... g [2]

(c) Ravi also grows tomatoes.
The masses of 200 of his tomatoes are also recorded.
For Ravi's tomatoes, the median mass was 124 g and the interquartile range of the masses was 12 g.

Make two comments comparing the masses of tomatoes grown by Lim with those grown by Ravi.

1 .....

.....

2 .....

..... [2]

(d) **(i)** Complete the frequency table for the masses of tomatoes grown by Lim.

Mass (m grams)	Frequency
$80 < m \leqslant 100$	20
$100 < m \leqslant 110$	28
$110 < m \leqslant 120$	64
$120 < m \leqslant 130$	
$130 < m \leqslant 140$	
$140 < m \leqslant 160$	16

[1]

(ii) Write down the modal class.

Answer ..... [1]

(iii) Calculate an estimate for the mean mass of these tomatoes.

Answer ..... g [3]

23. 4024/11/M/J/19 Q9

The students in a school each choose a piece of fruit to eat with their lunch.
They can choose from either an apple, a banana or an orange.

(a) On Monday, Klaudia records the fruit chosen by 30 of her classmates.
Their choices are given below.

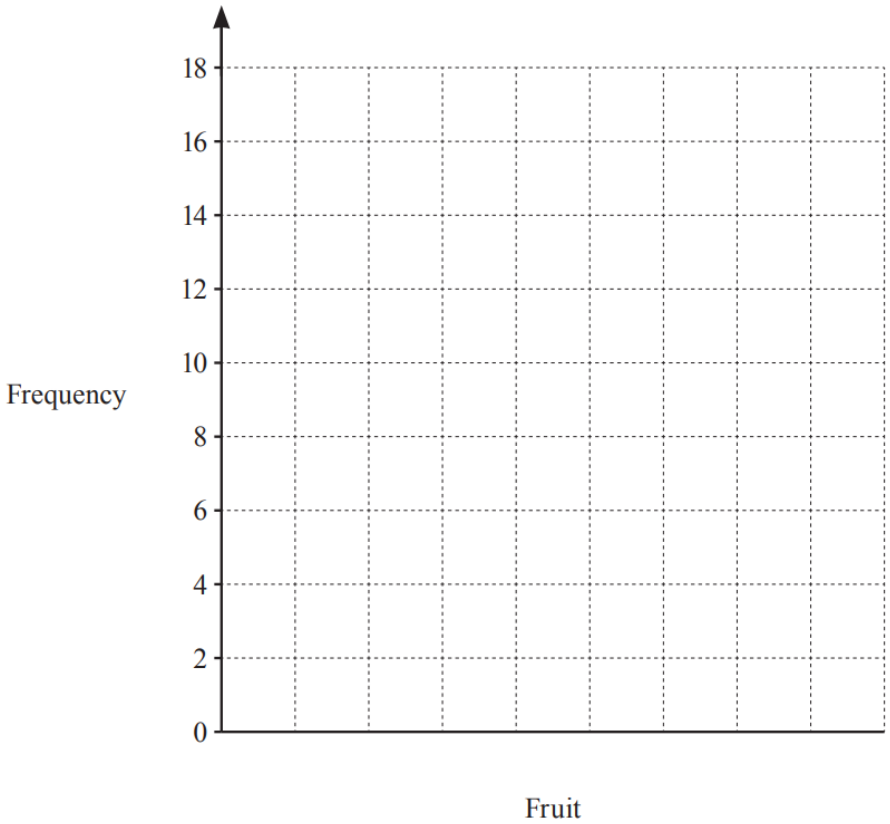
Orange	Apple	Orange	Apple	Apple	Orange
Banana	Orange	Apple	Banana	Orange	Orange
Apple	Banana	Orange	Apple	Orange	Banana
Orange	Apple	Banana	Apple	Banana	Orange
Apple	Orange	Orange	Banana	Apple	Banana

(i) Complete the frequency table for the data.

Fruit	Apple	Banana	Orange
Frequency			

[1]

(ii) On the grid below, draw a bar chart to show the data.



[2]

(b) On Tuesday, Ahmed records the fruit chosen by a random sample of 30 students in the lunch queue. His results are shown in the table below.

Fruit	Apple	Banana	Orange
Frequency	8	15	7

(i) Use Ahmed's results to estimate the probability that a student selected at random chooses an **orange**.

..... [1]

(ii) There is a total of 180 students in the school.

Use Ahmed's results to estimate the number of students in the school who chose an **apple** on Tuesday.

..... [1]

24. 4024/12/M/J/19 Q3

The height of water, in cm, in a river is recorded every week for 10 weeks.
The heights of the water, compared with its normal level, are listed below.

−45 −30 −35 0 5 −10 −20 40 20 25

(a) Work out the range.

..... cm [1]

(b) Calculate the mean.

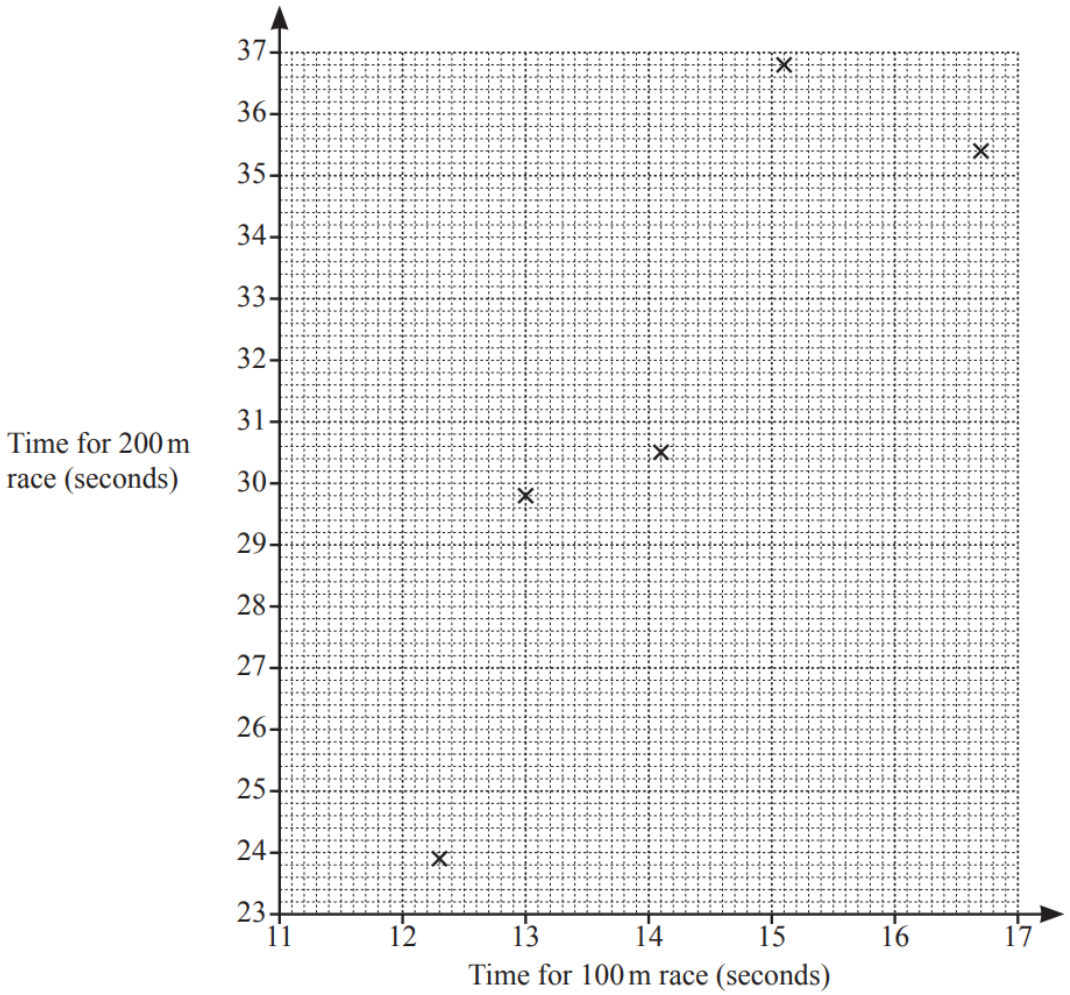
..... cm [2]

25. 4024/21/M/J/19 Q2

Ten boys ran in a 100 m race and a 200 m race.
The table below shows their times in seconds.

Time for 100 m race	12.3	14.1	15.1	16.7	13.0	14.7	13.7	12.9	15.2	16.1
Time for 200 m race	23.9	30.5	36.8	35.4	29.8	32.5	28.4	26.1	33.5	36.0

(a) Complete the scatter diagram.
The first five points have been plotted for you.



[2]

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

..... [1]

(c) Draw a line of best fit. [1]

(d) Another boy recorded a time of 27.5 s in the 200 m race.

Use your graph to estimate the time it would take him to run 100 m.

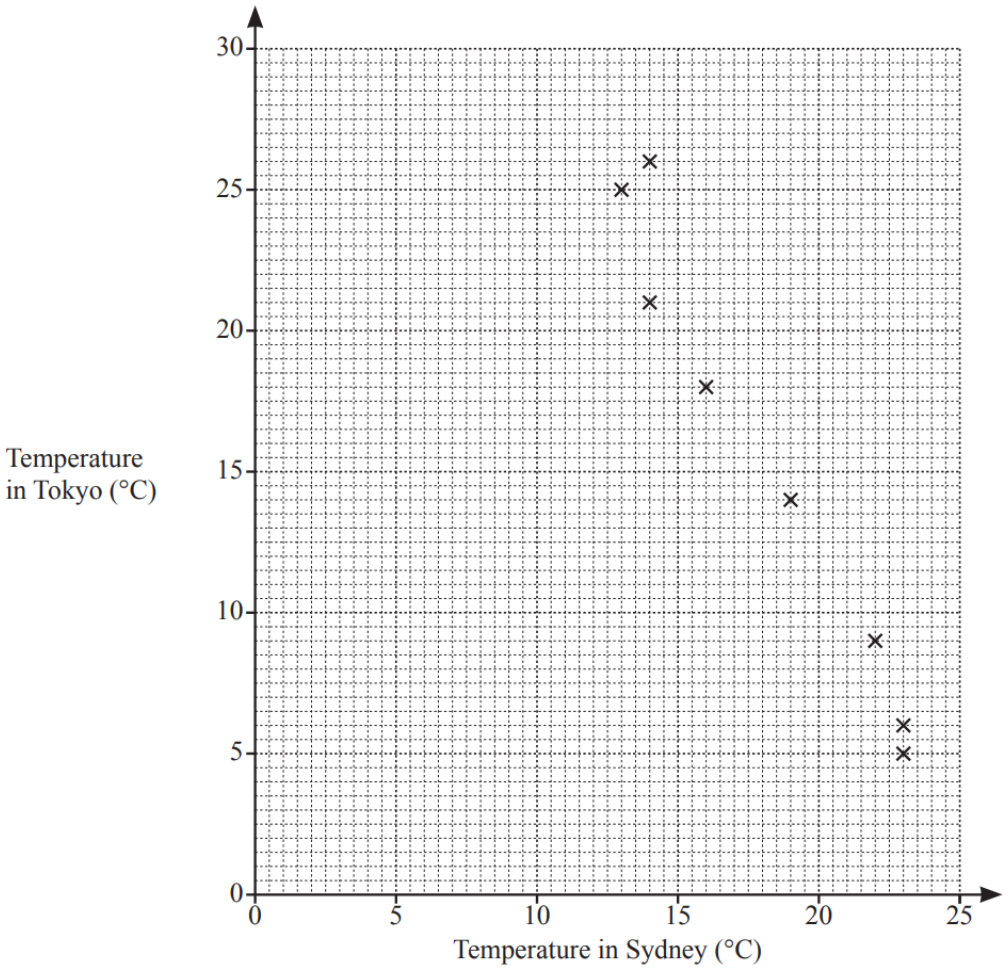
..... s [1]

26. 4024/22/M/J/19 Q2

The table shows the average monthly temperatures (°C) in Tokyo and in Sydney one year.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature in Sydney (°C)	23	23	22	19	16	14	13	14	16	18	20	21
Temperature in Tokyo (°C)	5	6	9	14	18	21	25	26	23	18	12	8

(a) Complete the scatter diagram.
The first eight points have been plotted for you. [2]



(b) What type of correlation is shown by the scatter diagram?

..... [1]

(c) Draw a line of best fit. [1]

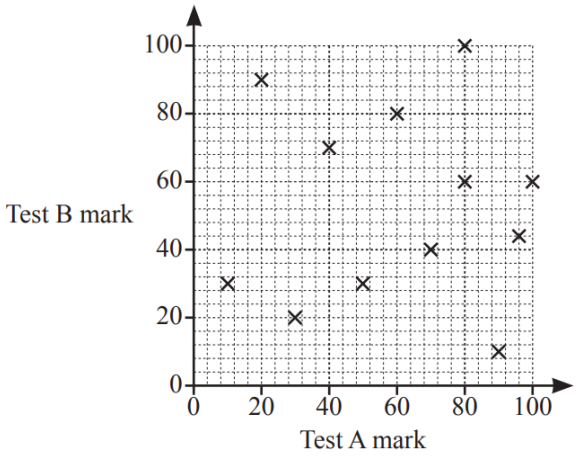
(d) The following year, the average temperature in Sydney during May was 15 °C.

By using your line of best fit, estimate the average temperature in Tokyo that May.

..... °C [1]

27. 4024/11/O/N/19 Q2

The scatter diagram shows the marks that 12 students each obtained in test A and test B.

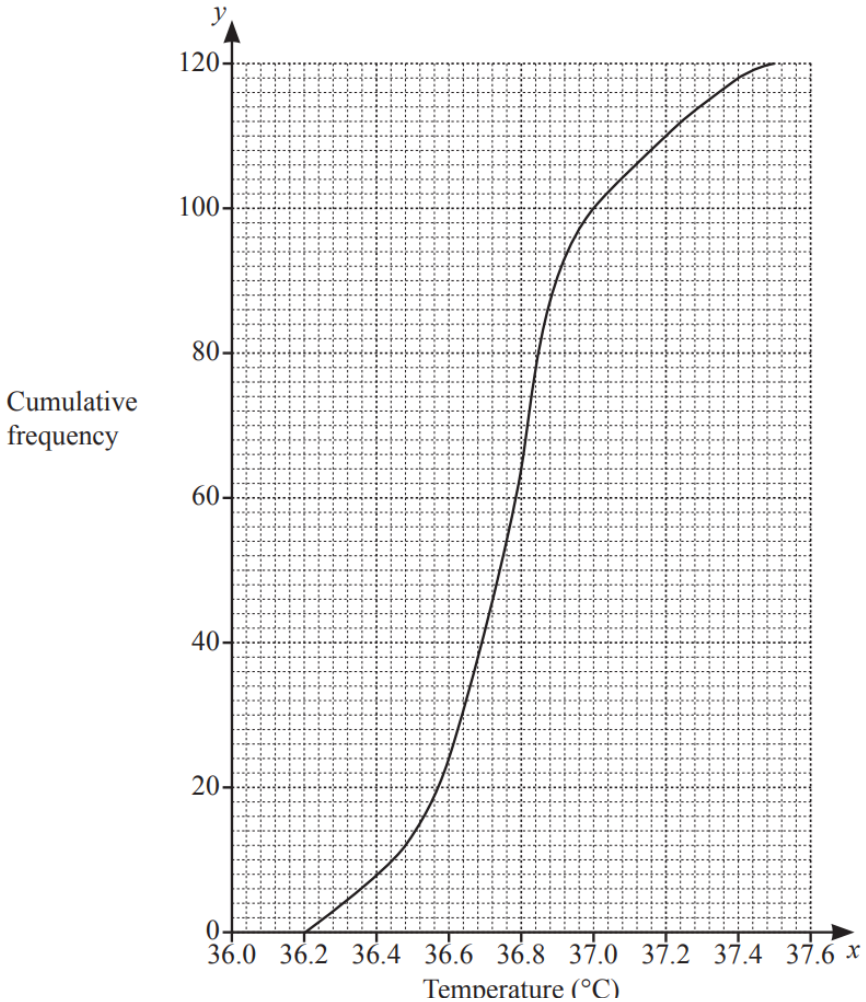


Give a reason why it is not appropriate to draw a line of best fit for this diagram.

..... [1]

28. 4024/12/O/N/19 Q14

The temperatures, in °C, of 120 people were measured.
The results are summarised in the cumulative frequency diagram.



Use the diagram to find an estimate of

(a) the 20th percentile,

..... °C [2]

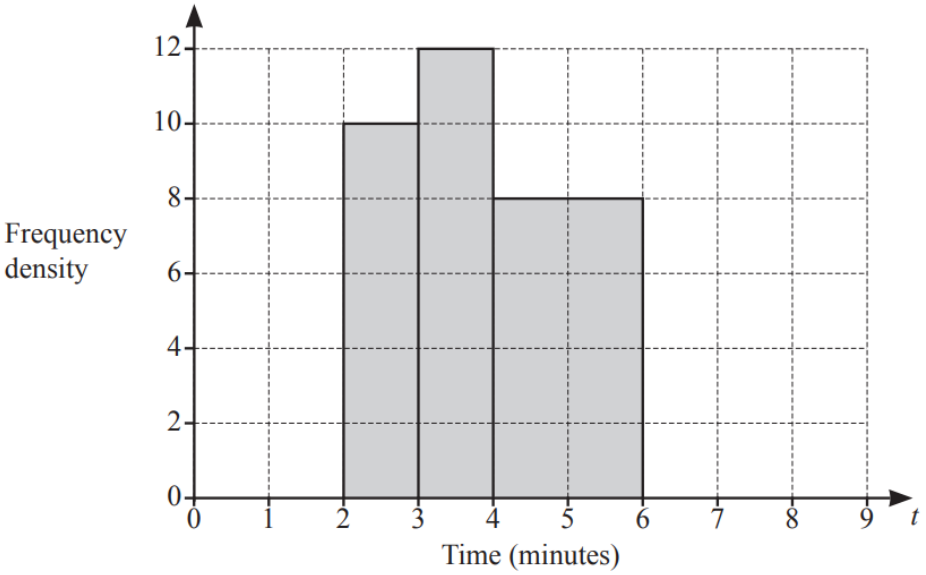
(b) the number of people with a temperature between 36.8 °C and 37.0 °C.

..... [2]

29. 4024/12/O/N/19 Q15

The time taken by each member of a group of students to solve a problem was recorded.
Some of the results are summarised in the table and illustrated in the histogram.

Time (t minutes)	$1 < t \leqslant 2$	$2 < t \leqslant 3$	$3 < t \leqslant 4$	$4 < t \leqslant 6$	$6 < t \leqslant 8$
Frequency	6	10	12	p	4



(a) Use the histogram to find the value of p.

$p =$ ..... [1]

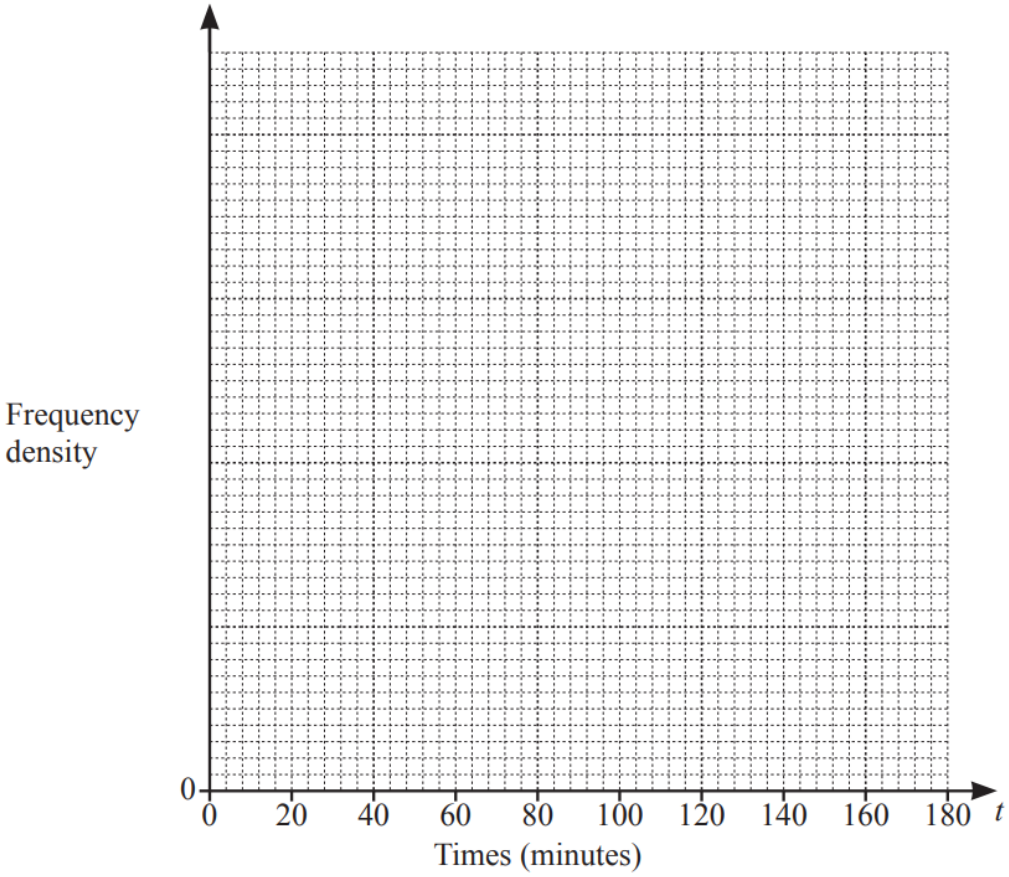
(b) Complete the histogram. [2]

30. 4024/21/O/N/19 Q2

(a) One afternoon, there were 200 visitors to a library.
The table summarises the time, in minutes, each visitor spent in the library.

Time (t minutes)	$0 < t \leqslant 20$	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 90$	$90 < t \leqslant 180$
Frequency	26	76	56	24	18

(i) On the grid, draw a histogram to represent this data.



(ii) Work out the percentage of these visitors who spent more than 40 minutes in the library. [3]

..... % [2]

(b) Mario recorded the number of books borrowed by each of the 200 visitors to the library. His results are shown in the table.

Number of books	0	1	2	3	4	5	6
Frequency	17	47	42	28	32	21	13

(i) Find the median.

..... [1]

(ii) Calculate the mean.

..... [2]

(iii) One of the visitors is selected at random.

Find the probability that this visitor borrowed more than 4 books.

..... [1]

(iv) Two of the visitors are selected at random.

Find the probability that only one of them borrowed 6 books.
Give your answer as a decimal correct to 4 significant figures.

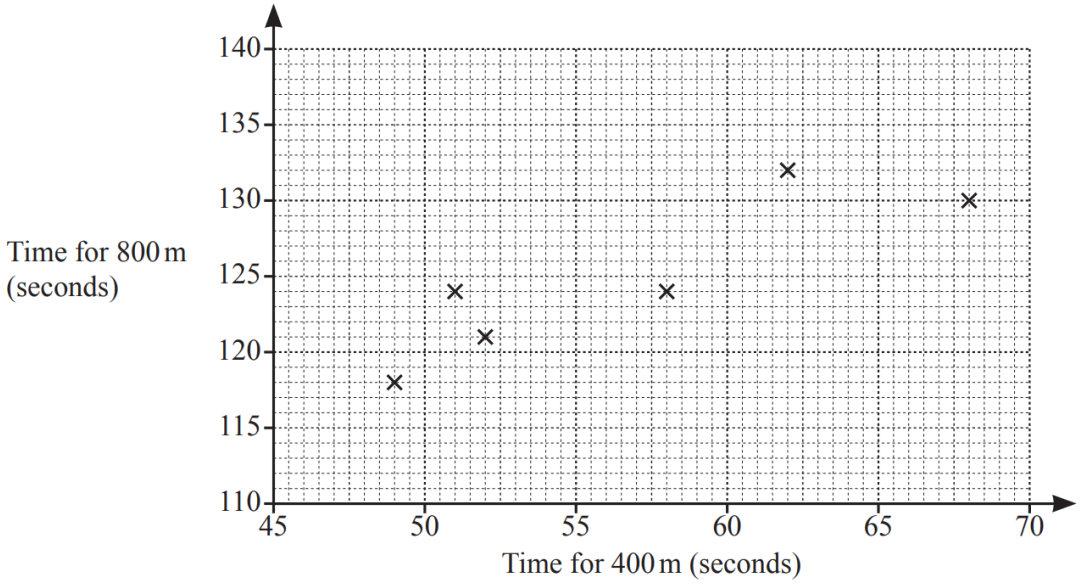
..... [3]

31. 4024/22/O/N/19 Q3

(a) The table shows the times, in seconds, taken for each of 12 members of an athletics club to run 400 metres and 800 metres.

Time for 400 m (seconds)	49	62	58	52	51	68	56	63	50	61	53	55
Time for 800 m (seconds)	118	132	124	121	124	130	129	138	126	131	119	127

(i) On the grid, complete the scatter diagram.
The first six points have been plotted for you.



[2]

(ii) Runners who took less than 55 seconds to run 400 metres **and** less than 125 seconds to run 800 metres are selected to enter an athletics competition.

How many of these runners are selected for the competition?

..... [1]

(iii) What type of correlation does the scatter diagram show?

..... [1]

(iv) Draw a line of best fit on the scatter diagram. [1]

(v) Another runner took 65 seconds to run 400 metres.

Use your line of best fit to estimate how long they would take to run 800 metres.

..... s [1]

(b) 50 members of the athletics club attempted the high jump.
The table summarises the heights, in centimetres, of their jumps.

Height (h cm)	$140 < h \leqslant 145$	$145 < h \leqslant 150$	$150 < h \leqslant 155$	$155 < h \leqslant 160$	$160 < h \leqslant 165$
Frequency	p	10	15	13	q

The athletics coach uses the mid-interval values to calculate an estimate of the mean height jumped by the 50 athletes.
His estimate of the mean is 153.6 cm.

(i) Explain why $p+q = 12$.

.....

..... [1]

(ii) Show that $142.5p + 162.5q = 1870$.

[2]

(iii) Find the value of p and the value of q.
Show your working.

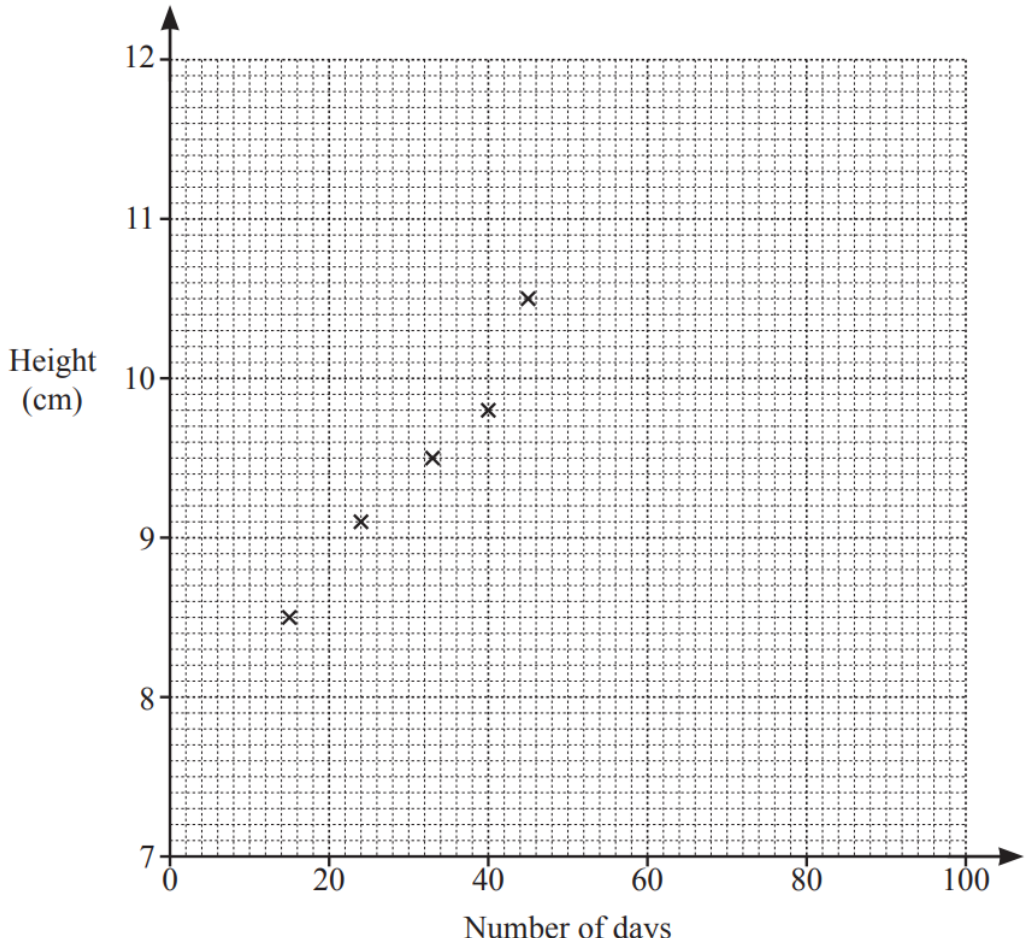
$p =$ .....

$q =$ ..... [3]

32. 4024/11/M/J/20 Q10

The table below shows the height of a plant, in centimetres, and the number of days after planting.

Number of days	15	24	33	40	45	51	62	68	73	80
Height (cm)	8.5	9.1	9.5	9.8	10.5	10.8	11.3	11.4	11.8	11.8



(a) On the grid, complete the scatter diagram.
The first five points have been plotted for you. [2]

(b) What type of correlation is shown on the scatter diagram?

..... [1]

(c) Draw a line of best fit. [1]

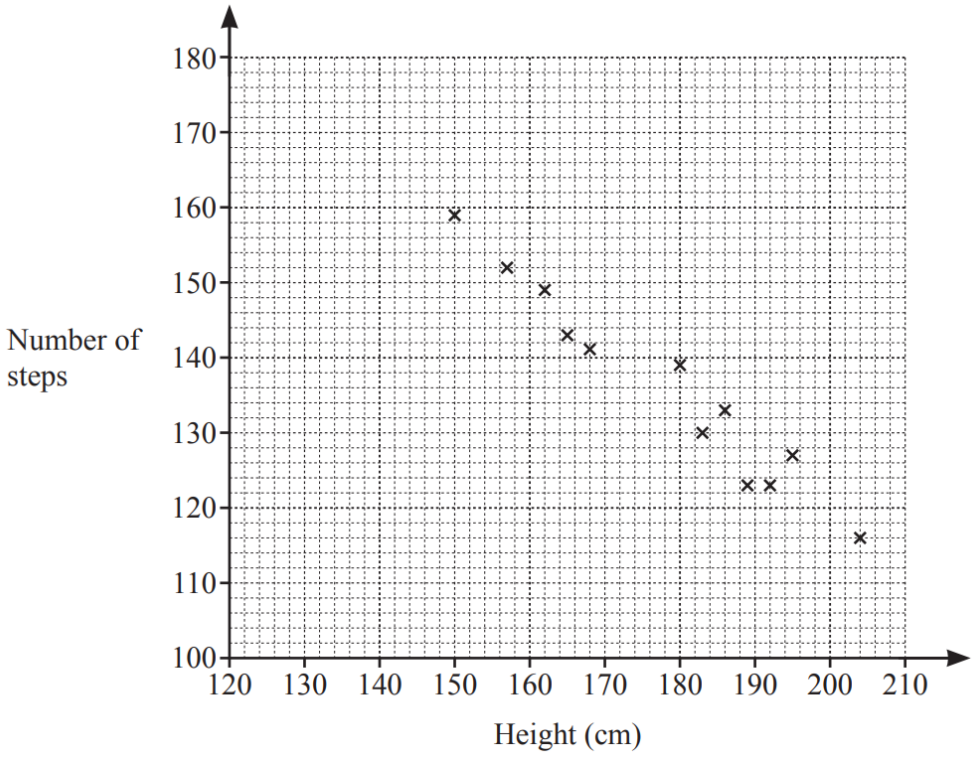
(d) Can the scatter diagram be used to predict the height of this plant 100 days after planting?
Give a reason for your answer.

.....

..... [1]

33. 4024/12/M/J/20 Q8

The number of steps taken by 12 people to walk 100 m was recorded.
The scatter diagram shows the heights of these people and the number of steps they took.



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

..... [1]

(b) Draw a line of best fit. [1]

(c) The height of another person is 175 cm.

Use your line of best fit to estimate the number of steps they would take to walk 100 m.

..... [1]

34. 4024/21/M/J/20 Q1

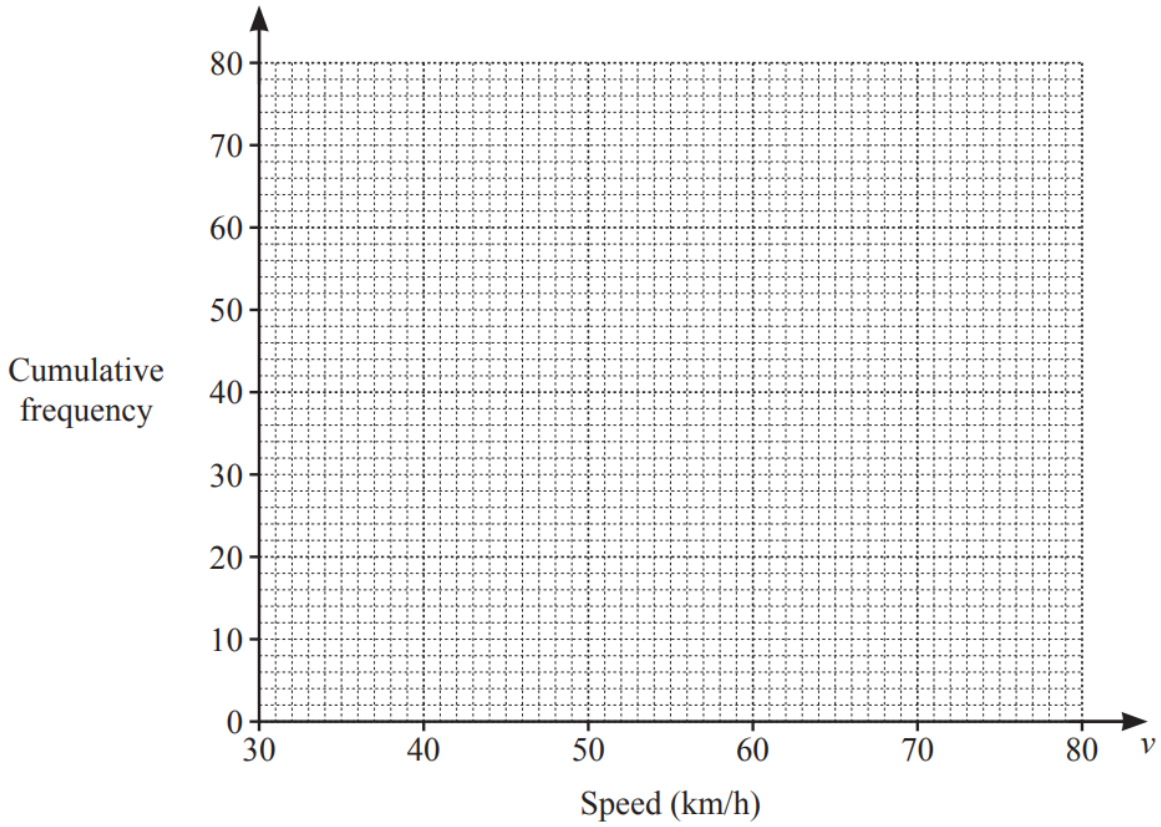
The speeds, v km/h, of 80 vehicles travelling along a road were recorded.
The results are shown in the table.

Speed (v km/h)	Frequency
$30 < v \leqslant 40$	10
$40 < v \leqslant 50$	18
$50 < v \leqslant 60$	27
$60 < v \leqslant 70$	19
$70 < v \leqslant 80$	6

(a) Calculate an estimate of the mean speed of the vehicles.

..... km/h [3]

(b) Draw the cumulative frequency diagram.



[3]

(c) Use your cumulative frequency diagram to find an estimate for

(i) the median,

..... km/h [1]

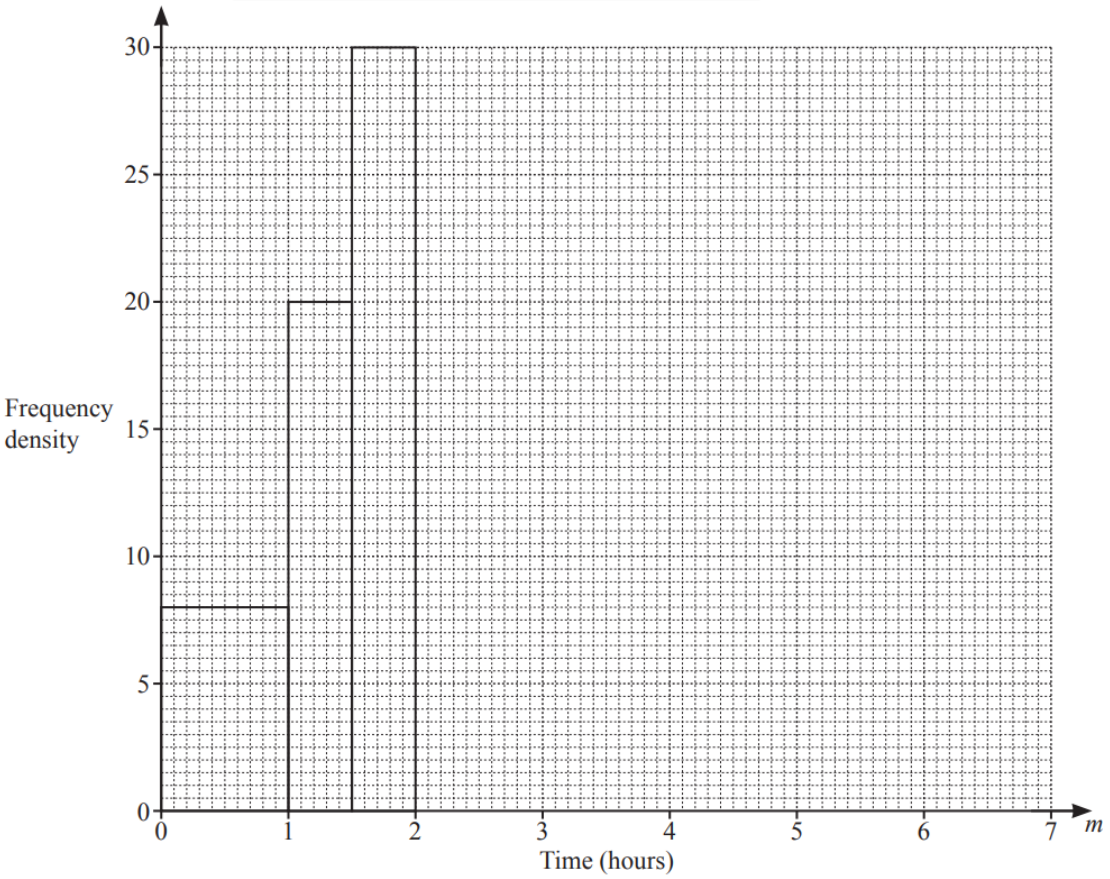
(ii) the interquartile range.

..... km/h [2]

35. 4024/22/M/J/20 Q4

(a) The table summarises the time, m hours, that each student in a year group spent listening to music in one day.
Some of the results are shown on the histogram.

Time (m hours)	Frequency
$0 < m \leqslant 1$	8
$1 < m \leqslant 1\frac{1}{2}$	10
$1\frac{1}{2} < m \leqslant 2$	p
$2 < m \leqslant 2\frac{1}{2}$	14
$2\frac{1}{2} < m \leqslant 3\frac{1}{2}$	23
$3\frac{1}{2} < m \leqslant 5$	18
$5 < m \leqslant 7$	12



(i) Use the histogram to find the value of p.

$p =$ ..... [1]

(ii) Complete the histogram. [3]

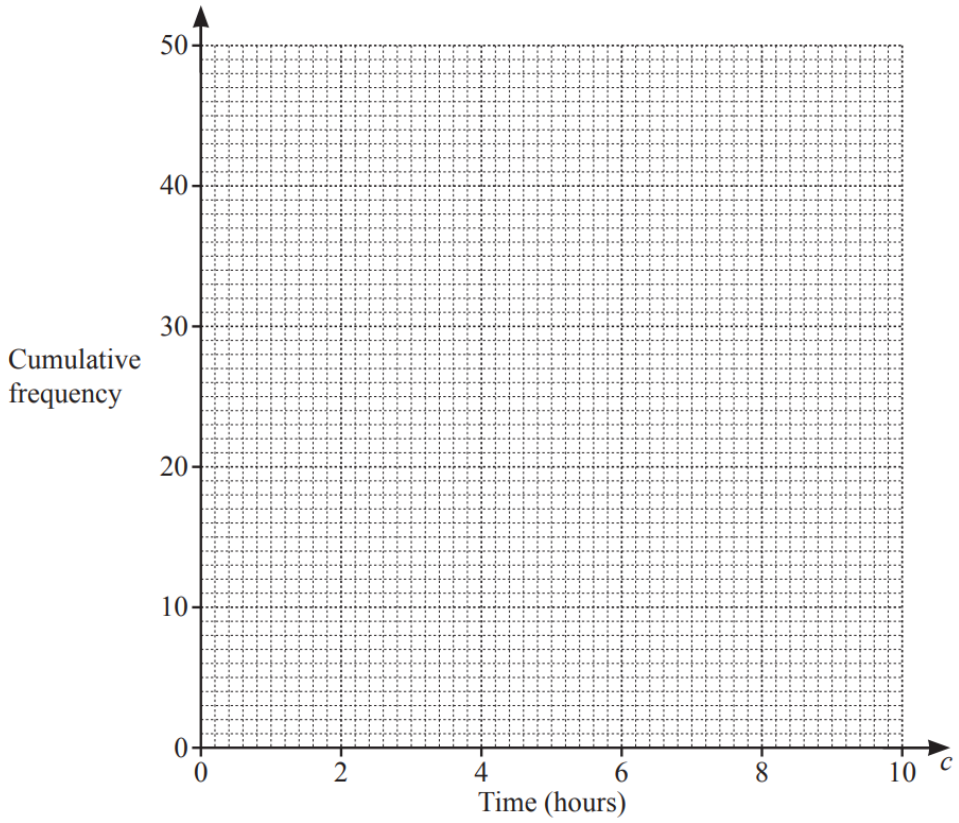
(b) This table summarises the time, c hours, that each student in a group of 50 students spent cooking in one week.

Time (c hours)	Frequency
$0 < c \leqslant 2$	8
$2 < c \leqslant 4$	16
$4 < c \leqslant 6$	15
$6 < c \leqslant 8$	7
$8 < c \leqslant 10$	4

(i) Calculate an estimate of the mean time spent cooking.

..... hours [3]

(ii) Draw the cumulative frequency diagram.



[3]

(iii) Use the cumulative frequency diagram to find an estimate for the median.

..... hours [1]

36. 4024/11/O/N/20 Q10

(a) A football team recorded the number of goals scored in each of their 20 games.
The table shows the results.

Number of goals scored	0	1	2	3	4
Frequency	6	5	4	4	1

(i) Write down the mode.

..... [1]

(ii) Find the median.

..... [1]

(b) In the football team

- the 2 tallest players have a mean mass of 75kg
- the 8 shortest players have a mean mass of 60kg.

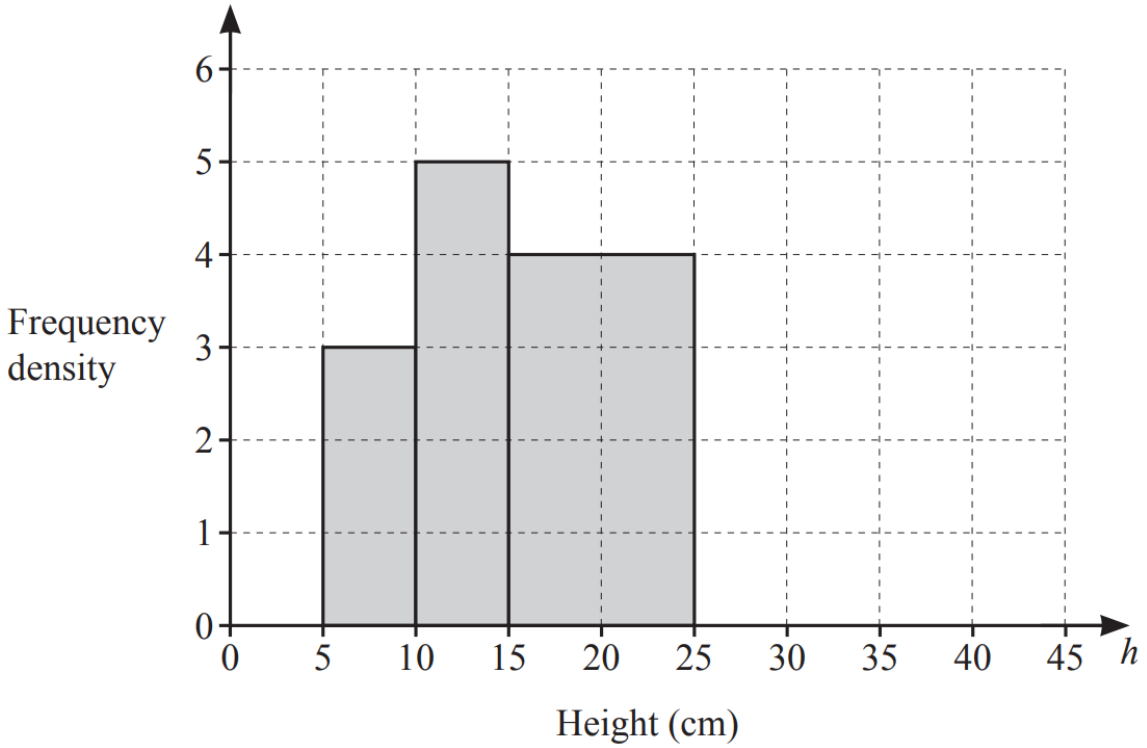
Calculate the mean mass of these 10 players.

..... kg [2]

37. 4024/12/O/N/20 Q16

The heights of a sample of plants were measured.
The results are shown in the table and in the histogram.

Height (h cm)	$5 < h \leqslant 10$	$10 < h \leqslant 15$	$15 < h \leqslant 25$	$25 < h \leqslant 40$
Frequency	15	25	p	30



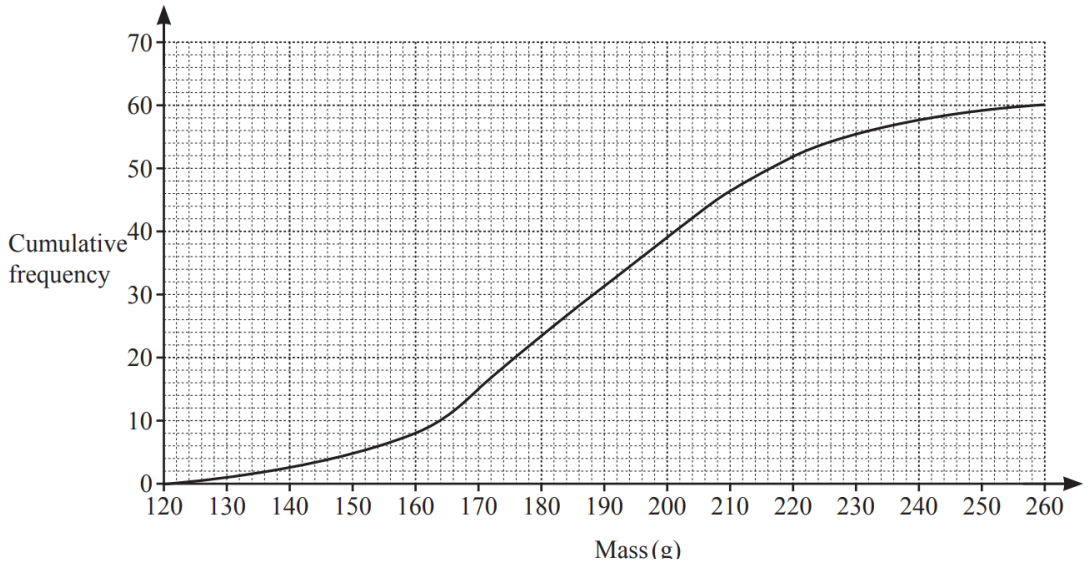
(a) Use the histogram to find the value of p.

$p =$ ..... [1]

(b) Complete the histogram. [1]

38. 4024/21/O/N/20 Q2

(a) The cumulative frequency diagram shows the masses, in grams, of 60 potatoes of variety A.



(i) Use the diagram to estimate

(a) the median,

..... g [1]

(b) the interquartile range.

..... g [2]

(ii) Potatoes with a mass greater than 220 g are sold as baking potatoes.

Find the percentage of the potatoes that are sold as baking potatoes.

..... % [3]

(iii) The masses of 60 potatoes of variety B are also measured.
For variety B, the median is 175 g and the interquartile range is 30 g.

Kali wants to buy potatoes that are more consistent in mass.

Should she choose variety A or variety B?
Explain how you decide.

Variety ..... because ..... [1]

(b) The table shows the masses, m grams, of 120 potatoes of variety C.

Mass (m g)	$80 \leqslant m < 100$	$100 \leqslant m < 120$	$120 \leqslant m < 130$	$130 \leqslant m < 140$	$140 \leqslant m < 200$
Frequency	10	15	42	36	17

Calculate an estimate of the mean mass.

..... g [3]

(c) A bag of potatoes has a mass of 2.5 kg, correct to the nearest 100 g.
Bags of potatoes are packed into a box.
The mass of the box is 600 g, correct to the nearest 10 g.

Calculate the upper bound of the total mass, in kilograms, of a box containing 10 of these bags of potatoes.

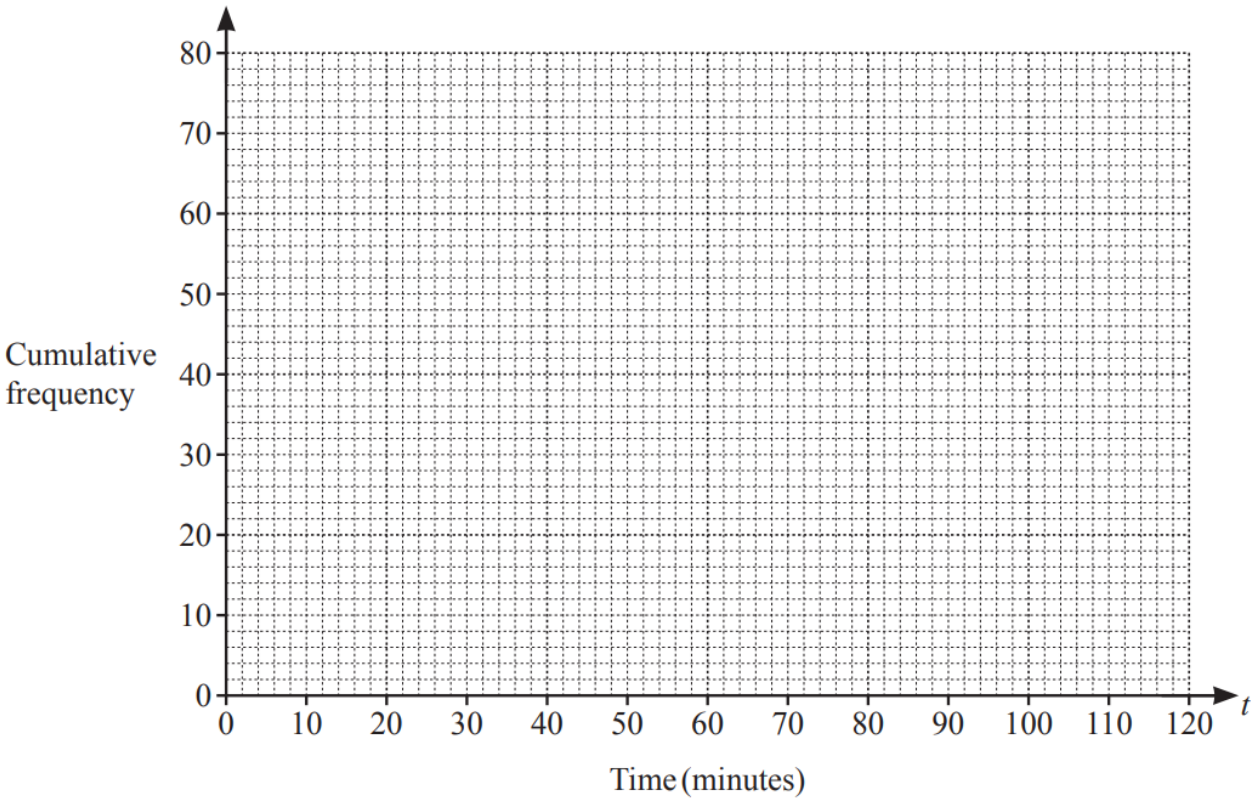
..... kg [3]

39. 4024/22/O/N/20 Q2

(a) A group of 80 students each completed a task.
The table shows the time, t minutes, each student took to complete the task.

Time (t minutes)	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 80$	$80 < t \leqslant 100$	$100 < t \leqslant 120$
Frequency	10	20	34	12	4

(i) On the grid, draw a cumulative frequency diagram to represent this information.



[3]

(ii) Use your diagram to estimate

(a) the median,

..... minutes [1]

(b) the interquartile range.

..... minutes [2]

(b) A group of 160 adults each completed the same task.
The table shows the number of errors made by each of these adults.

Number of errors	0	1	2	3	4	5
Frequency	24	30	50	32	16	8

(i) Calculate the mean.

..... [2]

(ii) One of the adults is selected at random.

Find the probability that this adult made more than 3 errors.

..... [1]

(iii) Two of the adults are selected at random.

Find the probability that they each made exactly one error.

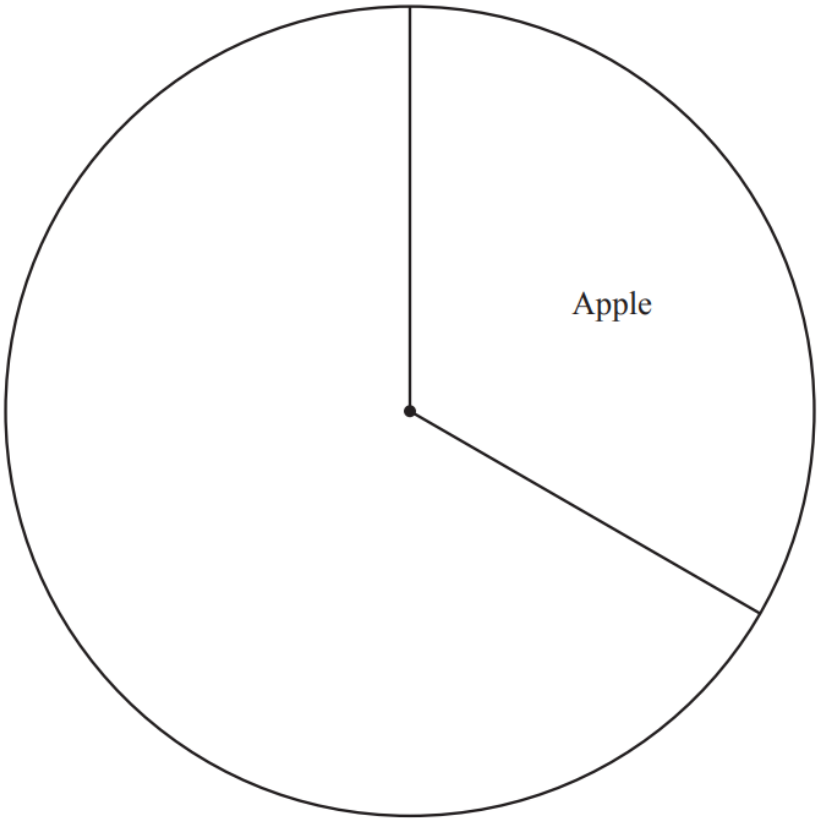
..... [2]

40. 4024/12/M/J/21 Q3

A group of 60 students were each asked their favourite fruit.
The results are shown in the table.

Fruit	Frequency
Apple	20
Banana	25
Orange	15

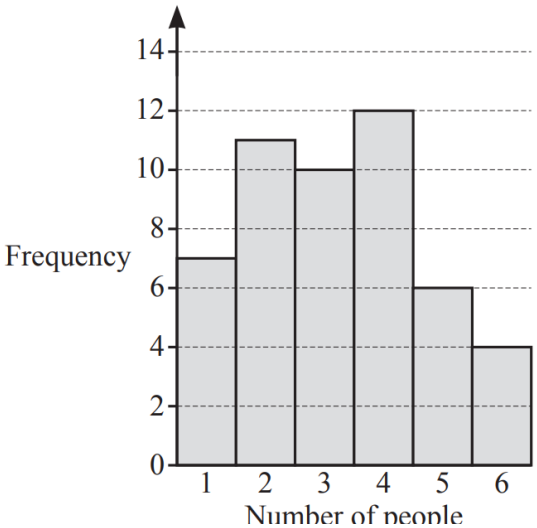
Complete the pie chart to show the results.



[2]

41. 4024/21/M/J/21 Q2

A survey recorded the number of people living in each of 50 houses.
The bar chart shows the results.



(a) Find the mode.

..... [1]

(b) Find the median.

..... [1]

(c) Calculate the mean.

..... [3]

(d) One of these houses is chosen at random.

Find the probability that exactly 3 people live there.

..... [1]

(e) Two houses are chosen at random from these 50 houses.

Find the probability that only one of the two houses has exactly 5 people living there.

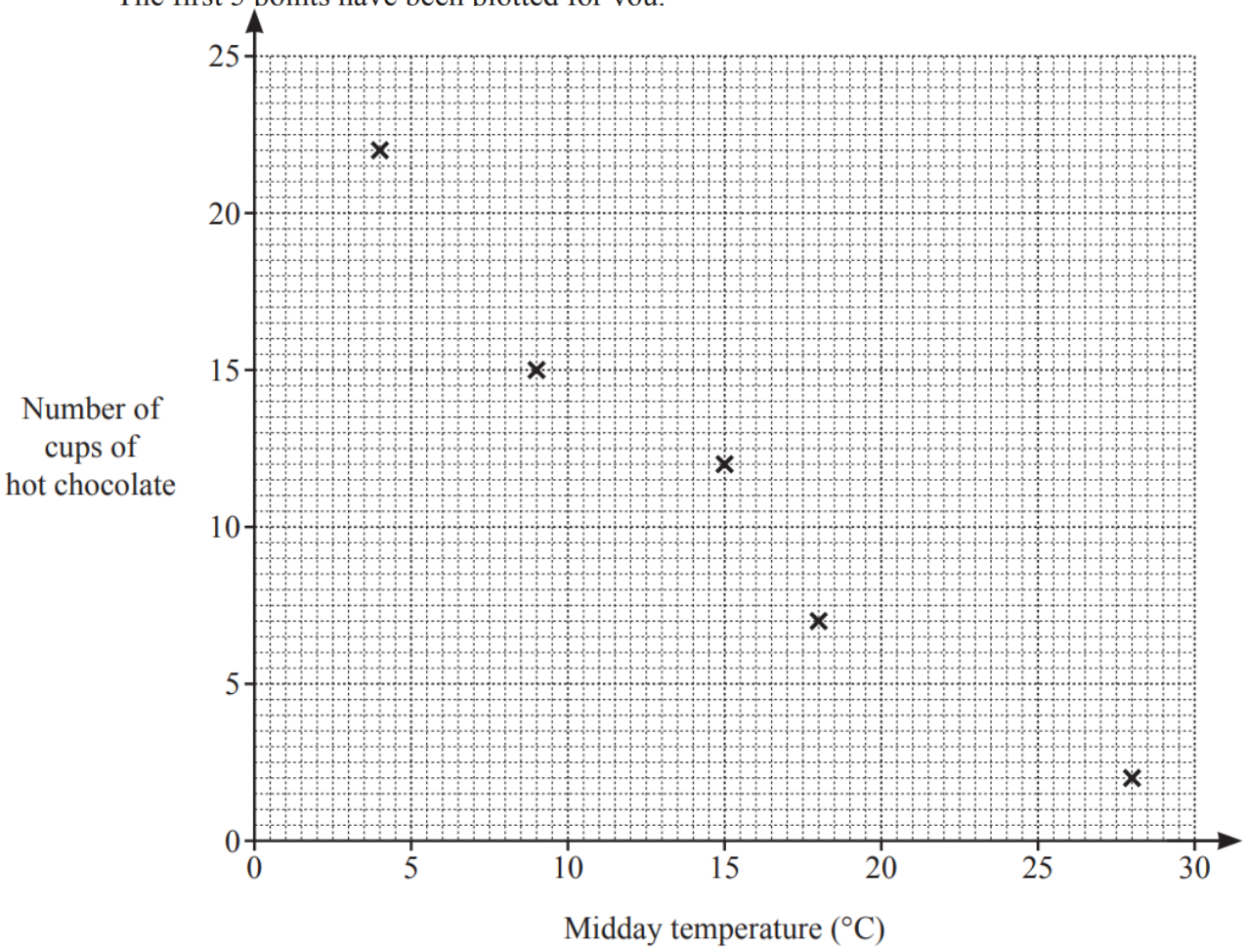
..... [3]

42. 4024/22/M/J/21 Q2

The table shows the midday temperature and the number of cups of hot chocolate Natcha sells on each of ten days.

Midday temperature (°C)	18	9	4	28	15	21	6	5	12	23
Number of cups of hot chocolate	7	15	22	2	12	8	17	21	16	6

(a) Complete the scatter diagram.
The first 5 points have been plotted for you.



[2]

(b) Describe the relationship between the midday temperature and the number of cups of hot chocolate Natcha sells.

.....

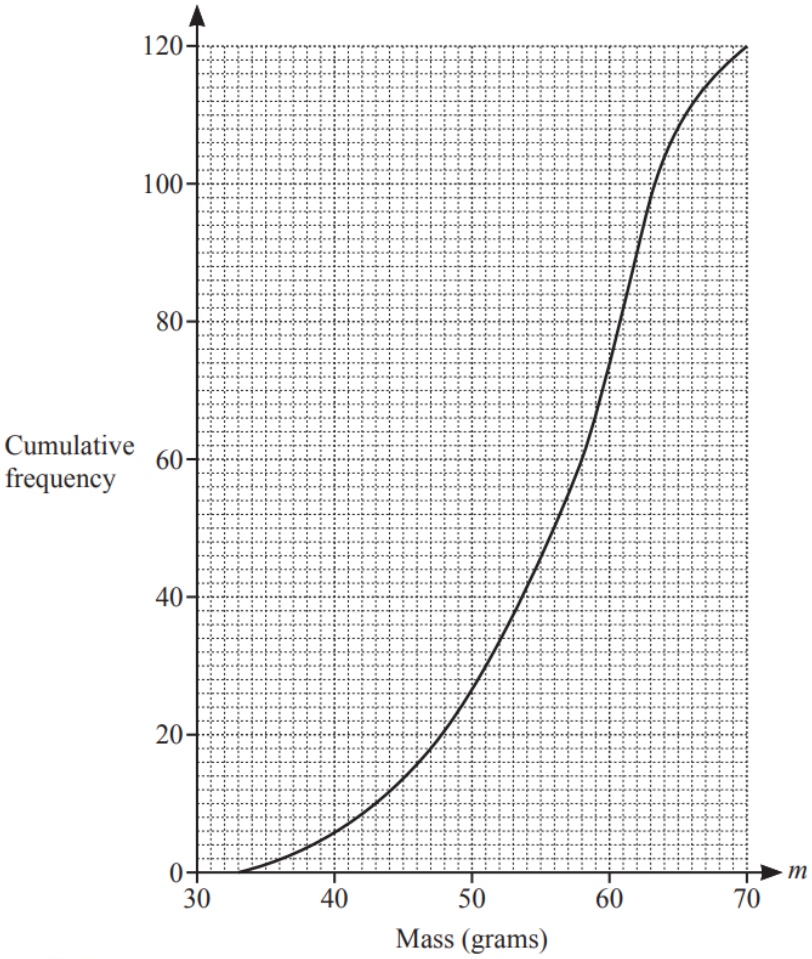
..... [1]

(c) By drawing a line of best fit, estimate the number of cups of hot chocolate sold when the midday temperature is 17 °C.

..... [2]

43. 4024/12/O/N/21 Q21

The cumulative frequency diagram shows the masses, m grams, of 120 eggs.



(a) Use the diagram to estimate

(i) the median,

..... g [1]

(ii) the interquartile range.

..... g [2]

(b) Eggs are described as 'large' if their mass is 63 g or more.

How many of these eggs are large?

..... [2]

44. 4024/21/O/N/21 Q2

(a) The table shows the number of exercise classes attended in one week by each of 80 members of a gym.

Number of classes	0	1	2	3	4	5
Frequency	10	29	26	10	3	2

(i) Find the mode.

..... [1]

(ii) Find the median.

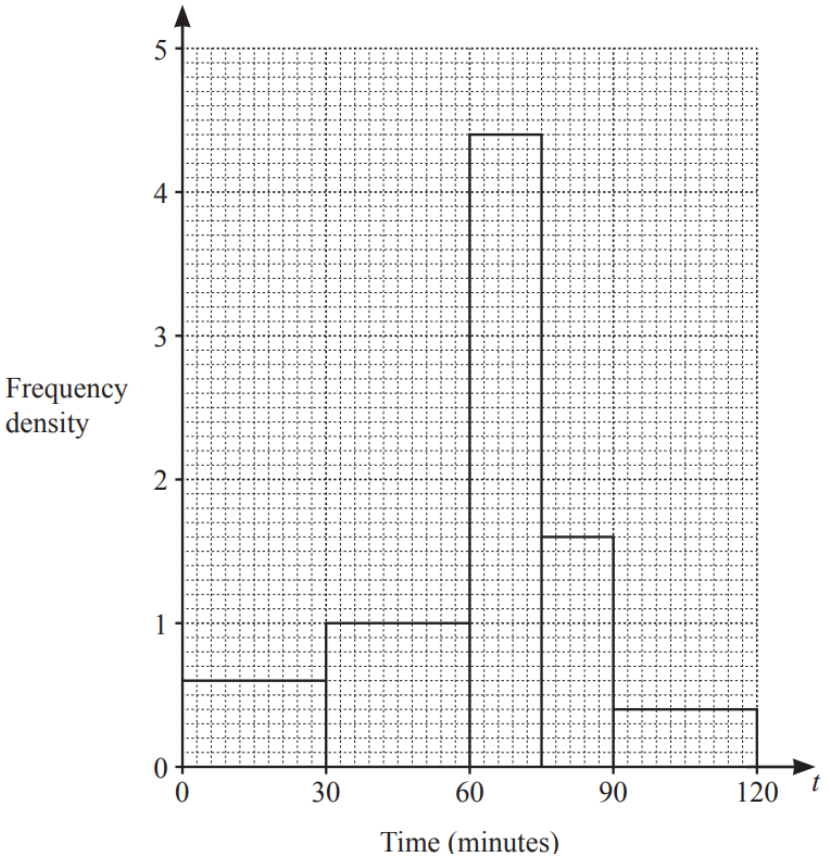
..... [1]

(iii) A pie chart is drawn to show this information.

Calculate the angle representing 5 classes attended.

..... [2]

(b) Some members of the gym were surveyed about how much time they spent at the gym.
The histogram shows the times, t minutes, they spent on their last visit.



(i) Thirty members spent between 30 and 60 minutes at the gym.

Calculate the number of members surveyed.

..... [3]

(ii) Rohit says:

One tenth of these members spent longer than $1\frac{1}{2}$ hours at the gym on their last visit.

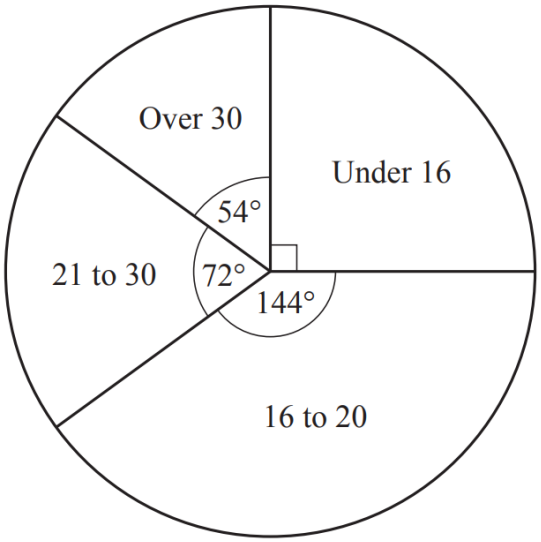
Is he correct?
Justify your answer.

.....

..... [2]

45. 4024/22/O/N/21 Q2

(a) The pie chart summarises the ages of people at a science fair.



(i) Write down the modal class.

..... [1]

(ii) There were 90 people aged over 30 at the science fair.

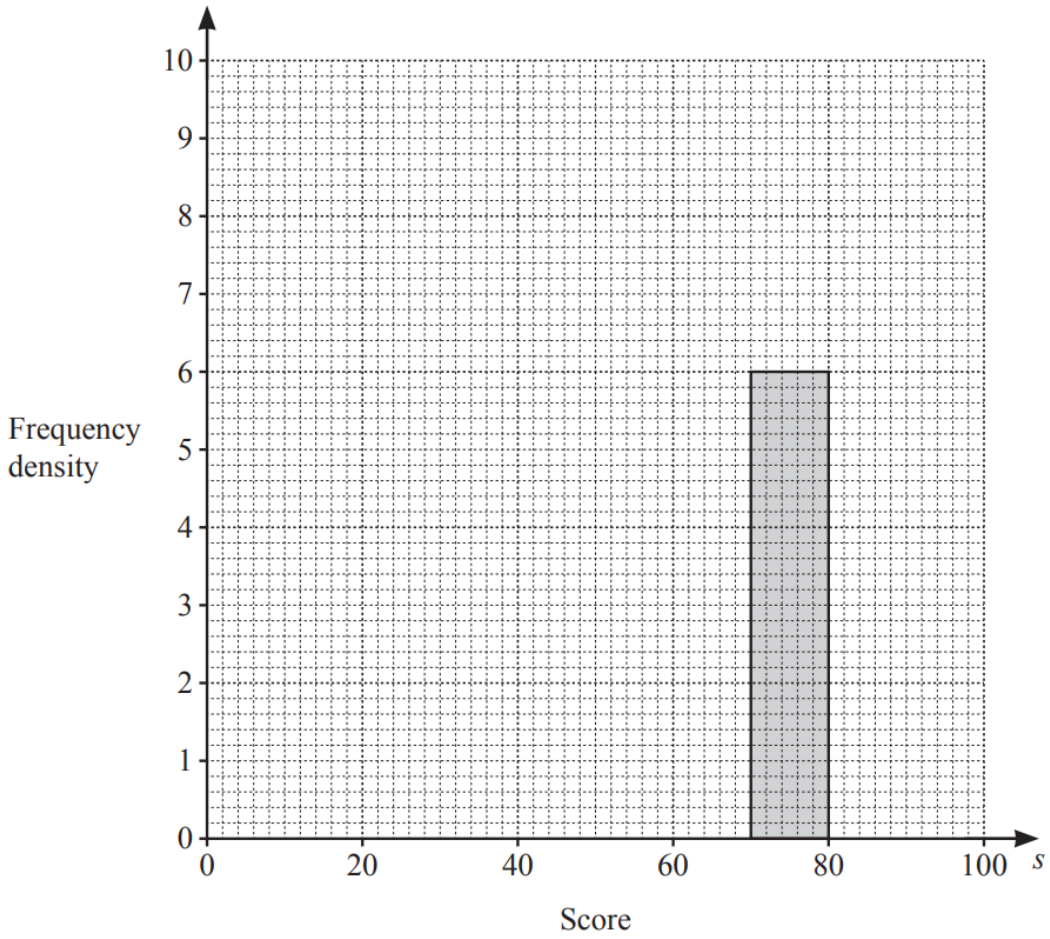
Calculate the number of people aged 16 to 20.

..... [2]

(b) 250 students entered a science competition.
The table summarises their scores.

Score (s)	$0 < s \leqslant 40$	$40 < s \leqslant 60$	$60 < s \leqslant 70$	$70 < s \leqslant 80$	$80 < s \leqslant 100$
Frequency	36	48	64	60	42

(i) Complete the histogram to represent this data.



[3]

(ii) Students who scored 75 or more are awarded a distinction.

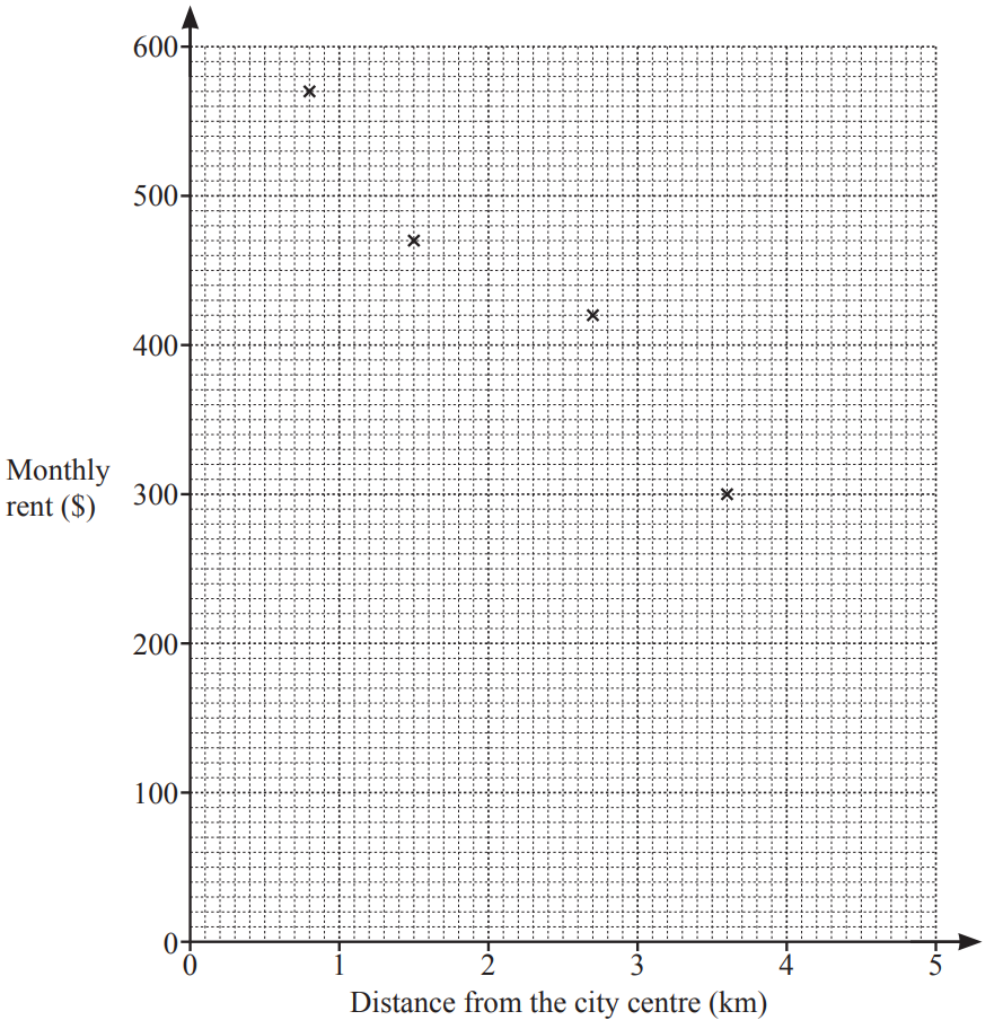
Find an estimate for the percentage of the 250 students who were awarded a distinction.

..... % [2]

46. 4024/11/M/J/22 Q10

The table below shows the monthly rent for nine apartments and the distance of these apartments from the city centre.

Distance from the city centre (km)	0.8	1.5	2.7	3.6	2.0	4.3	2.3	3.0	1.0
Monthly rent ($)	570	470	420	300	480	270	390	360	530



(a) Complete the scatter diagram.
The first four points have been plotted for you. [2]

(b) What type of correlation is shown on the scatter diagram?

..... [1]

(c) On the scatter diagram, draw a line of best fit. [1]

(d) Use your line of best fit to estimate the monthly rent for an apartment which is 4 km from the city centre.

$ ..... [1]

47. 4024/22/M/J/22 Q5

(a) A group of students each complete a puzzle.
The table shows the time, t seconds, each student took to complete the puzzle.

Time (t seconds)	$80 < t \leqslant 120$	$120 < t \leqslant 140$	$140 < t \leqslant 150$	$150 < t \leqslant 240$
Frequency	13	26	27	24

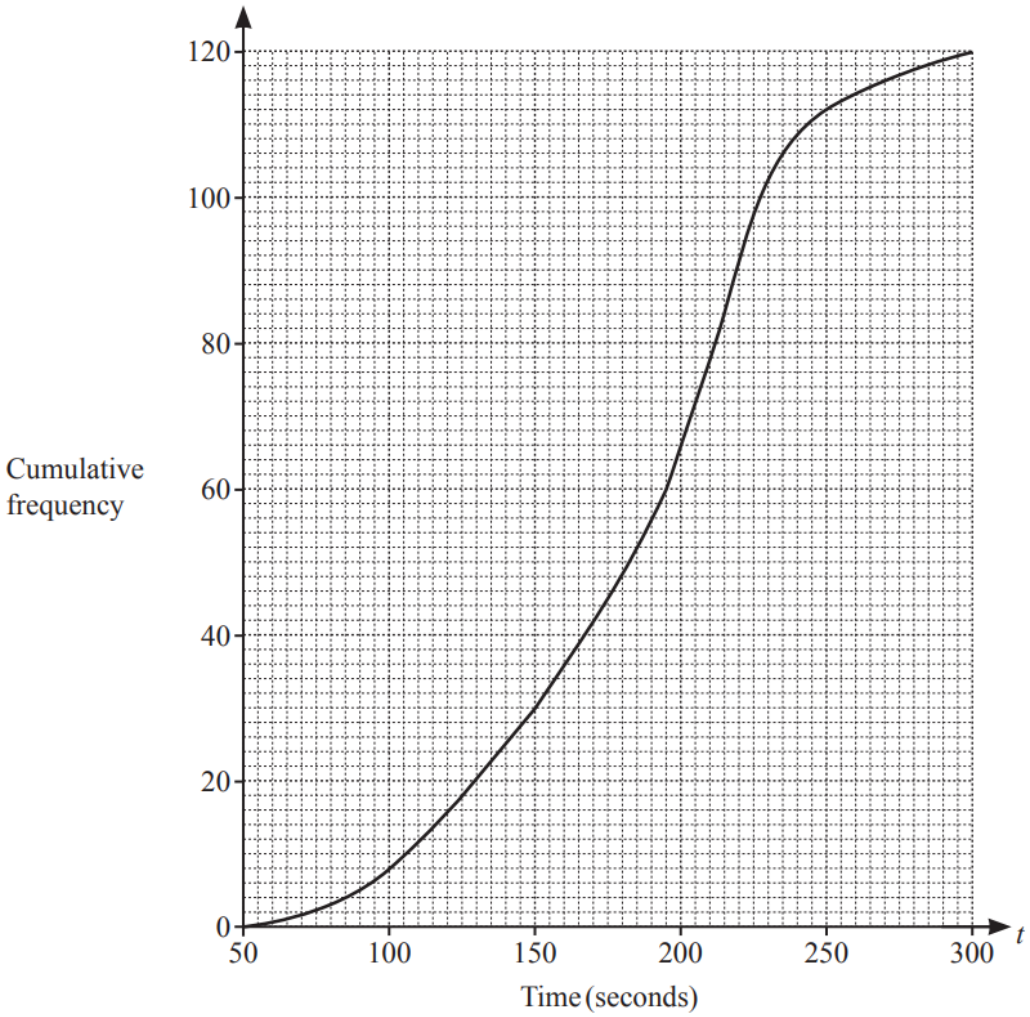
(i) Find the number of students who took 2 minutes 20 seconds or less to complete the puzzle.

..... [1]

(ii) Calculate an estimate of the mean time taken, in seconds, to complete the puzzle.

..... s [3]

(b) A group of adults also completed this puzzle.
A cumulative frequency diagram for their times is shown.



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

Time (t seconds)	$50 < t \leqslant 100$	$100 < t \leqslant 150$	$150 < t \leqslant 200$	$200 < t \leqslant 250$	$250 < t \leqslant 300$
Frequency	8				

[2]

(ii) Use the cumulative frequency diagram to find an estimate of the median.

..... s [1]

(iii) 55% of the adults took between 125 seconds and k seconds to complete the puzzle.

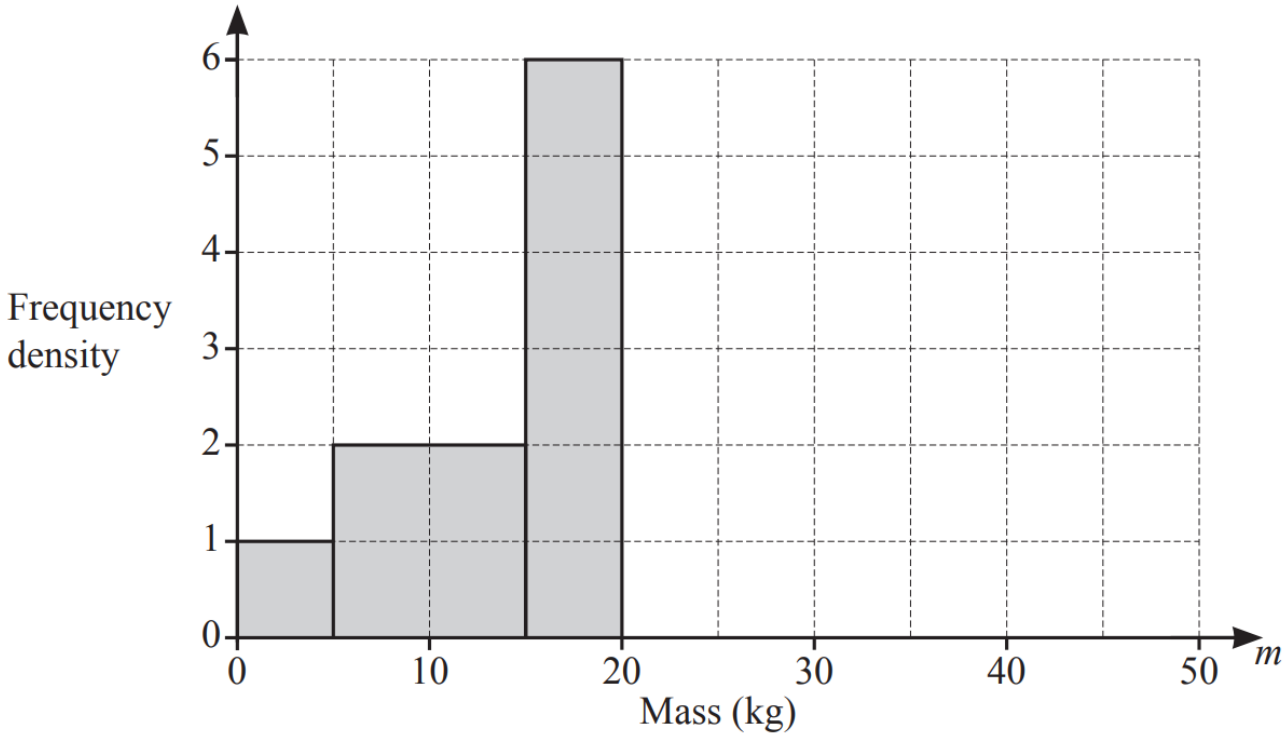
Use the cumulative frequency diagram to find the value of k.

$k =$ ..... [3]

48. 4024/11/O/N/22 Q20

A farmer records the mass of each of his sheep.
Some of the results are summarised in the table and illustrated in the histogram.

Mass (m kg)	$0 < m \leqslant 5$	$5 < m \leqslant 15$	$15 < m \leqslant 20$	$20 < m \leqslant 30$	$30 < m \leqslant 50$
Frequency	5	20	a	40	20



(a) Use the histogram to find the value of a.

$a =$ ..... [1]

(b) Complete the histogram. [2]

49. 4024/12//O/N/22 Q20

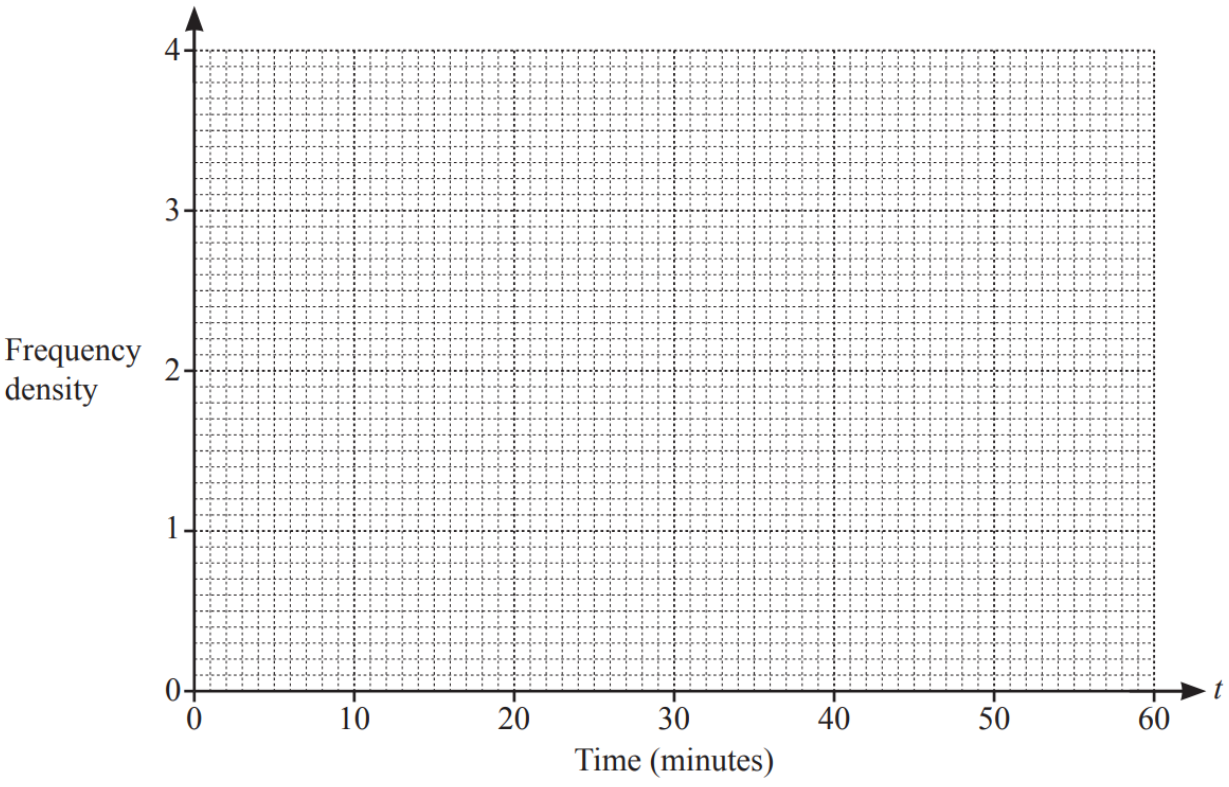
The table shows some information about the times each of 100 children spent reading in one day.

Time (t mins)	$x < t \leqslant 30$	$30 < t \leqslant 40$	$40 < t \leqslant 45$	$45 < t \leqslant 60$
Frequency	32	23	15	30
Frequency density	1.6	2.3		

(a) Find the value of x in the interval $x < t \leqslant 30$.

$x =$ ..... [1]

(b) On the grid, draw a histogram to represent the data for the 100 children.

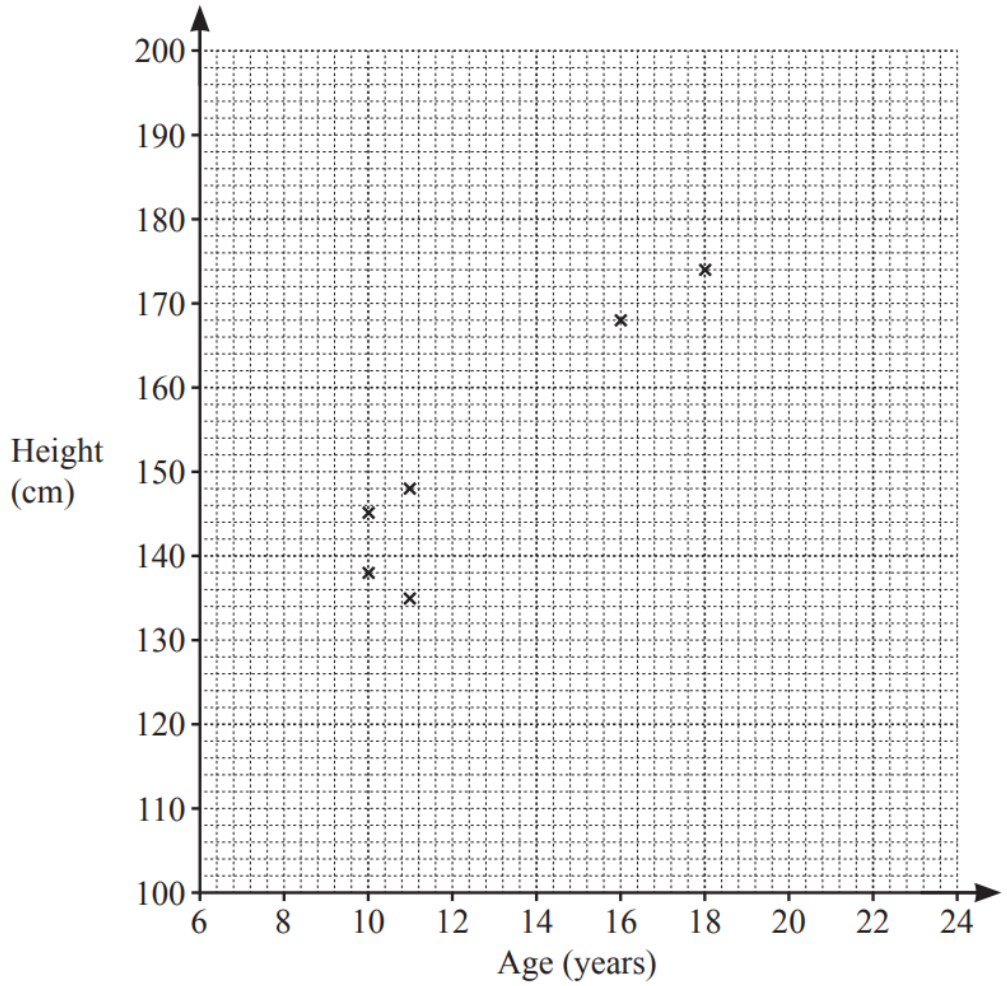


[3]

50. 4024/21/O/N/22 Q2

(a) The table shows the ages and heights of 10 boys.

Age (years)	10	16	11	18	10	11	13	17	13	16
Height (cm)	138	168	135	174	145	148	158	175	150	160



(i) Complete the scatter diagram.
The first six points have been plotted for you. [2]

(ii) Draw a line of best fit. [1]

(iii) Use your line of best fit to estimate the height of a 14-year-old boy.

..... cm [1]

(iv) Simon is 22 years old.

Explain why your line of best fit should not be used to estimate his height.

.....

..... [1]

(b) The table summarises the heights of 180 girls in Year 7 of a school.

Height (h cm)	$125 < h \leqslant 135$	$135 < h \leqslant 140$	$140 < h \leqslant 145$	$145 < h \leqslant 150$	$150 < h \leqslant 160$
Frequency	8	31	55	62	24

(i) Work out the percentage of girls who are taller than 145 cm.

..... % [2]

(ii) Calculate an estimate of the mean height.

..... cm [3]

51. 4024/22/O/N/22 Q2

(a) Marco grows two types of tomato plants, type A and type B.
He counts the number of tomatoes growing on each tomato plant.

The results for type A plants are shown in the table.

Number of tomatoes on plant	17	18	19	20	21	22
Frequency	5	2	7	3	2	1

(i) Calculate the mean number of tomatoes per plant.

..... [2]

(ii) Calculate the range.

..... [1]

(iii) The mean number of tomatoes per plant for type B plants is 17.1 and the range is 8.

Make two comments comparing the number of tomatoes growing on type A and type B plants.

1 .....

.....

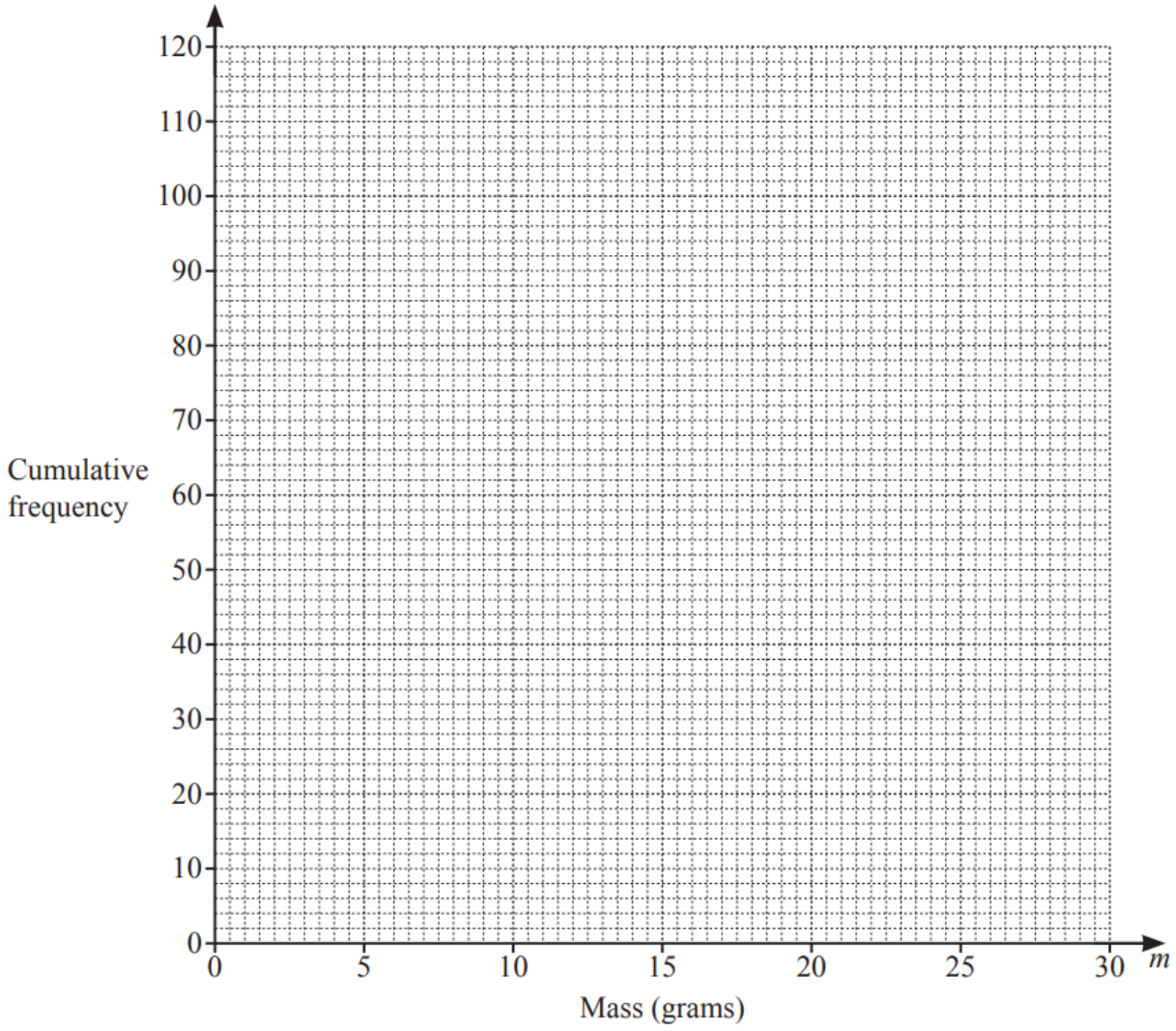
2 .....

..... [2]

(b) Marco also grows strawberries.
He records the masses, m grams, of 120 of his strawberries.
The frequency table shows the results.

Mass (m grams)	$5 < m \leqslant 10$	$10 < m \leqslant 15$	$15 < m \leqslant 20$	$20 < m \leqslant 25$	$25 < m \leqslant 30$
Frequency	15	38	45	17	5

(i) Draw a cumulative frequency diagram to represent these results.



[3]

(ii) Marco uses strawberries with a mass greater than 21 grams to make jam.

Use your diagram to find an estimate for the percentage of strawberries he uses to make jam.

..... % [3]