Write your name here

Surname	Other names

In the style of:
Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Cumulative Frequency

Higher Tier

GCSE style questions arranged by topic

Paper Reference
1MA1/3H

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

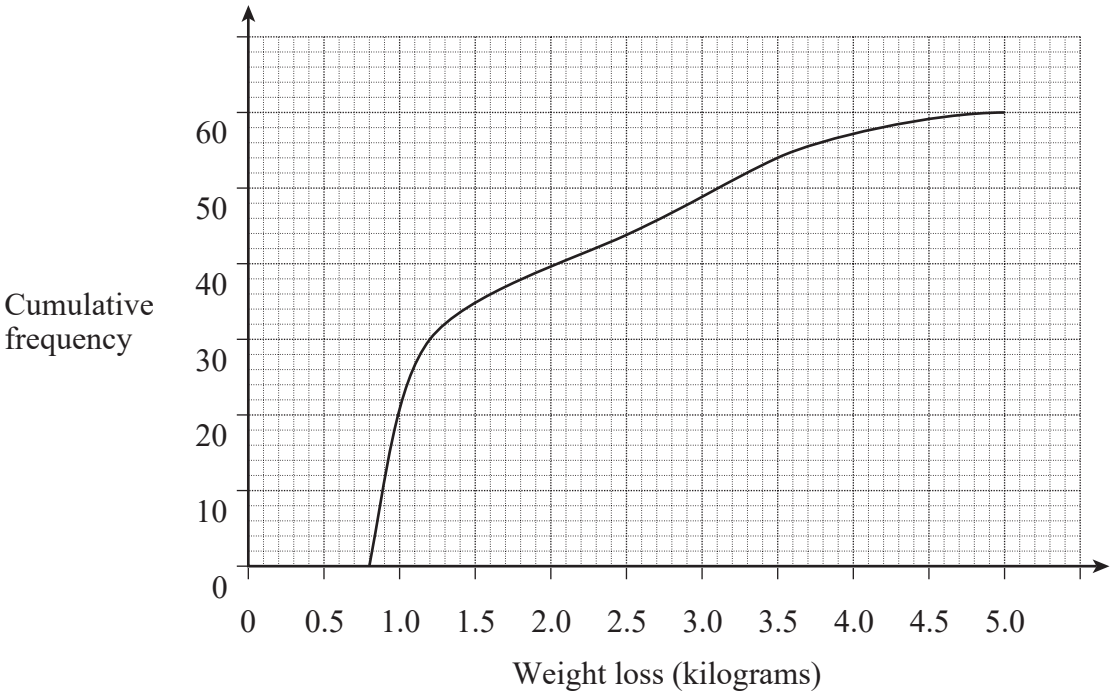
Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

1 Two groups of people are trying to lose weight.

(a) Group A join a gym.
The graph shows information about their weight loss after one month.



(i) How many people are in group A?

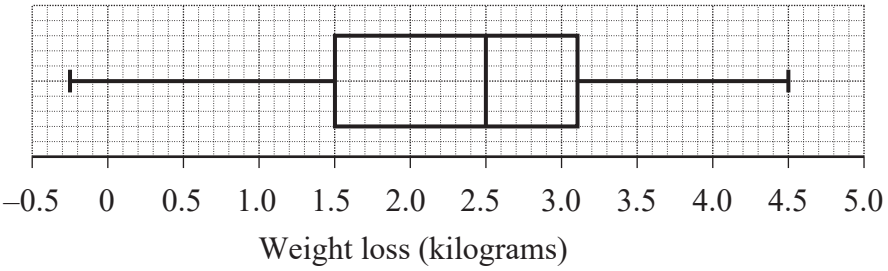
(1)

(ii) Does everyone in group A lose weight?
Write down how you decide.

(1)

(b) Group B follow a diet.

The box plot shows information about their weight loss after one month.



Does everyone in group B lose weight?Write down how you decide.

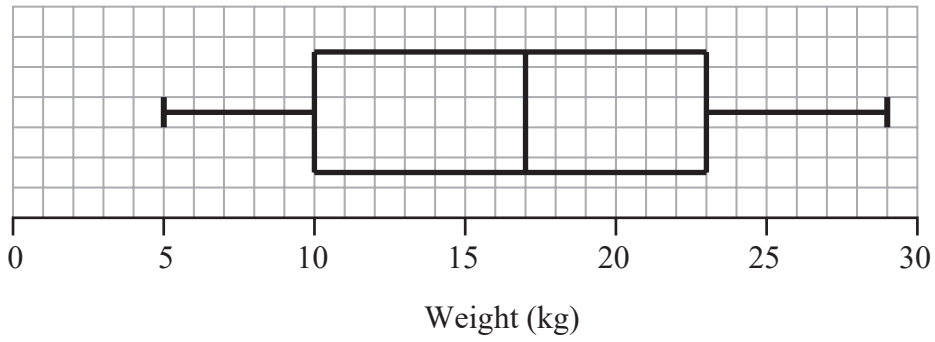
(1)

(c) Compare the weight loss of group A with group B.

(5)

Total for Question 1 is 8 marks

2 The box plot gives information about the distribution of the weights of bags on a plane.



(a) Georgina says the lightest bag weighs 10 kg.

She is **wrong**.
Explain why.

.....

.....

(1)

(b) Write down the median weight.

..... kg

(1)

(c) Work out the interquartile range of the weights.

..... kg

(1)

There are 240 bags on the plane.

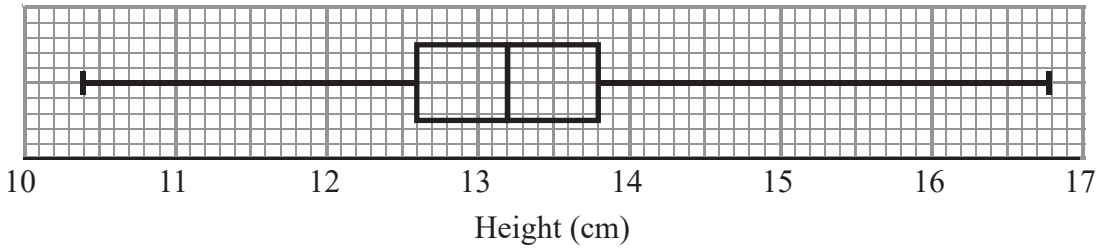
(d) Work out the number of bags with a weight of 23 kg or more.

.....

(2)

Total for Question 2 is 5 marks

3 David measured the height, in cm, of each tomato plant in his greenhouse.
He used the results to draw the box plot shown below.



(a) Write down the median height.

.....cm
(1)

(b) Work out the interquartile range.

.....cm
(2)

(c) Explain why the interquartile range may be a better measure of spread than the range.

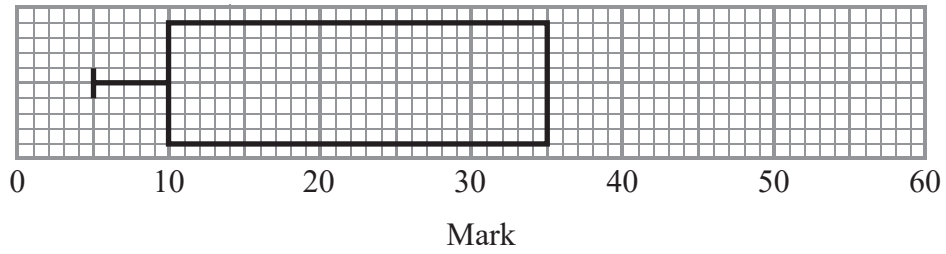
.....

.....

(1)

Total for Question 3 is 4 marks

4 The incomplete box plot and table show some information about some marks.



	Mark
Lowest mark	5
Lower quartile	
Median	30
Upper quartile	35
Highest mark	55

(a) Use the information in the table to complete the box plot.

(2)

(b) Use the information in the box plot to complete the table.

(1)

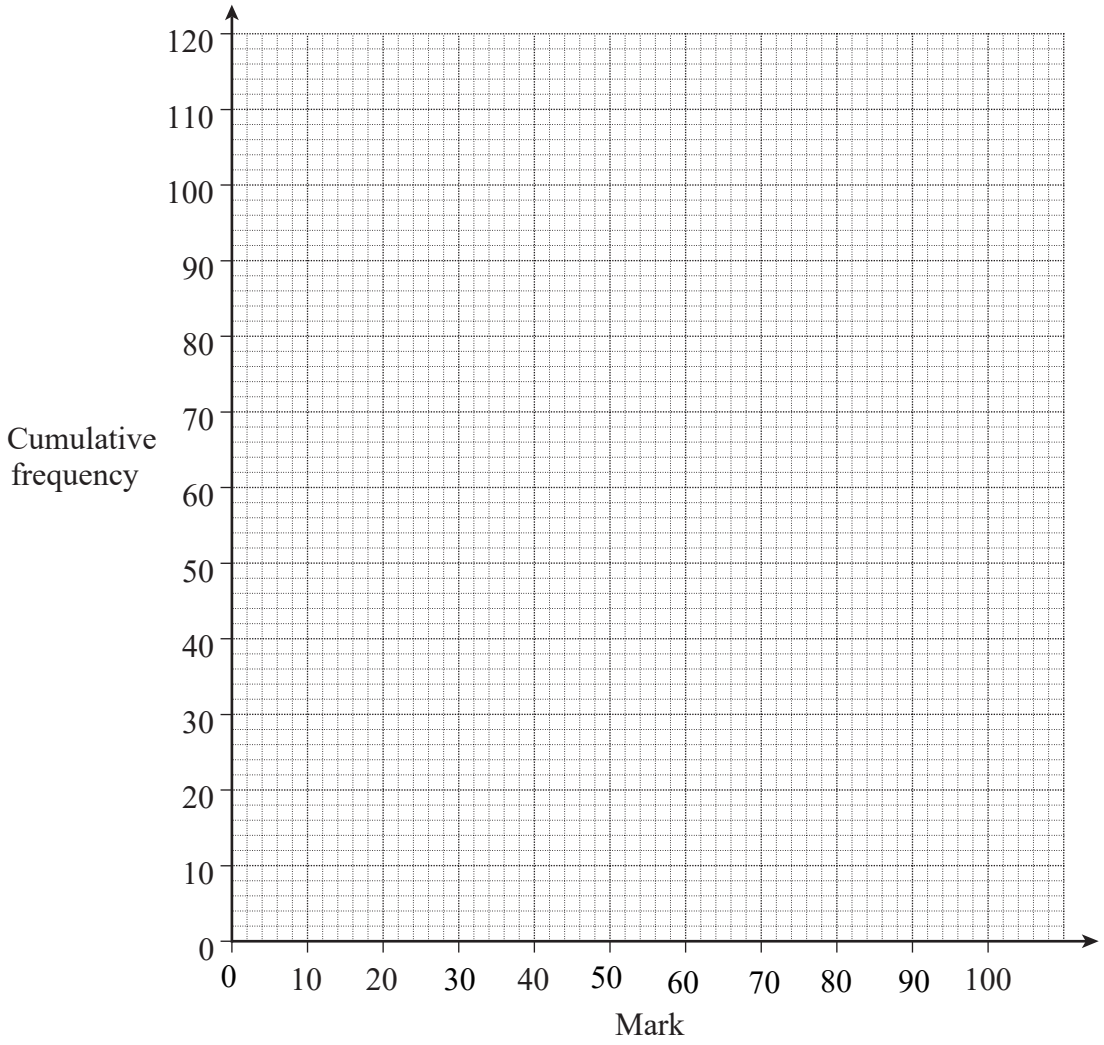
Total for Question 4 is 3 marks

5 The table shows a summary of the marks scored by 120 people in a test.

Mark	Frequency
$0 < \text{mark} \leqslant 20$	8
$20 < \text{mark} \leqslant 40$	12
$40 < \text{mark} \leqslant 60$	46
$60 < \text{mark} \leqslant 80$	35
$80 < \text{mark} \leqslant 100$	19

(a) Three-quarters of the people pass the test.

Use a cumulative frequency graph to estimate the pass mark.



.....

(5)

(b) Here is the table again.

Mark	Frequency
$0 < \text{mark} \leqslant 20$	8
$20 < \text{mark} \leqslant 40$	12
$40 < \text{mark} \leqslant 60$	46
$60 < \text{mark} \leqslant 80$	35
$80 < \text{mark} \leqslant 100$	19

Two of these 120 people are chosen at random.

(i) Work out the probability that both scored **over** 60.

.....

(2)

(ii) Work out the probability that one scored **over** 80 and the other scored 80 or **under**.

.....

(3)

Total for Question 5 is 10 marks

6 Georgina did a survey about the amounts of money spent by 120 families during summer holidays.

The cumulative frequency table gives some information about the amounts of money spent by the 120 families.

Amount (£A) spent	Cumulative frequency
$0 \leqslant A < 100$	13
$0 \leqslant A < 150$	25
$0 \leqslant A < 200$	42
$0 \leqslant A < 250$	64
$0 \leqslant A < 300$	93
$0 \leqslant A < 350$	110
$0 \leqslant A < 400$	120

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

(2)

(b) Use your cumulative frequency diagram to estimate the median.

£ .....

(2)

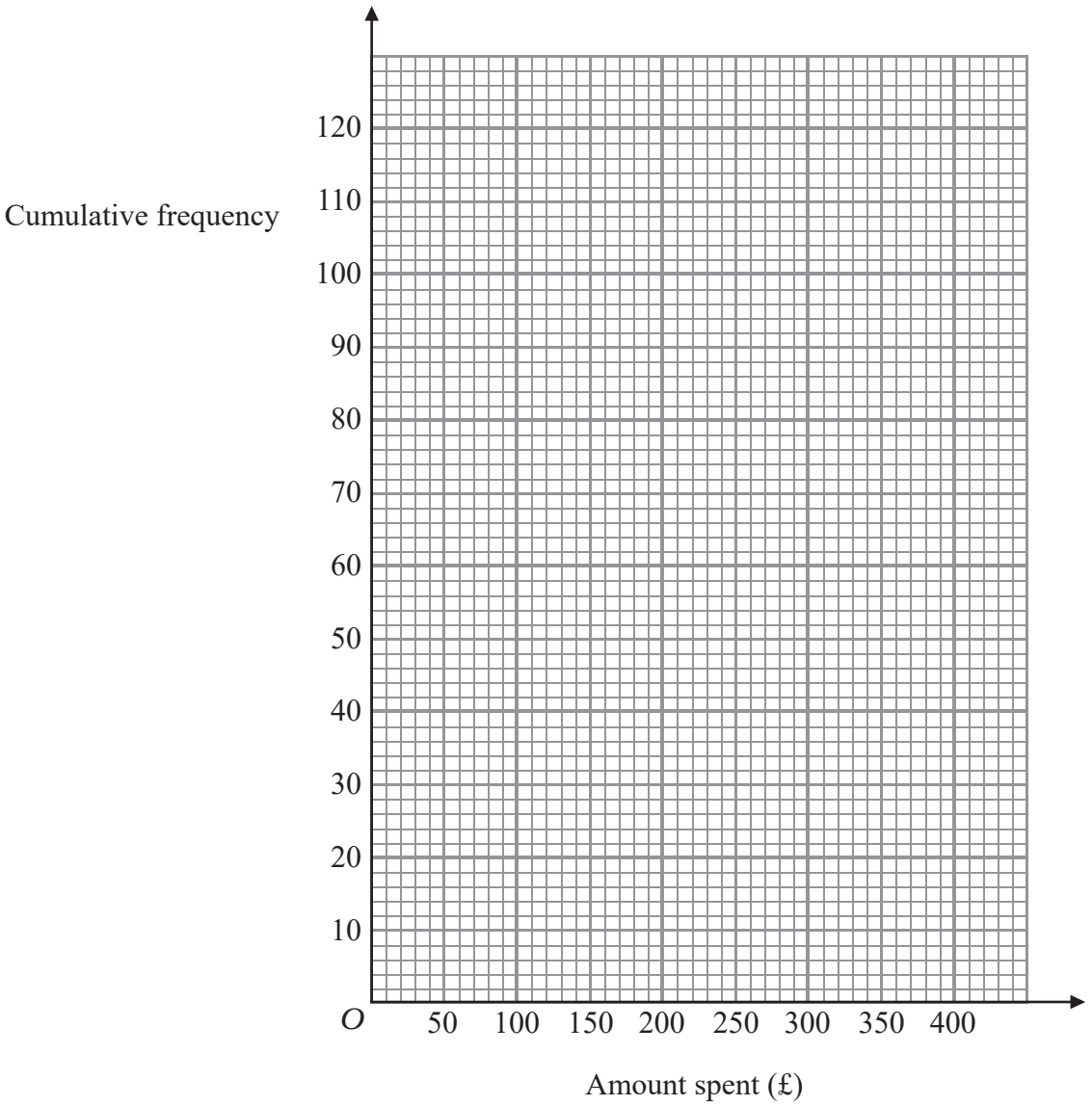
A survey of the amounts of money spent by 200 families during their Christmas holidays gave a median of £305

(c) Compare the amounts of money spent at Christmas with the amounts of money spent in summer.

.....

.....

(1)



Total for Question 6 is 5 marks

7 The table shows information about the number of felt tip pens in 100 childrens pencil cases.

Number of pens	Frequency
$0 < n \leqslant 20$	18
$20 < n \leqslant 40$	22
$40 < n \leqslant 60$	35
$60 < n \leqslant 80$	15
$80 < n \leqslant 100$	8
$100 < n \leqslant 120$	2

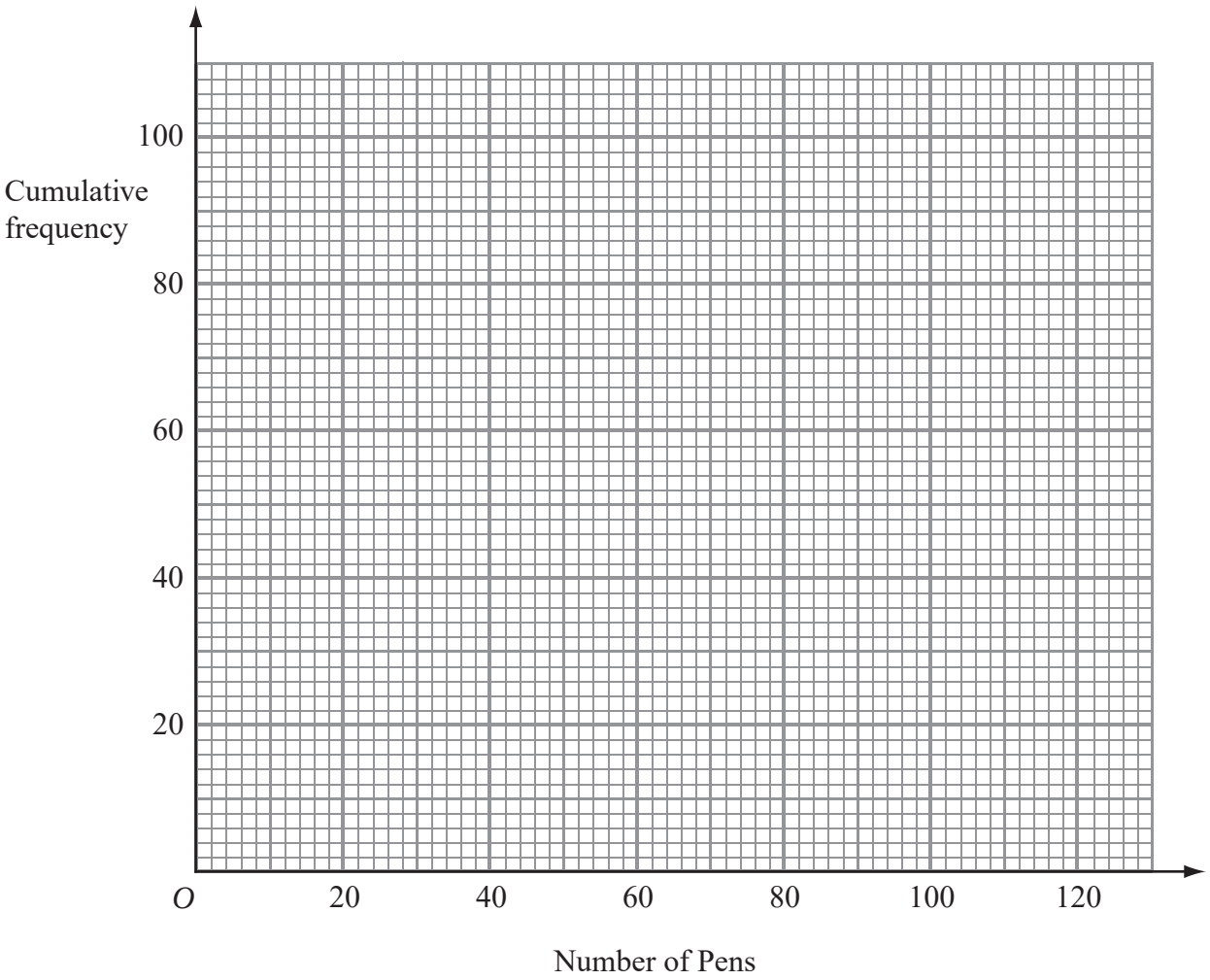
(a) Complete the cumulative frequency table for this information.

Number of pens	Cumulative frequency
$0 < n \leqslant 20$	18
$0 < n \leqslant 40$	
$0 < n \leqslant 60$	
$0 < n \leqslant 80$	
$0 < n \leqslant 100$	
$0 < n \leqslant 120$	

(1)

(b) On the grid, draw a cumulative frequency graph for your table.

(2)



(c) Use your graph to find an estimate for the median number of pens.

.....

(1)

Total for Question 7 is 4 marks

8 A company tested 100 batteries.

The table shows information about the number of hours that the batteries lasted.

Time (t hours)	Frequency
$50 \leqslant t < 55$	12
$55 \leqslant t < 60$	21
$60 \leqslant t < 65$	36
$65 \leqslant t < 70$	23
$70 \leqslant t < 75$	8

(a) Complete the cumulative frequency table for this information.

(1)

Time (t hours)	Cumulative frequency
$50 \leqslant t < 55$	12
$50 \leqslant t < 60$	
$50 \leqslant t < 65$	
$50 \leqslant t < 70$	
$50 \leqslant t < 75$	

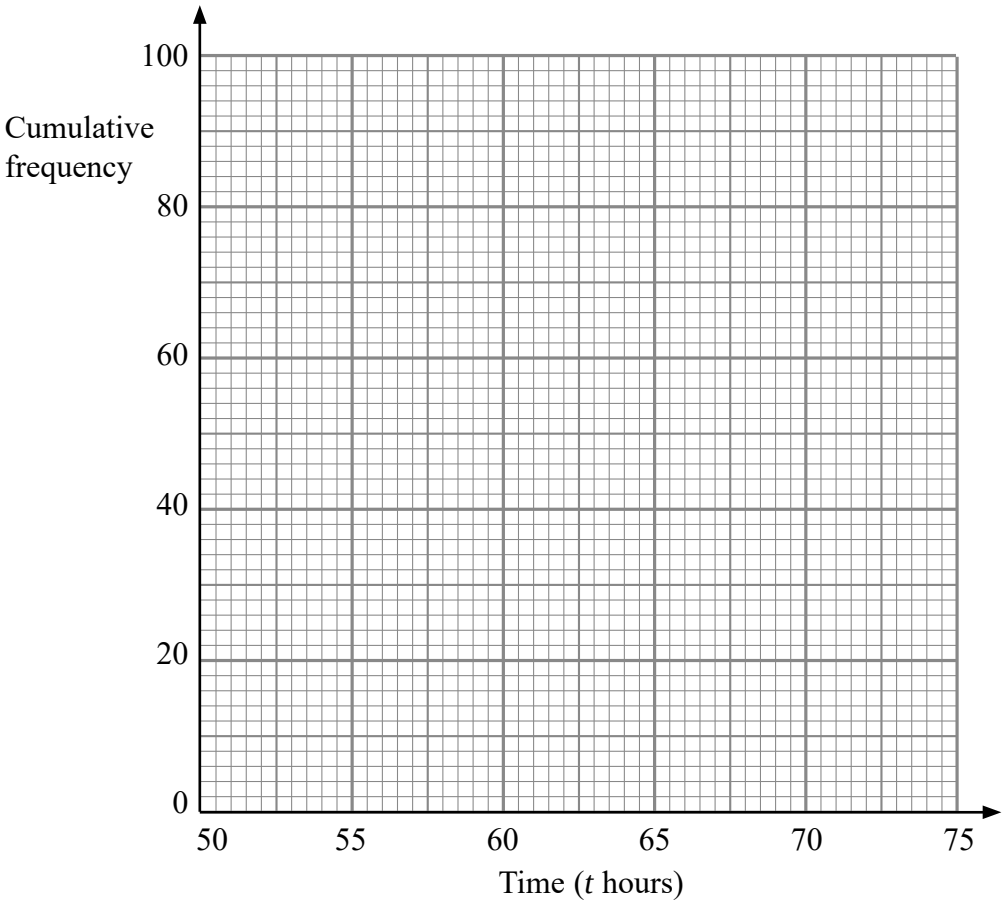
(b) On the grid, draw a cumulative frequency graph for your completed table.

(2)

(c) Use your completed graph to find an estimate for the median time.
You must state the units of your answer.

.....

(2)



Total for Question 8 is 5 marks

9 The table gives some information about the number of fish caught in a match.

Number of fish	Frequency
$0 < n \leqslant 20$	16
$20 < n \leqslant 30$	26
$30 < n \leqslant 40$	23
$40 < n \leqslant 50$	10
$50 < n \leqslant 60$	5

(a) Write down the modal class interval.

.....

(1)

(b) Complete the cumulative frequency table.

Number of fish	Cumulative Frequency
$0 < n \leqslant 20$	
$0 < n \leqslant 30$	
$0 < n \leqslant 40$	
$0 < n \leqslant 50$	
$0 < n \leqslant 60$	

(1)

(c) On the grid opposite, draw a cumulative frequency graph for your table.

(2)

(d) Use your graph to find an estimate for

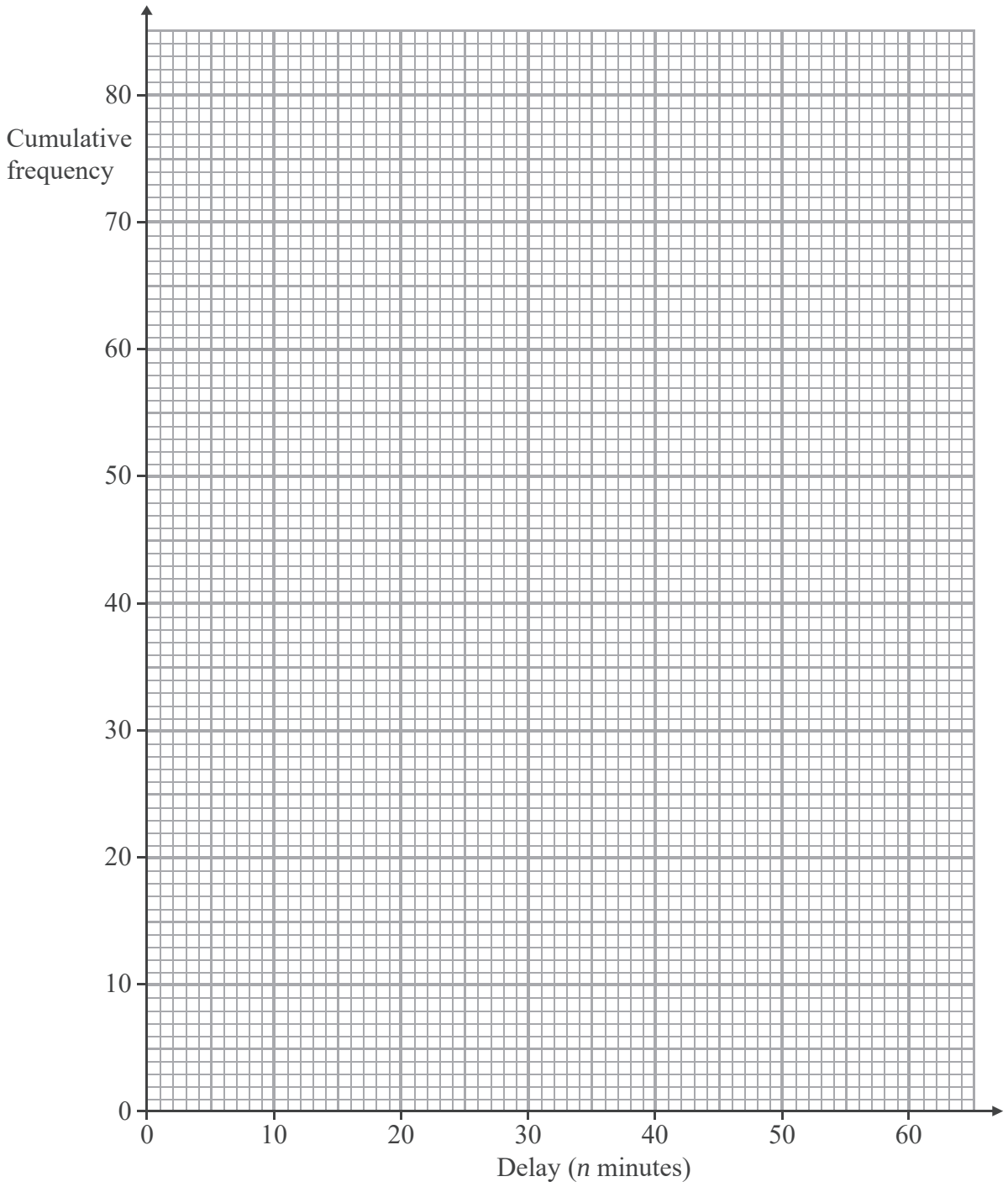
(i) the median number of fish,

..... minutes

(ii) the interquartile range of the number of fish.

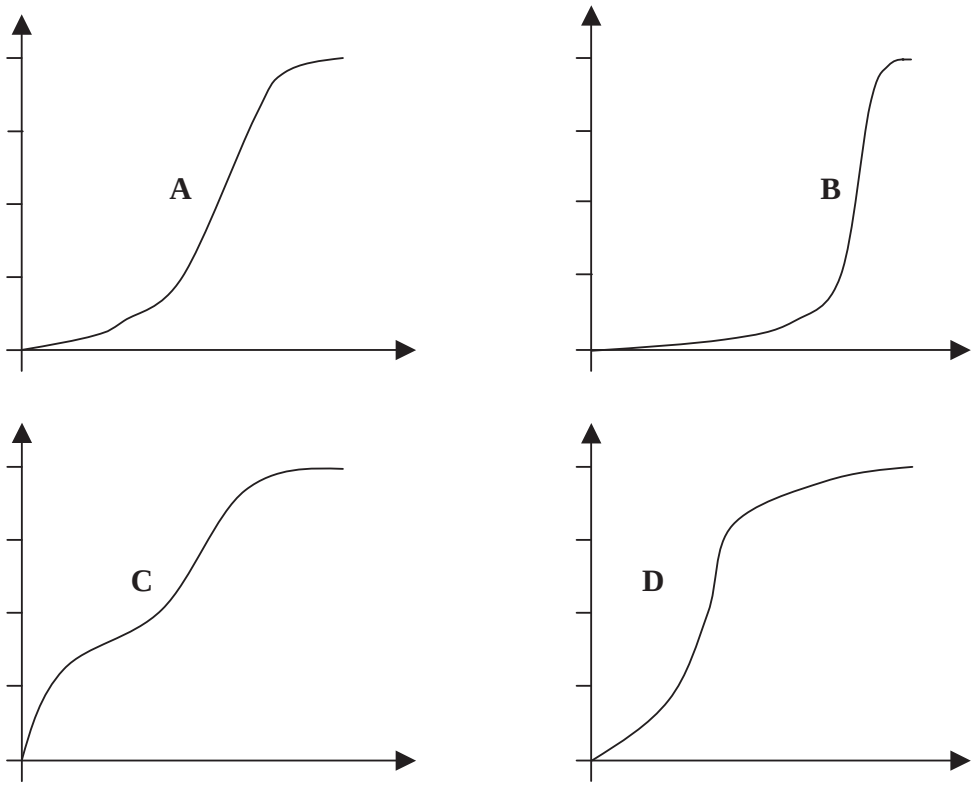
..... minutes

(3)

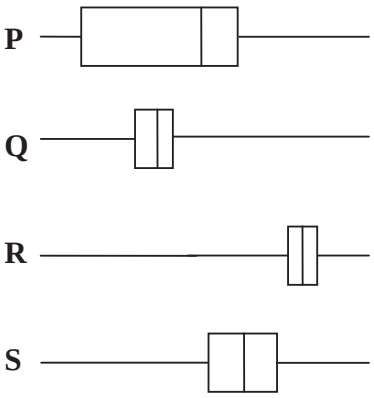


Total for Question 9 is 7 marks

10 Here are four cumulative frequency diagrams.



Here are four box plots.



For each box plot, write down the letter of the appropriate cumulative frequency diagram.

P and .....

Q and .....

R and .....

S and .....

Total for Question 10 is 2 marks

11 The table shows information about the time, m millimetres120 tomato plants grow in a week.

Time (m millimetres)	Frequency
$70 < m \leqslant 80$	4
$80 < m \leqslant 90$	12
$90 < m \leqslant 100$	34
$100 < m \leqslant 110$	32
$110 < m \leqslant 120$	26
$120 < m \leqslant 130$	12

(a) Write down the modal class interval.

.....

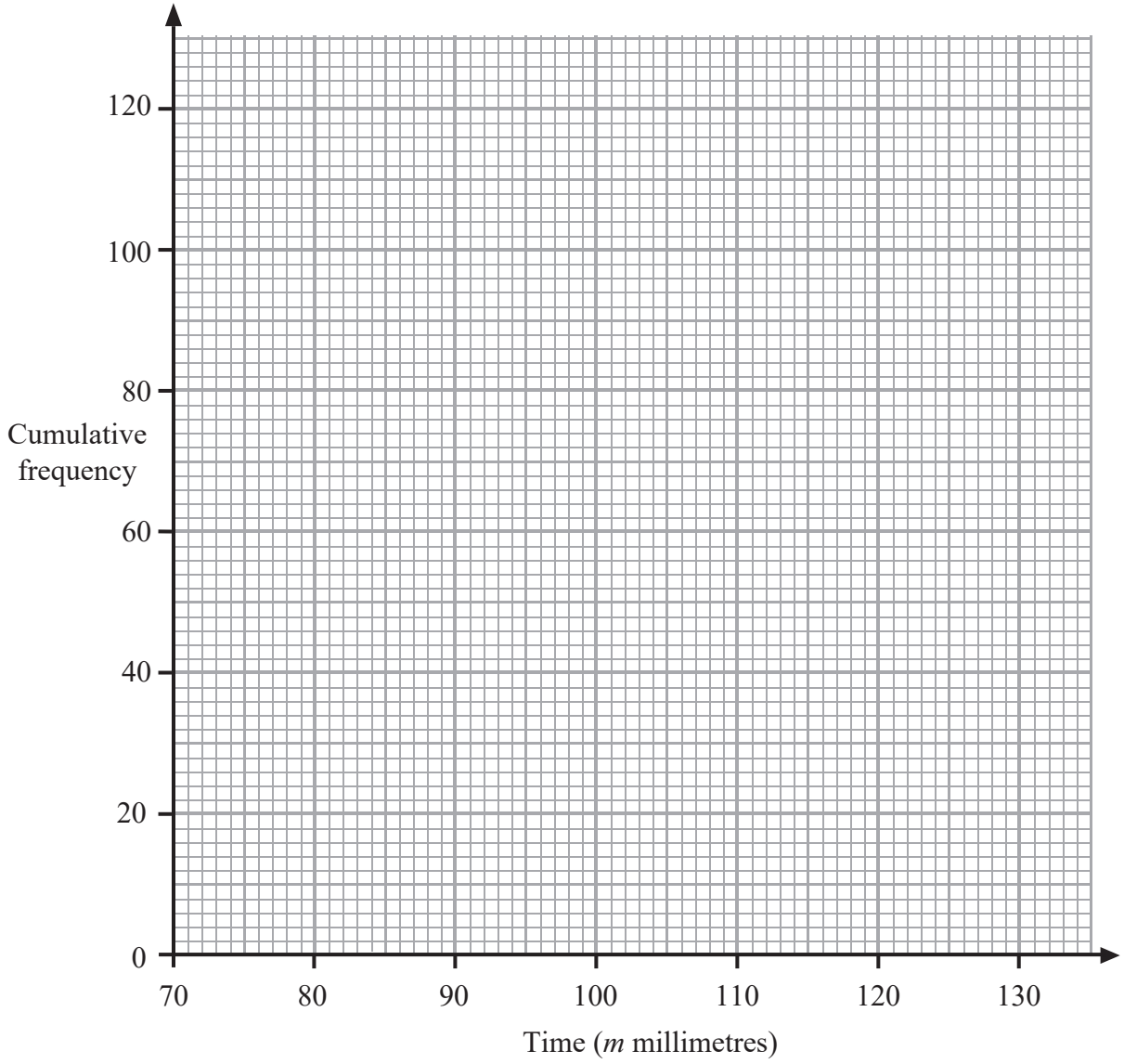
(1)

(b) Complete the cumulative frequency table.

Time (m millimetres)	Cumulative frequency
$70 < m \leqslant 80$	4
$70 < m \leqslant 90$	
$70 < m \leqslant 100$	
$70 < m \leqslant 110$	
$70 < m \leqslant 120$	
$70 < m \leqslant 130$	

(1)

(c) On the grid, draw a cumulative frequency graph for your cumulative frequency table.



(2)

(d) Use your graph to find an estimate for the median.

..... minutes

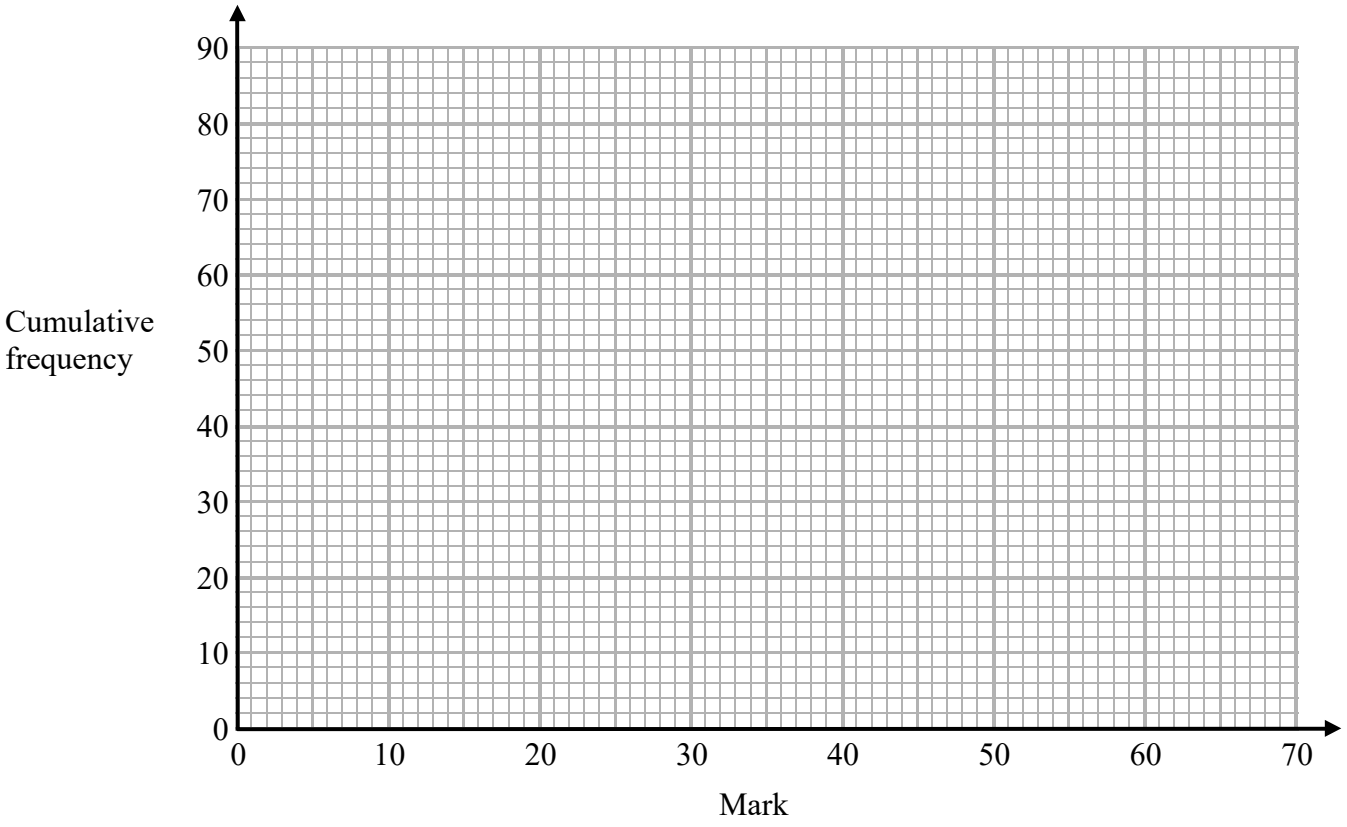
(1)

Total for Question 11 is 5 marks

12 The cumulative frequency table shows the marks some students got in a test.

Mark (m)	Cumulative frequency
$0 < m \leqslant 10$	8
$0 < m \leqslant 20$	23
$0 < m \leqslant 30$	48
$0 < m \leqslant 40$	65
$0 < m \leqslant 50$	74
$0 < m \leqslant 60$	80

(a) On the grid, plot a cumulative frequency graph for this information.



(2)

(b) Find the median mark.

.....

(1)

Students either pass the test or fail the test.
The pass mark is set so that 3 times as many students fail the test as pass the test.

(c) Find an estimate for the lowest possible pass mark.

.....

(3)

(Total for Question 12 is 6 marks)

13 David measures the heights of 80 plants he has grown.
This table summarises his results.

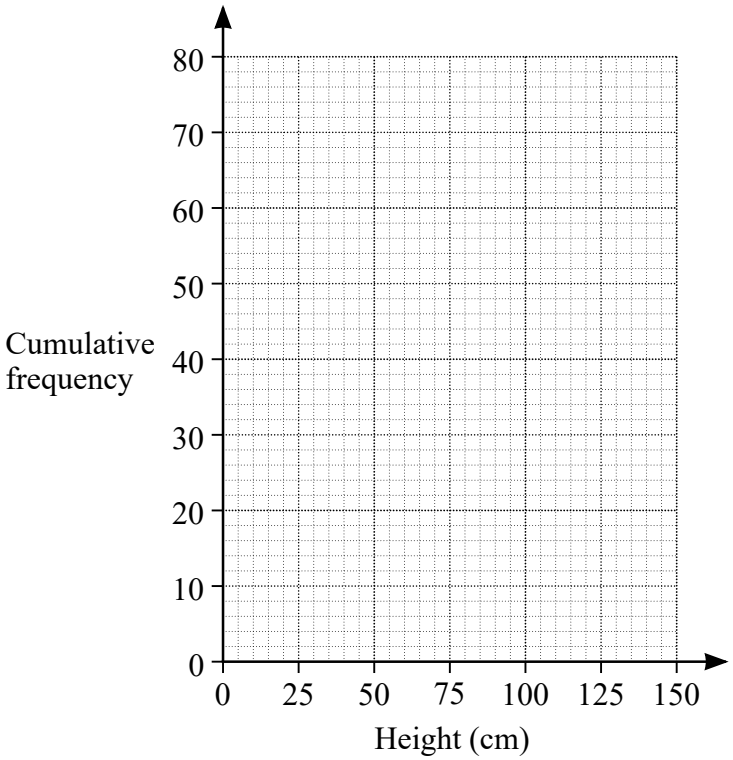
Height, h cm	$0 < h \leq 50$	$50 < h \leq 100$	$100 < h \leq 125$	$125 < h \leq 150$
Number of plants	8	38	31	3

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

Height, h cm	$h \leq 50$	$h \leq 100$	$h \leq 125$	$h \leq 150$
Cumulative frequency	8			

(2)

(ii) Draw the cumulative frequency graph.



(2)

(b) Tara asks if David has 10 plants over 120 cm in height.

Explain why David cannot be certain that he has 10 plants over this height.

(1)

(c) David sells these 80 plants using the price list below.

Height, h cm	$h \leq 80$	$80 < h \leq 120$	$h > 120$
Price (£)	2.00	3.50	5.00

Each plant costs him 60p to grow.

Estimate the total profit David will receive when he sells all these plants.

£ .....

(6)

Total for Question 13 is 11 marks

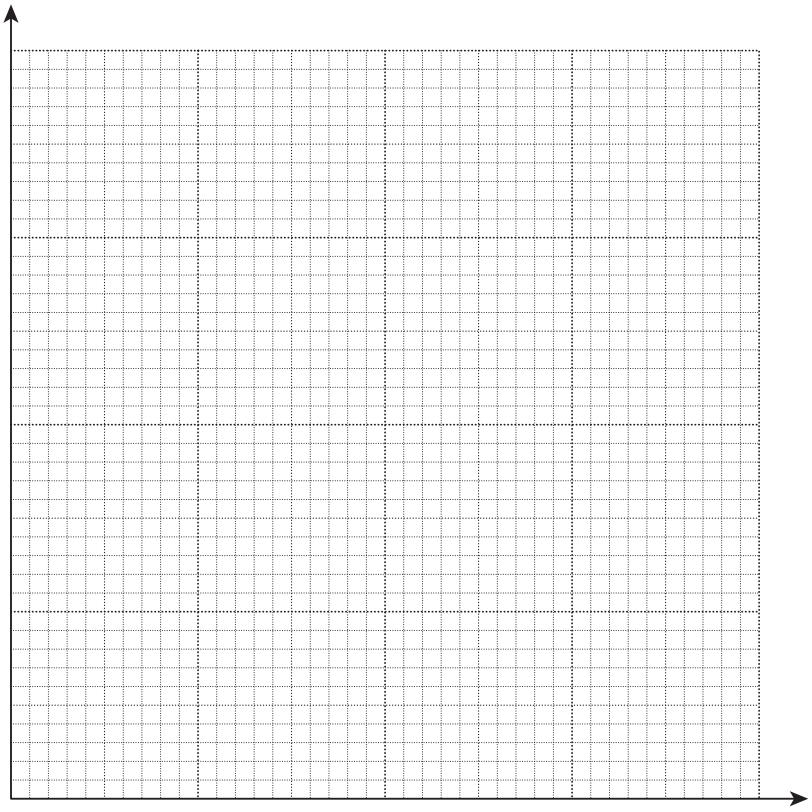
14 The table shows the marks gained by 150 students taking an examination.

Mark (m)	$0<m\leqslant 10$	$10<m\leqslant 20$	$20<m\leqslant 30$	$30<m\leqslant 40$	$40<m\leqslant 50$	$50<m\leqslant 60$	$60<m\leqslant 70$	$70<m\leqslant 80$
Frequency	9	14	26	27	25	22	17	10

(a) (i) Construct a cumulative frequency table.

Mark (m)	$m \leqslant 10$	$m \leqslant 20$	$m \leqslant 30$	$m \leqslant 40$	$m \leqslant 50$	$m \leqslant 60$	$m \leqslant 70$	$m \leqslant 80$
Cumulative Frequency	9							150

(ii) Draw the cumulative frequency graph on the grid below. **(2)**



(4)

(b) Students are to be awarded Gold, Silver, Bronze or Fail.
The students' teacher wishes to award the top 10% of students Gold, the next 60% Silver and the next 20% Bronze.

Use your graph to estimate the lowest mark that Silver will be awarded for.

(b) .....

(3)

(c) Explain why the teacher's method will not necessarily award Gold to exactly 10% of the students.

.....

.....

(1)

Total for Question 14 is 10 marks

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