

1MA1 Higher themed papers: Statistical diagrams – Cumulative frequency

Write your name here			
Surname	Other names		
Centre Number		Candidate Number	
Pearson Edexcel Level 1/Level 2 GCSE (9–1)			
Mathematics Cumulative frequency			
		Paper Reference 1MA1	
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.			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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is **40**. There are **9** questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by all students in the June 2017–November 2019 examinations.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

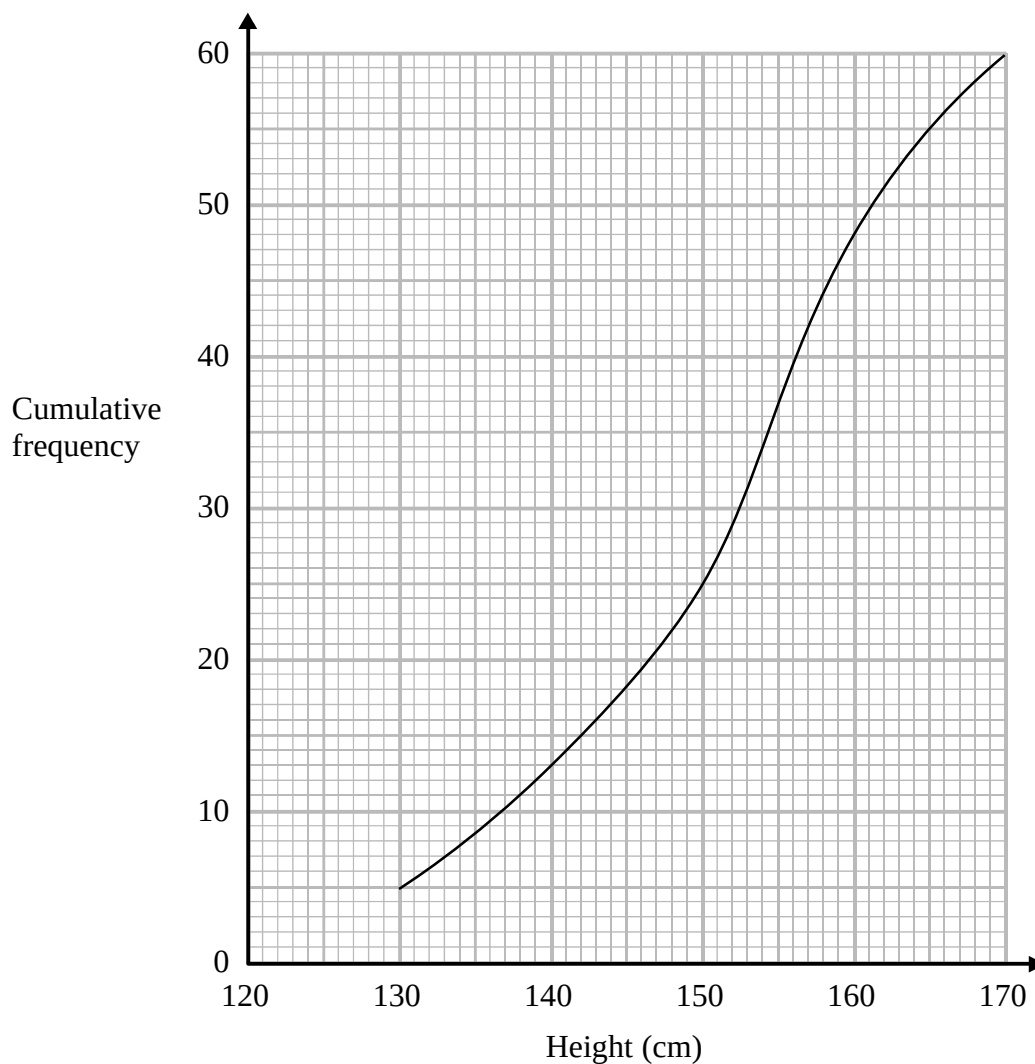
Advice

- 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.

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- 1 The cumulative frequency graph shows some information about the heights, in cm, of 60 students.



Work out an estimate for the number of these students with a height greater than 160 cm.

.....
(Total for Question 1 is 2 marks)

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- 2 The grouped frequency table gives information about the times, in minutes, that 80 office workers take to get to work.

Time (t minutes)	Frequency
$0 < t \leq 20$	5
$20 < t \leq 40$	30
$40 < t \leq 60$	20
$60 < t \leq 80$	15
$80 < t \leq 100$	8
$100 < t \leq 120$	2

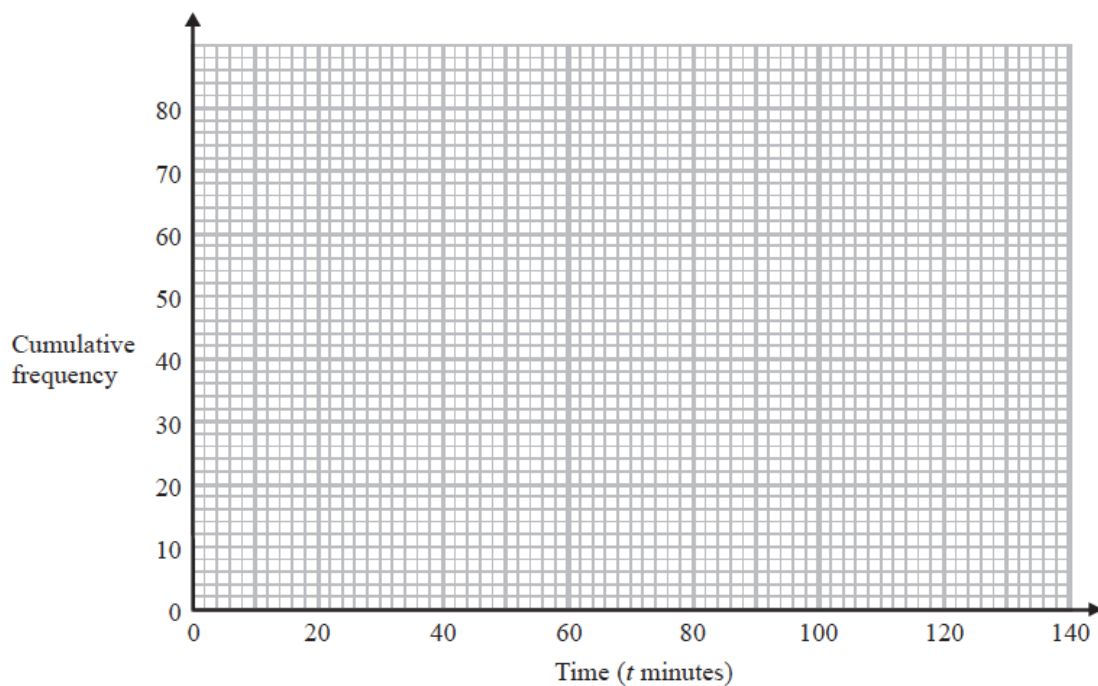
- (a) Complete the cumulative frequency table.

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

(1)

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- (b) On the grid, draw the cumulative frequency graph for this information.



(2)

- (c) Use your graph to find an estimate for the percentage of these office workers who take more than 90 minutes to get to work.

.....%

(3)

(Total for Question 2 is 6 marks)

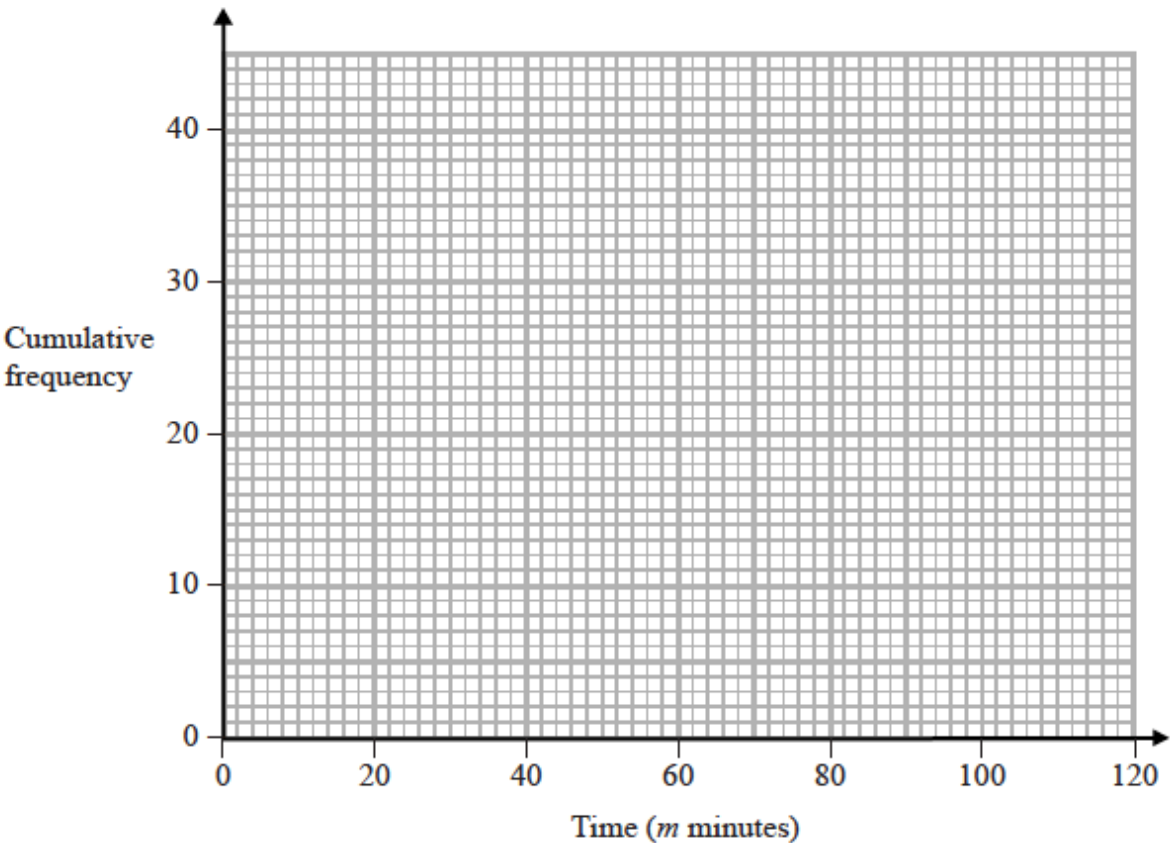
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- 3 The cumulative frequency table shows information about the times, in minutes, taken by 40 people to complete a puzzle.

Time (m minutes)	Cumulative frequency
$20 < m \leq 40$	5
$20 < m \leq 60$	25
$20 < m \leq 80$	35
$20 < m \leq 100$	38
$20 < m \leq 120$	40

- (a) On the grid below, draw a cumulative frequency graph for this information.



(2)

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(b) Use your graph to find an estimate for the interquartile range.

..... minutes

(2)

One of the 40 people is chosen at random.

(c) Use your graph to find an estimate for the probability that this person took between 50 minutes and 90 minutes to complete the puzzle.

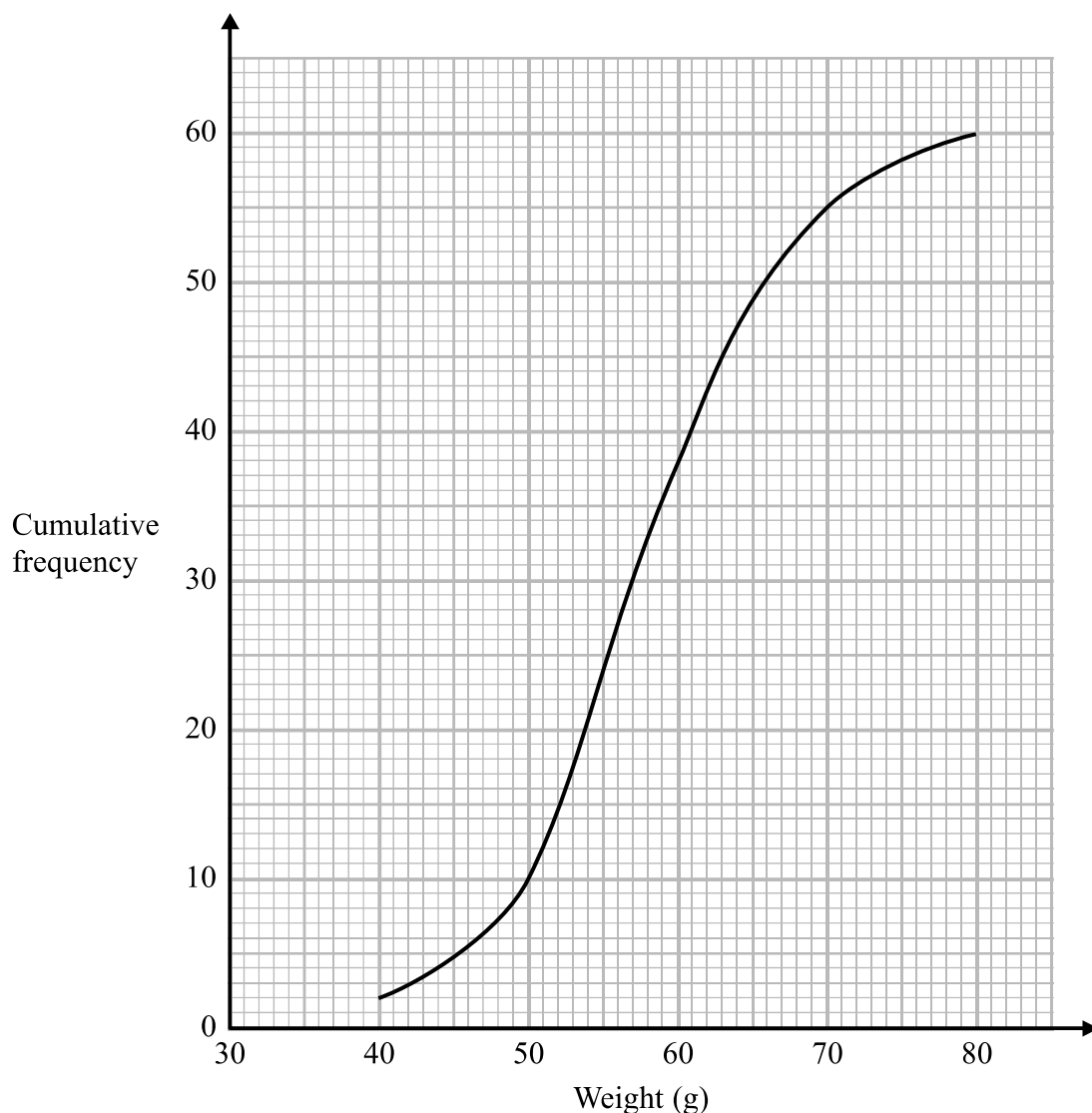
.....

(2)

(Total for Question 3 is 6 marks)

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- 4 The cumulative frequency graph shows information about the weights of 60 potatoes.



- (a) Use the graph to find an estimate for the median weight.

..... g
(1)

Jamil says,

“ $80 - 40 = 40$ so the range of the weights is 40 g.”

- (b) Is Jamil correct?

You must give a reason for your answer.

.....
.....
(1)

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(c) Show that less than 25% of the potatoes have a weight greater than 65 g.

(2)

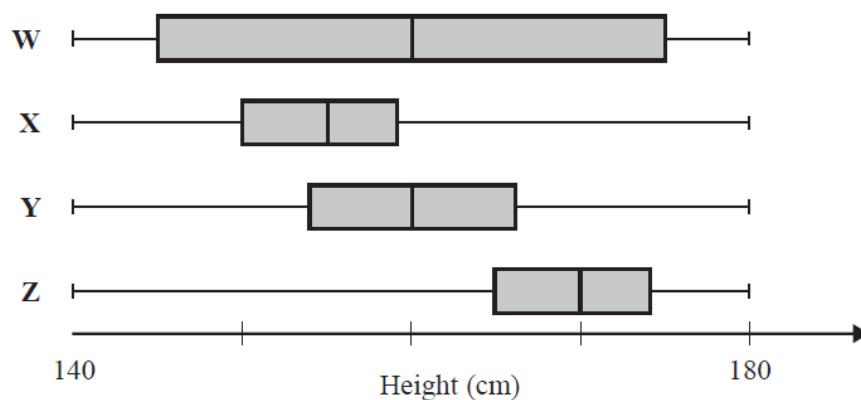
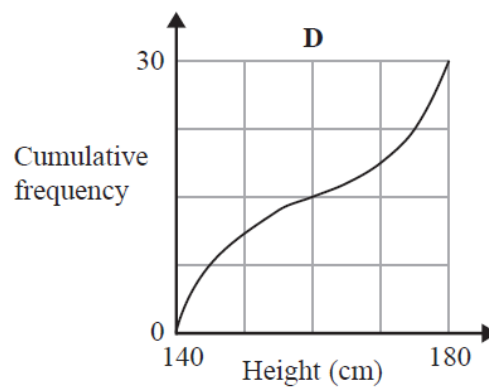
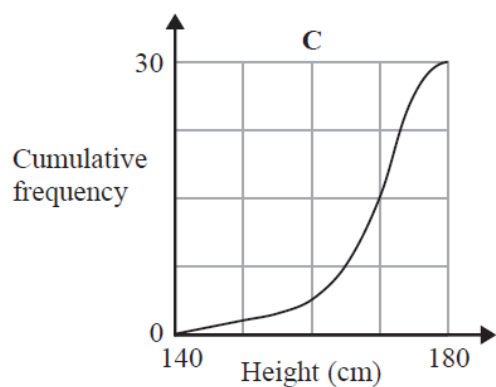
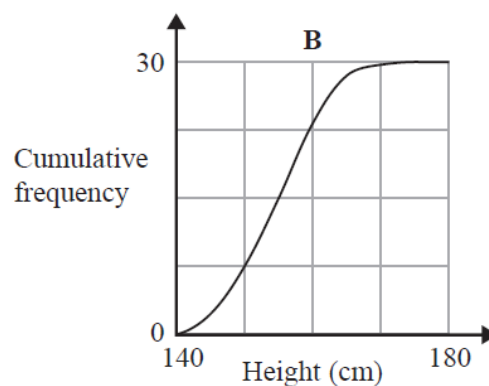
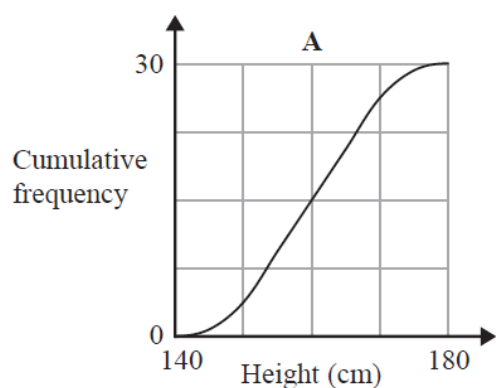
(Total for Question 4 is 4 marks)

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- 5 Joan measured the heights of students in four different classes.

She drew a cumulative frequency graph and a box plot for each class.



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Match each cumulative frequency graph to its box plot.

Cumulative frequency graph	Box plot
A	
B	
C	
D	

(Total for Question 5 is 2 marks)

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6

The cumulative frequency table gives information about the time, in minutes, Jim took to go from his home to school each day last term.

Time taken (t minutes)	Cumulative frequency
$0 < t \leq 10$	0
$0 < t \leq 20$	7
$0 < t \leq 30$	20
$0 < t \leq 40$	64
$0 < t \leq 50$	74
$0 < t \leq 60$	80

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

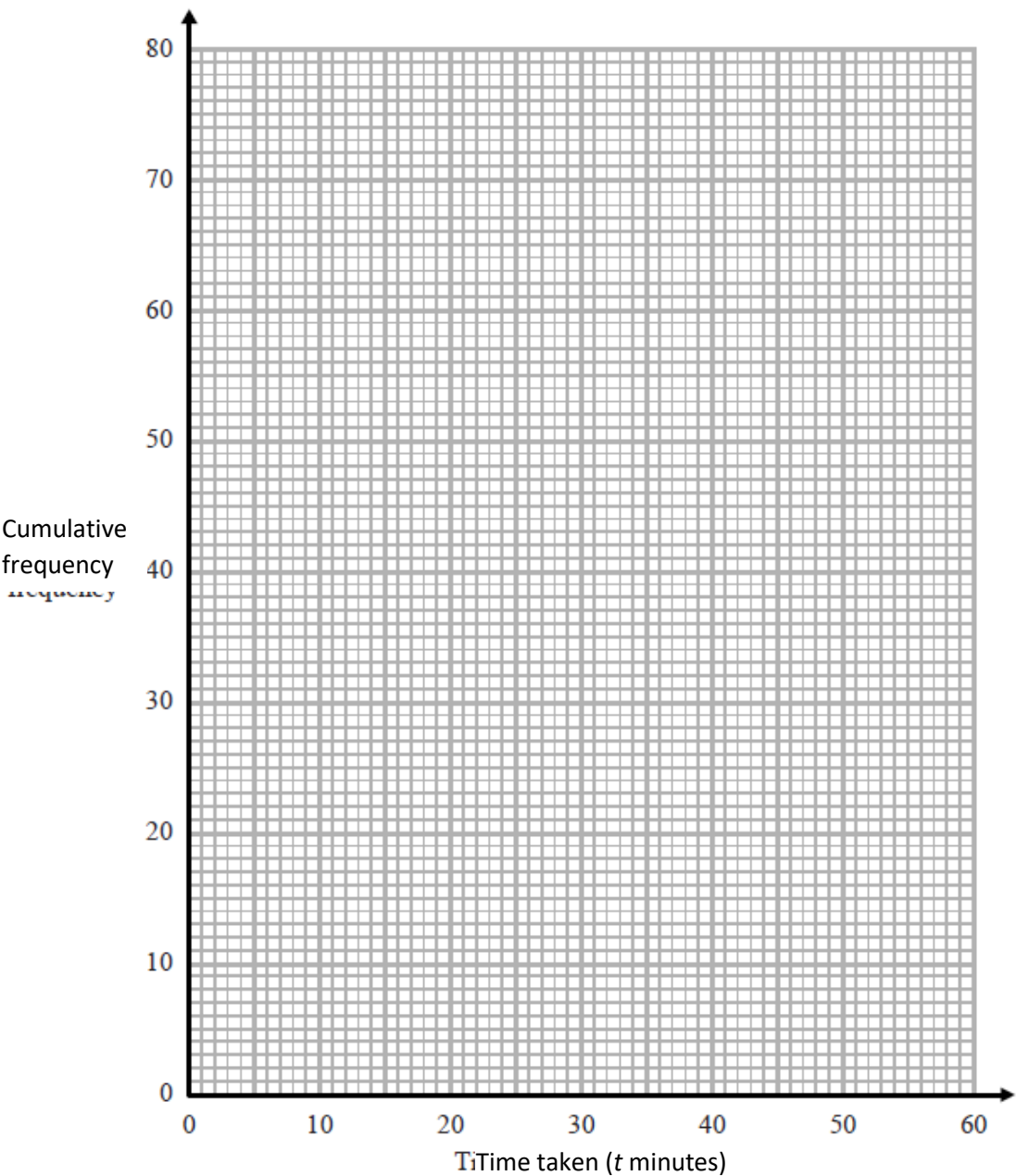
(2)

Jane expects that it should take her x minutes to go from her home to school each day. On 25% of the days last term, Jane took longer than x minutes to go from her home to school.

(b) Use your cumulative frequency graph to find an estimate for the value of x .

.....

(3)



(Total for Question 6 is 5 marks)

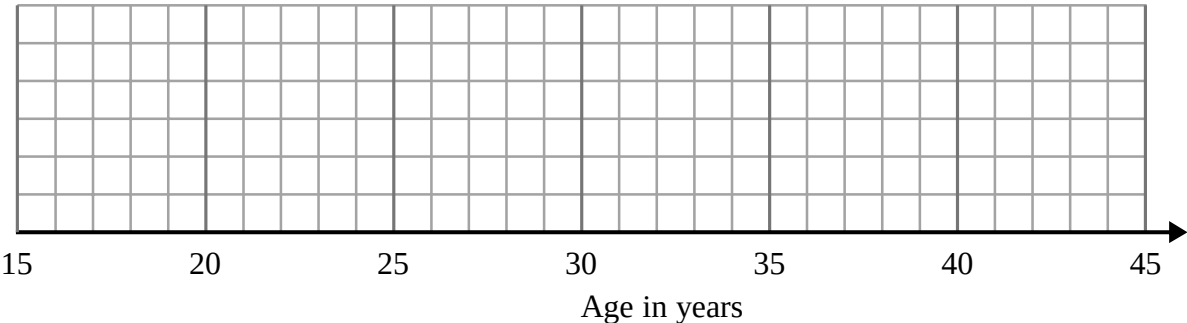


7 The stem and leaf diagram shows the ages, in years, of 25 people.

1	7	7	8	9							
2	1	2	4	4	5	5	6	7	8	9	9
3	0	1	2	2	3	4	5	6			
4	0	1									

Key: 1 | 7 represents 17 years

(a) (i) On the grid, draw a box plot for this information.



(3)

One of these people is chosen at random.

(ii) What is the probability that this person is 30 years of age or older?

.....
(2)

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The grouped frequency table gives information about the ages of a different group of people.

Age (a years)	Frequency
$0 < a \leq 20$	7
$20 < a \leq 30$	12
$30 < a \leq 40$	5
$40 < a \leq 50$	1

Anne drew this cumulative frequency table for this information.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	7
$20 < a \leq 30$	19
$30 < a \leq 40$	24
$40 < a \leq 50$	25

The cumulative frequency table is **not** correct.

(b) Write down one thing that is wrong with the table.

.....
(1)

(Total for Question 7 is 6 marks)

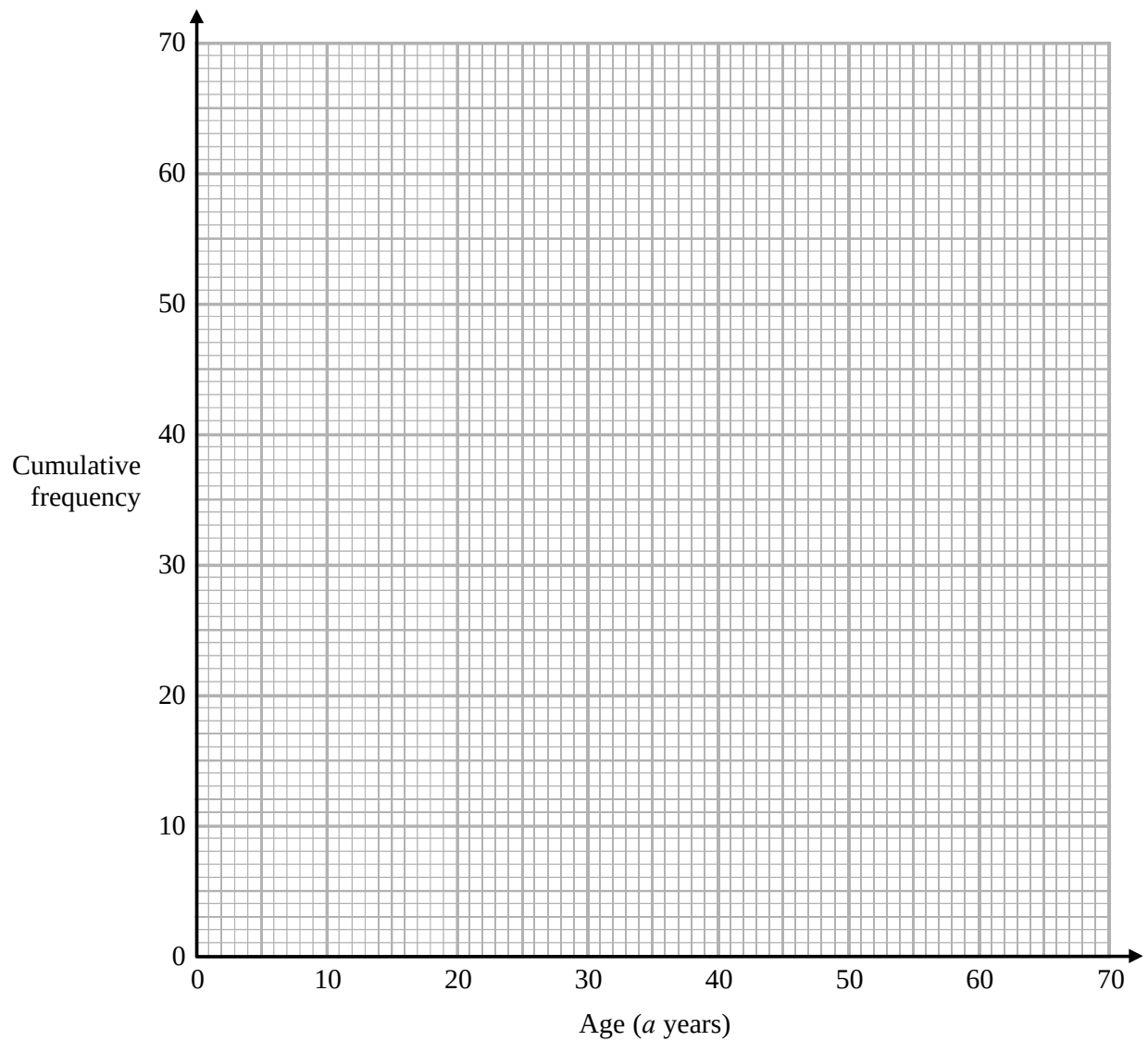
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- 8 Francesco carried out a survey about the ages of the people in his office.
The table shows information about his results.

Age (a years)	Cumulative frequency
$20 < a \leq 30$	10
$20 < a \leq 40$	26
$20 < a \leq 50$	58
$20 < a \leq 60$	66
$20 < a \leq 70$	70

- (a) On the grid opposite, draw a cumulative frequency graph for this information. (2)

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

.....years
(1)

Francesco says,

“More than 60% of the people in the office are between 35 and 55 years old.”

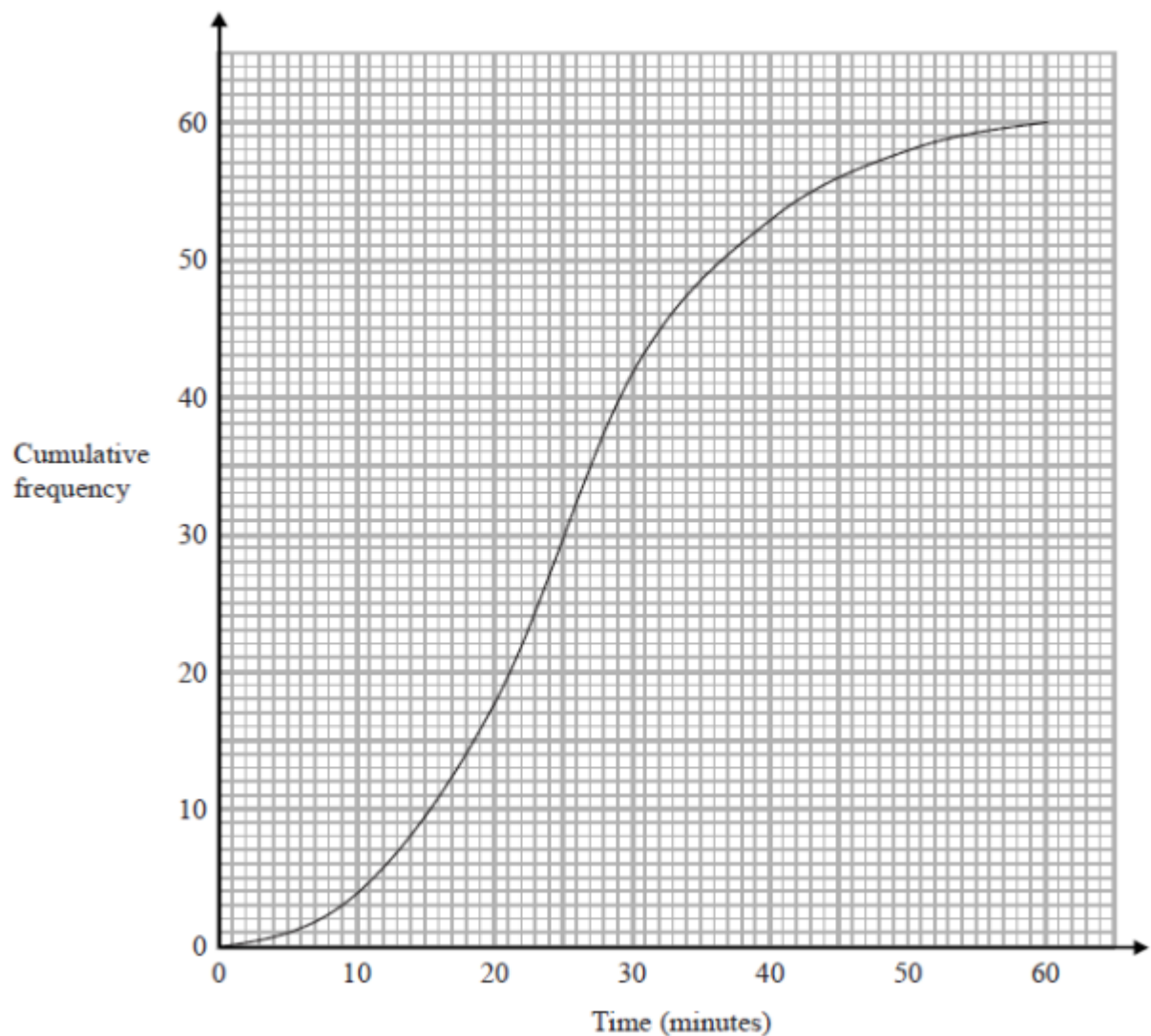
(c) Use your graph to determine if Francesco is correct.

.....
(3)

(Total for Question 8 is 6 marks)

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- 9 The cumulative frequency graph gives information about the number of minutes each of 60 people was in a shop.



- (a) Find an estimate for the number of people who were in the shop for more than 40 minutes.

.....
(2)

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Stan has to use the graph to find an estimate for the lower quartile of the times.

Stan writes,

60 people were in the shop.

25% of 60 = 15

So the lower quartile of the times is 15 minutes.

(b) What mistake has Stan made?

.....

.....

.....

(1)

(Total for Question 9 is 3 marks)

TOTAL MARKS FOR PAPER: 40