Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Cumulative Frequency

Calculator Allowed

INSTRUCTIONS TO CANDIDATES

- Write your name in the space provided.

- Write your answers in the spaces provided in this question paper.

- Answer ALL questions.

- Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

- You should have a ruler, compass and protractor where required.

Total Marks :

1) The salaries of employees were recorded and a cumulative frequency graph drawn.
Use the graph to estimate
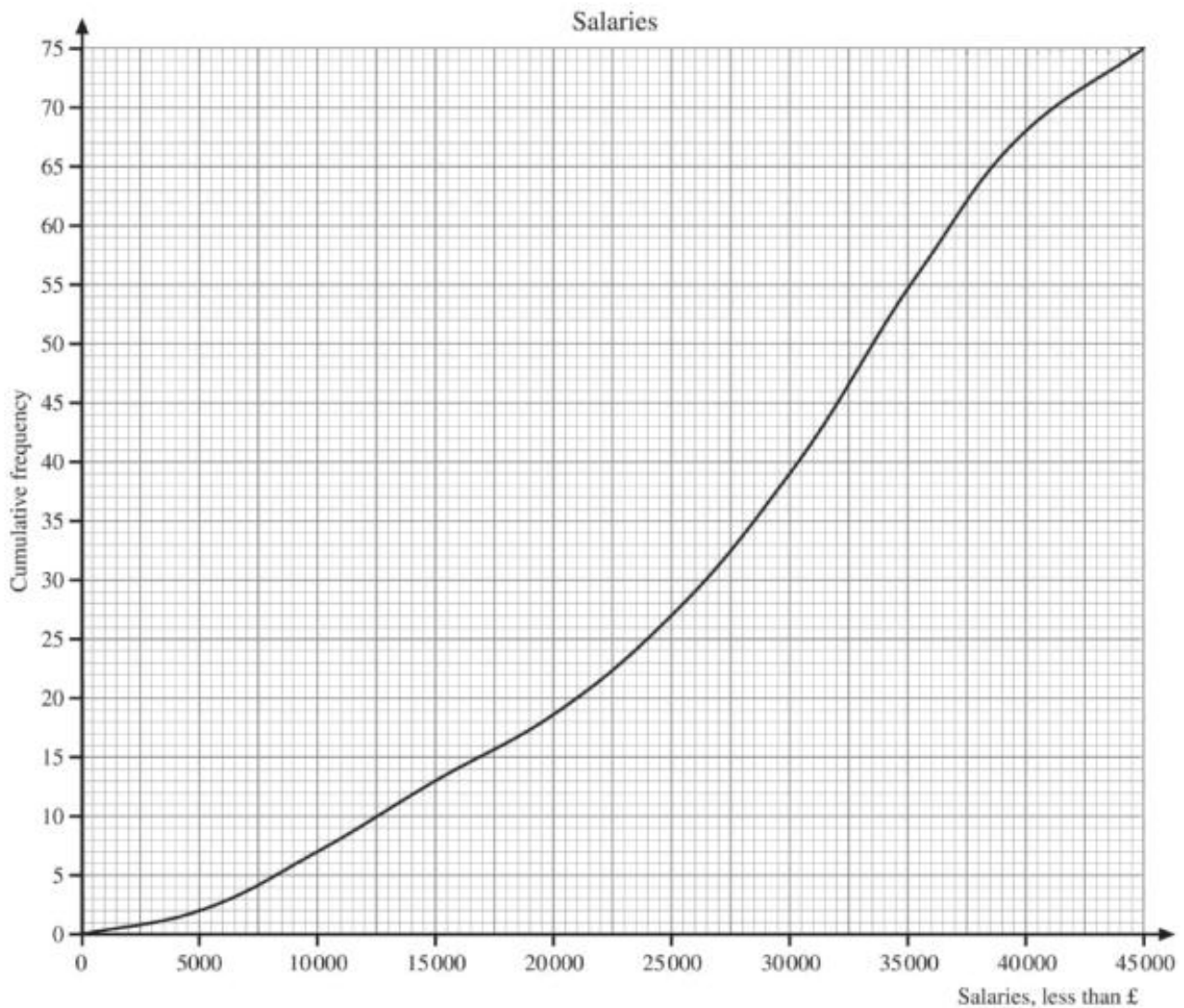
(a) the median salary,

Answer _____ [1]

(b) the interquartile range,

Answer _____ [2]

(c) how many employees earned more than £37,500

Answer_____[2]

Salaries

2) The times that students spent surfing the Internet during one week were recorded.
   The times were grouped as shown in the table.

Time t (hours)	Frequency
$0 < t \leq 5$	15
$5 < t \leq 10$	18
$10 < t \leq 15$	22
$15 < t \leq 20$	14
$20 < t \leq 25$	8
$25 < t \leq 30$	3

(a) Calculate an estimate for the mean time.

Answer _____ hours [4]

(b) Draw a cumulative frequency curve to represent the data

[4]
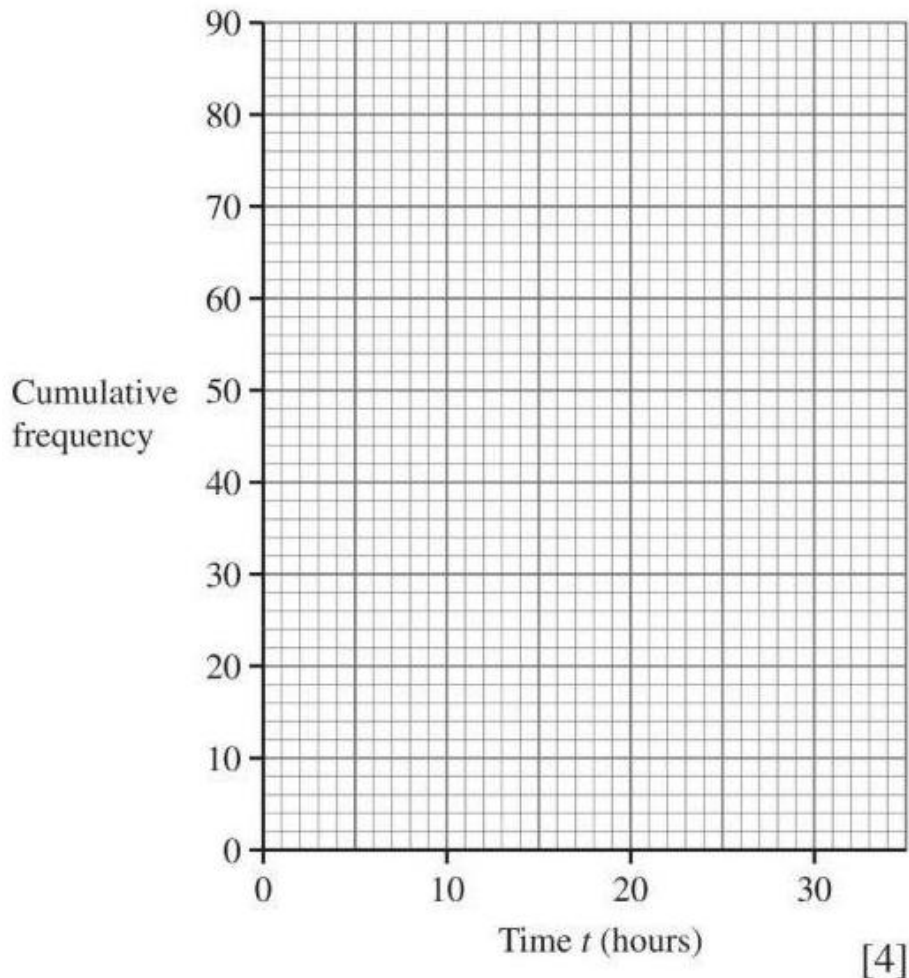
3) Mrs Loydon teaches a primary school class.
During one school week, her maths lessons are based on learning the '2 times table'.
She decides to measure the time taken for pupils in her class to say the '2 times table' at the start and at the end of the school week.

The grouped frequency table below shows her results at the start of the week.

Time taken, t (seconds)	$15 < t \leqslant 20$	$20 < t \leqslant 25$	$25 < t \leqslant 30$	$30 < t \leqslant 35$	$35 < t \leqslant 40$	$40 < t \leqslant 45$
Frequency	3	4	8	6	2	1

(a) Complete the table below. [1]

Time taken, t (seconds)	$\leqslant 15$	$\leqslant 20$	$\leqslant 25$	$\leqslant 30$	$\leqslant 35$	$\leqslant 40$	$\leqslant 45$
Cumulative frequency	0						

(b) Draw a cumulative frequency graph of the times taken. [3]

Cumulative frequency

Time taken, t (seconds)
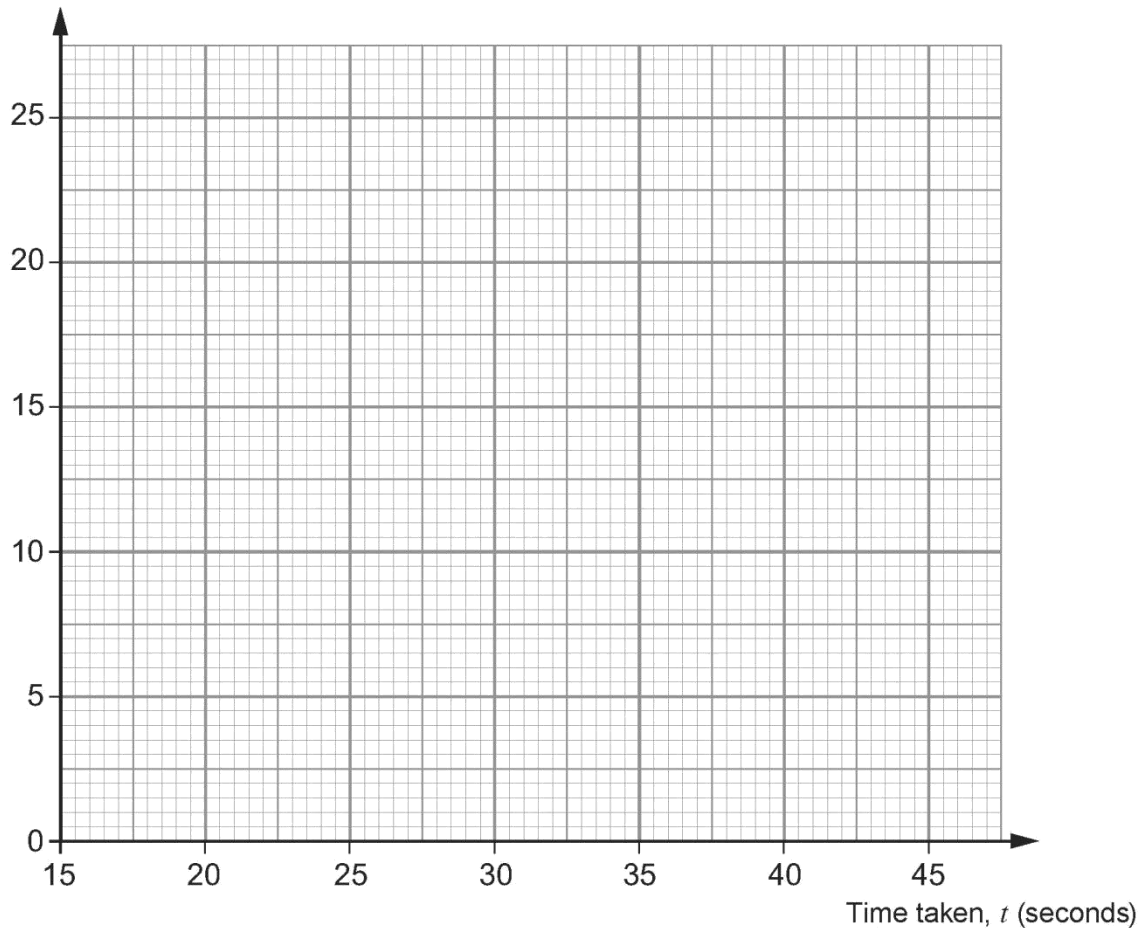
(c)   Use your cumulative frequency graph to estimate the median time taken at the start of the week.   [1]

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(d)   At the end of the week, the lower quartile of the class was 18 seconds, and the upper quartile was 26 seconds.
Mrs Loydon compares these results with those from the start of the week.
Explain, with reasons, what conclusions she can make.   [2]

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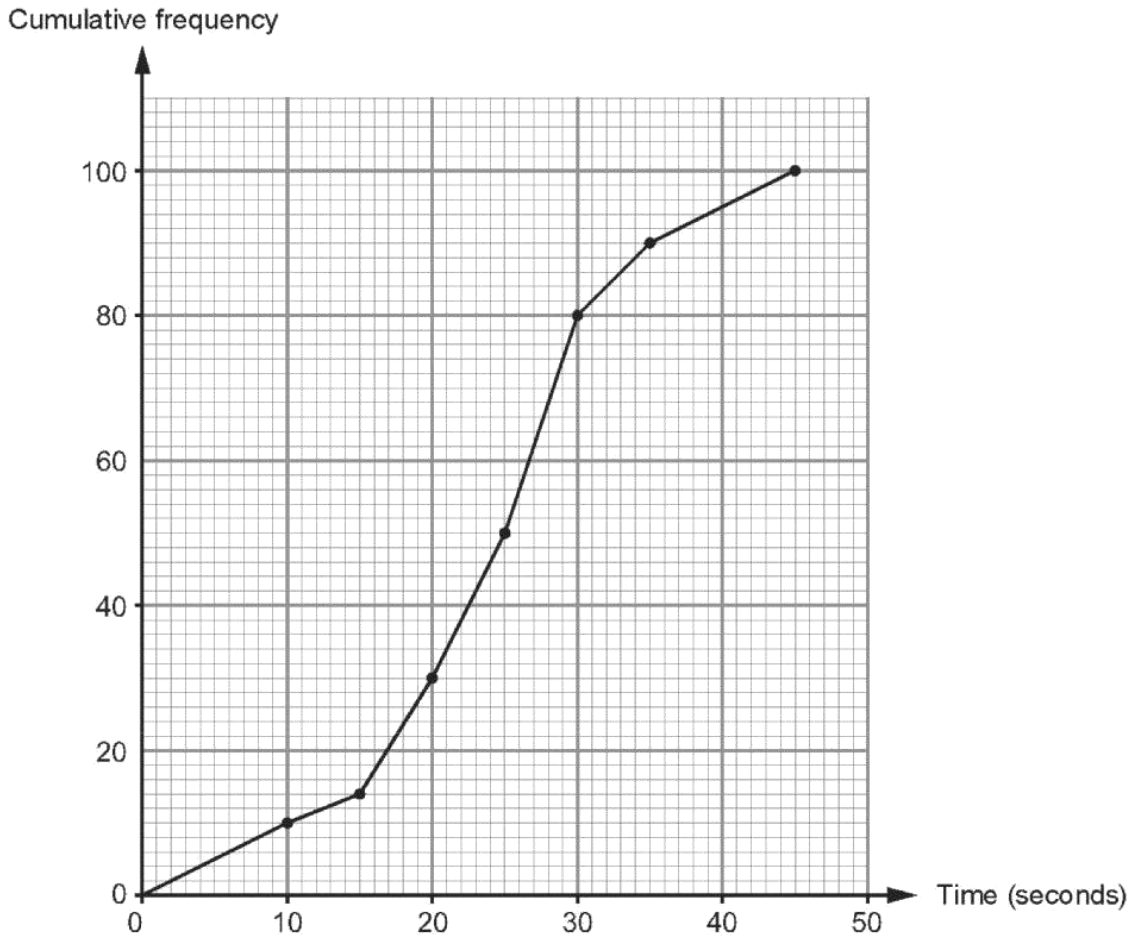...

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4) An exercise was carried out to time a group of 100 passengers leaving an aeroplane using the emergency exits.
The results are illustrated in the cumulative frequency diagram shown below.

Cumulative frequency

(a) How many passengers took between 20 seconds and 35 seconds to leave the plane?

[2]

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(b) How many passengers took more than 40 seconds to leave the plane? [2]

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(c) The regulations state that 85% of the passengers should be able to leave the plane in less than 30 seconds.
Complete the following statement. You must show your working. [2]

'In this exercise, the target time for passengers leaving the plane in an emergency

was missed by .... seconds.'

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5) The birth weights of 120 babies were recorded.
The cumulative frequency diagram shows the distribution of the weights.

Cumulative frequency
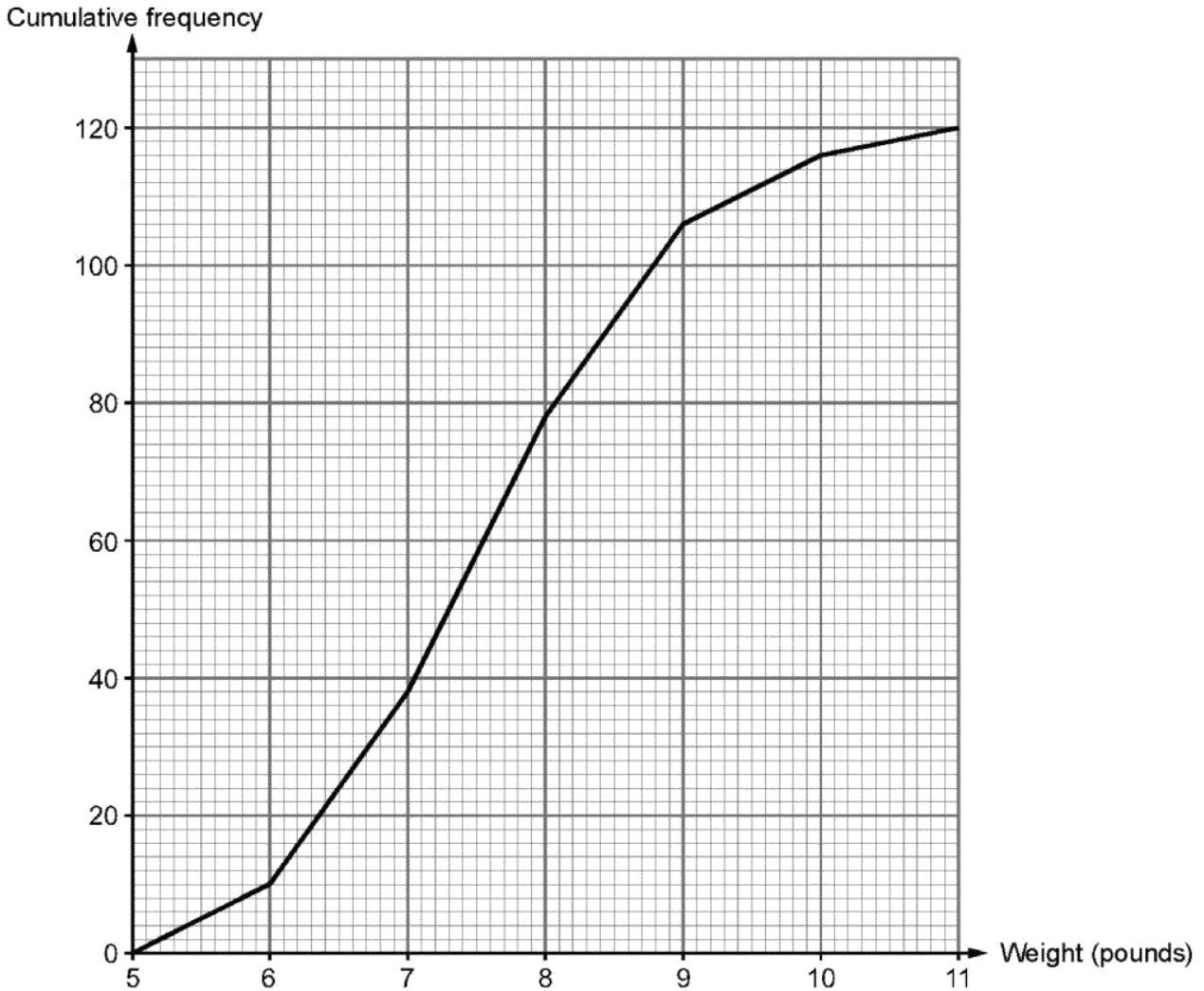
Weight (pounds)

(a) Write down an estimate of the median weight of the 120 babies. [1]

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(b) Calculate an estimate of the interquartile range of the weights of the 120 babies. [2]

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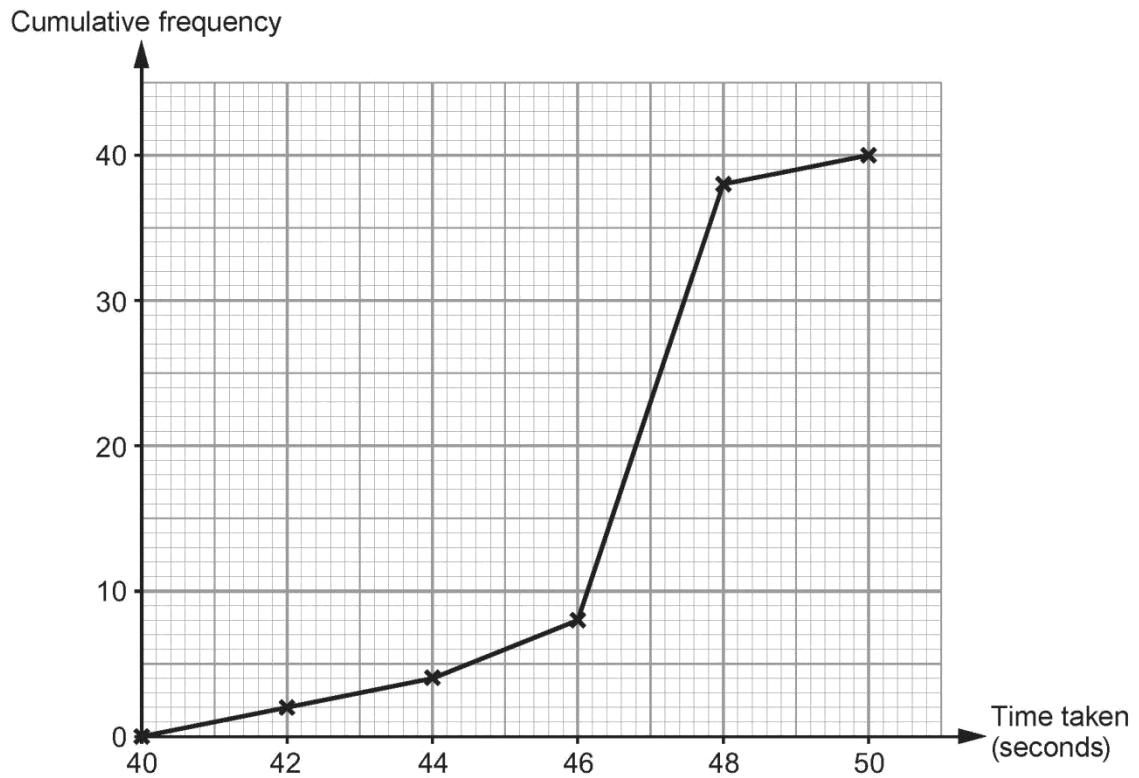
(c) Write down an estimate of the number of babies whose weights were greater than 9 pounds. [2]

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6) At the start of a new football season, a coach recorded the times taken by the 40 players in his squad to carry out a fitness drill.
He grouped the times taken by the 40 players and drew the cumulative frequency diagram shown below.

Cumulative frequency

(a)   What was the median time taken to complete the fitness drill?   [1]

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(b)   The coach sets a target over the next week to get the median time for the fitness drill down to 46 seconds.
Of the players who took more than 46 seconds, how many need to improve their times to 46 seconds or under, so that the median time would be 46 seconds?   [1]

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7) *(a)* A group of 120 pupils from Heolwen school sat a Numeracy test.
Their marks out of 100 are shown in the cumulative frequency diagram below.

Cumulative frequency
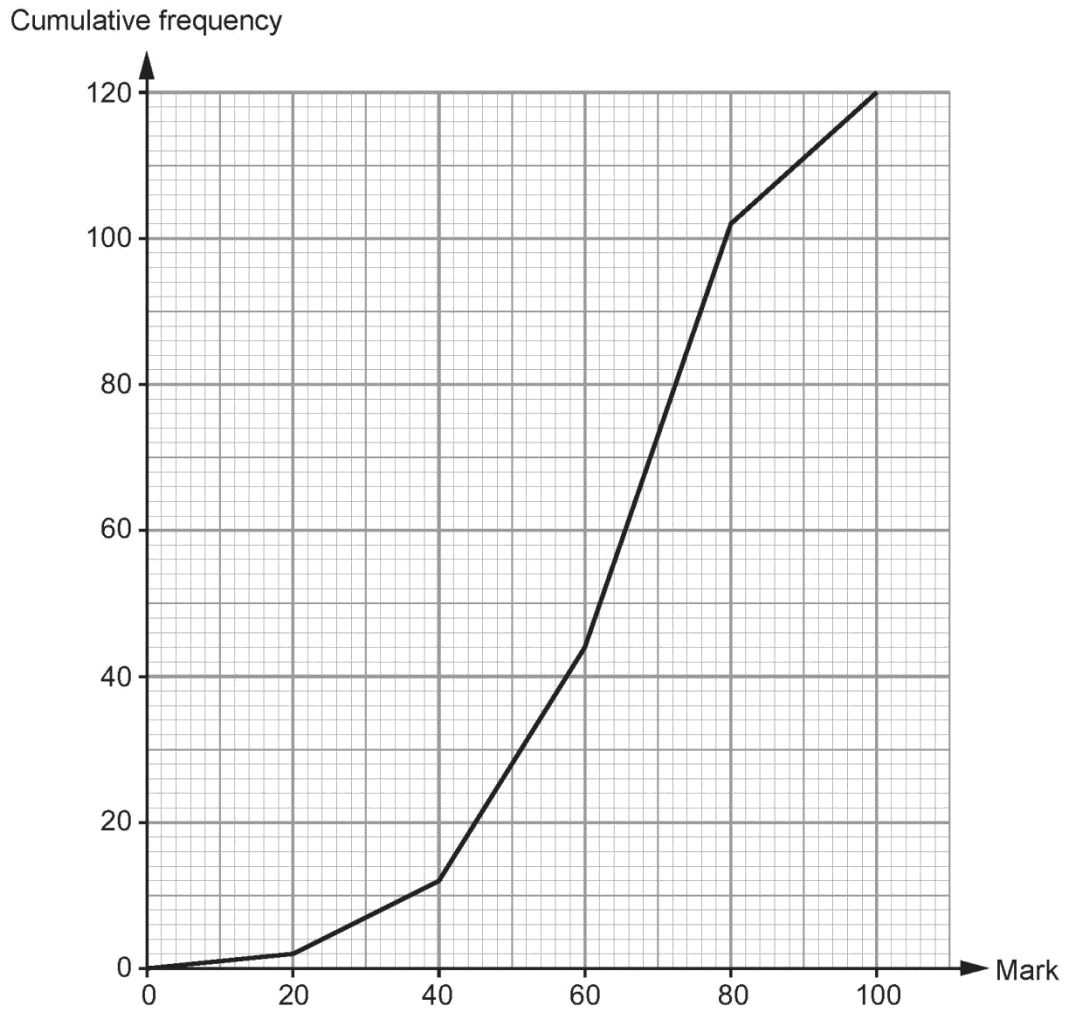
The pass mark for the test is 50 marks.
Use the graph to estimate how many pupils passed the test.   [2]

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(b) A group of **80** pupils from Cwmteg school sat the same Numeracy test.
Their marks out of 100 are shown in the grouped frequency table below.

Mark	1 – 20	21 – 40	41 – 60	61 – 80	81 – 100
Number of pupils	1	9	20	24	26

Complete the cumulative frequency table for Cwmteg school. [1]

Mark	$\leqslant 0$	$\leqslant 20$	$\leqslant 40$	$\leqslant 60$	$\leqslant 80$	$\leqslant 100$
Cumulative frequency	0					

(c) Using the same graph paper as used for Heolwen school, draw a cumulative frequency
diagram of the marks of the pupils from Cwmteg school. [2]

(d) Use the cumulative frequency diagrams to decide which school had the higher estimated
median.
You must show your working. [2]

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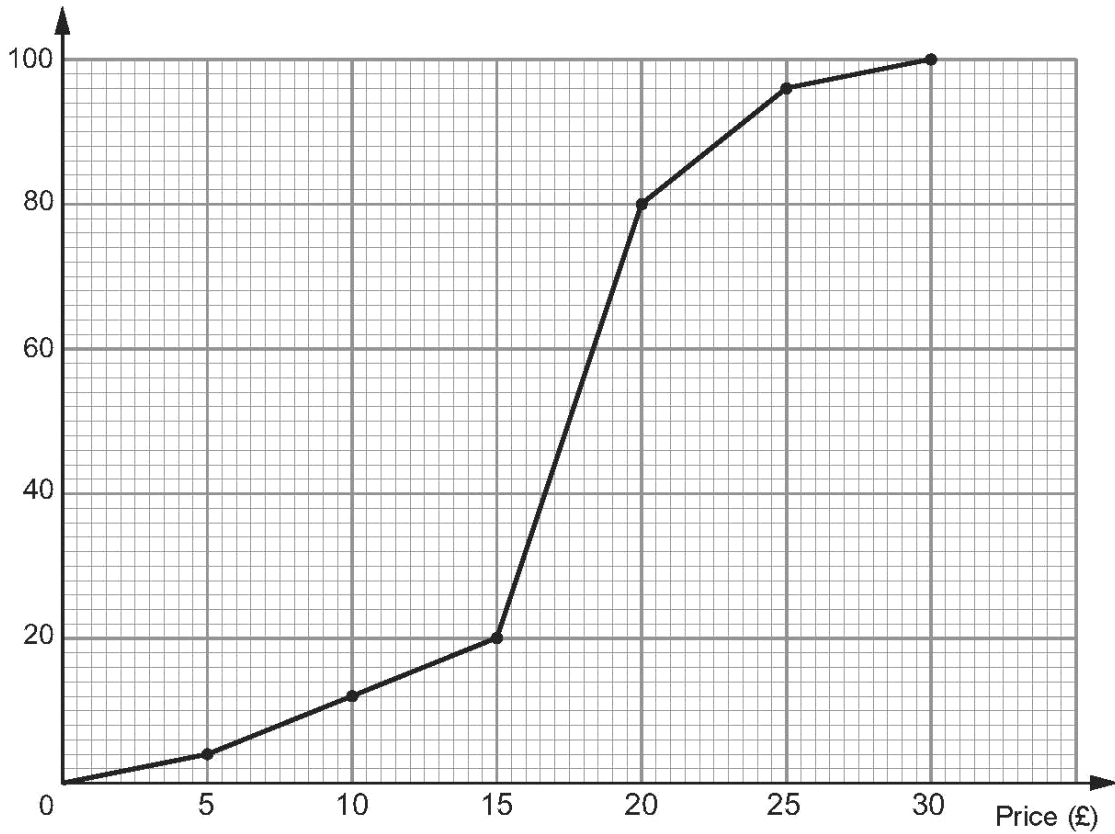..

8) The cumulative frequency diagram shows the prices of 100 items in a shop.

Cumulative frequency

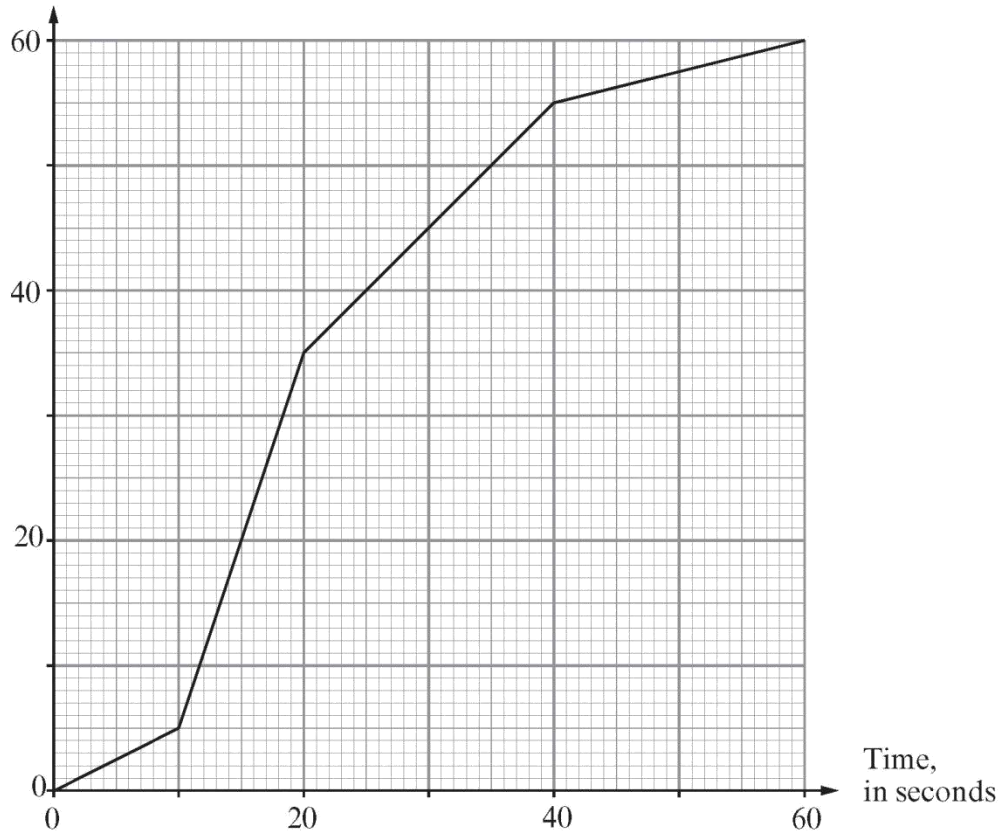(a)   Write down an estimate for the median price of these items.   [1]

....

(b)   Calculate an estimate for the interquartile range of these items.   [2]

....

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9) A timekeeper has recorded the times taken by a number of children to complete a task.
All of the children completed the task.
The results are shown in the following cumulative frequency diagram.

Cumulative frequency

In order to compare with another task, the timekeeper needs to know the interquartile range.

(a)   Calculate an estimate for the interquartile range.

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....

....

[2]

(b)   The same children completed a different task of similar difficulty.
The interquartile range for this task was 30 seconds.
More children finished with a time closer to the median in one of the tasks.
Which task was this, the first task or the second task?
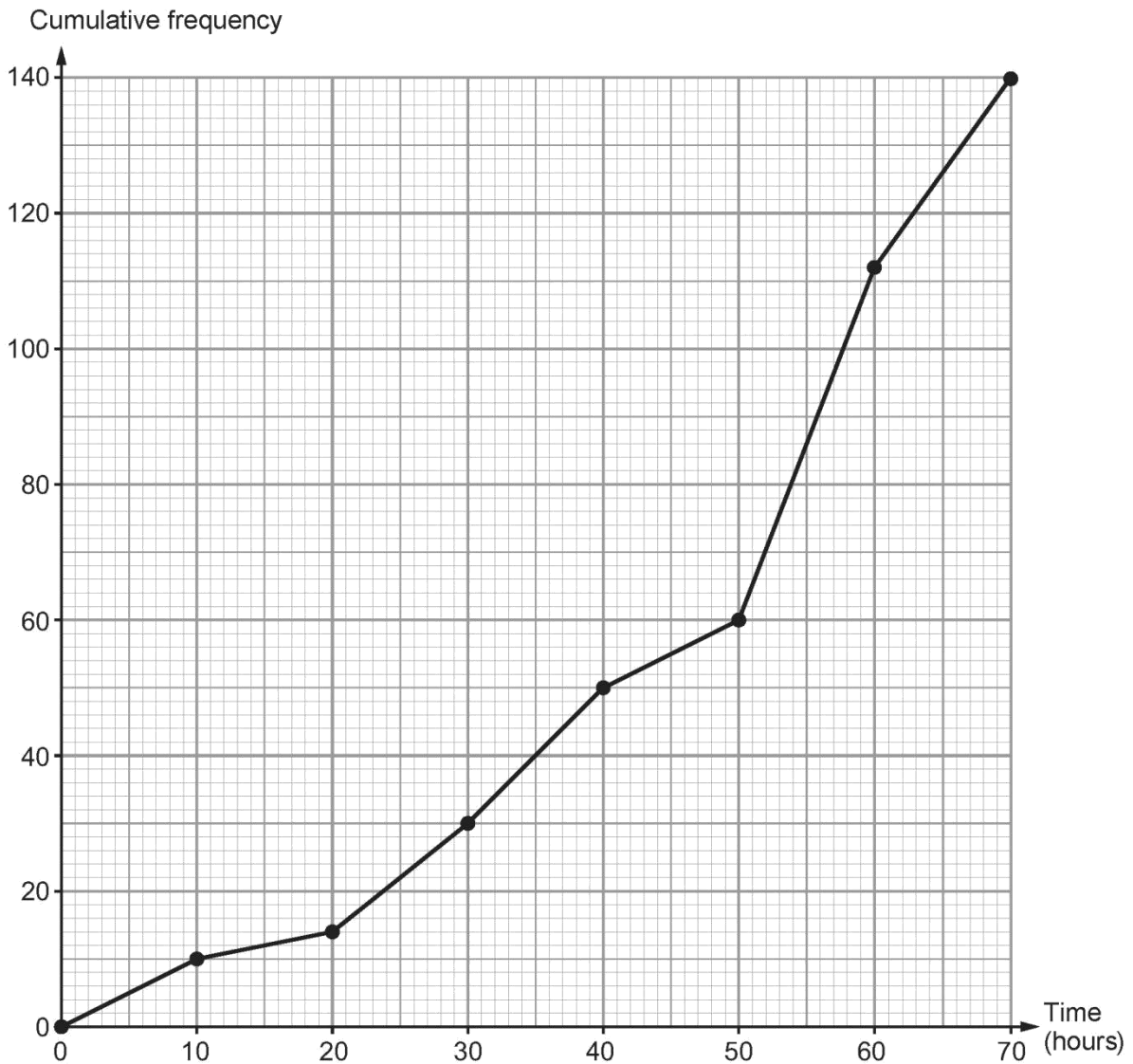Give a reason for your answer.

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[1]

10) *(a)* 140 girls were asked how long they spent revising for their GCSE examinations. The cumulative frequency diagram shows the results.

Cumulative frequency

(i) Estimate the median time the girls spent revising.
Circle your answer. [1]

35 hours   40 hours   48 hours   52 hours   70 hours

(ii) Calculate the number of girls who spent between 40 and 50 hours revising.
Circle your answer. [1]

0 girls   5 girls   10 girls   15 girls   20 girls

(iii)   Circle either TRUE or FALSE for each of the following statements.   [2]

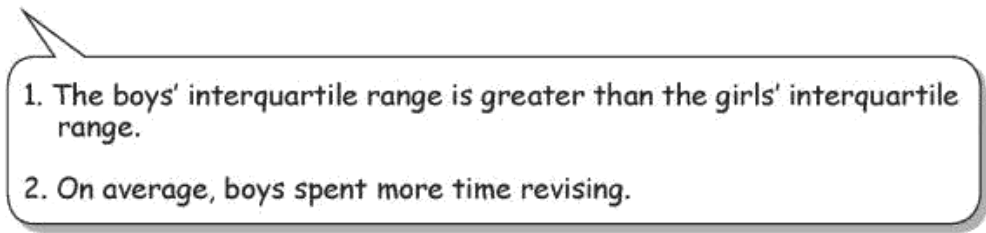|		
25 girls spent between 30 and 50 hours revising.	TRUE	FALSE
No girls spent more than 80 hours revising.	TRUE	FALSE
The modal group is between 50 and 60 hours spent revising.	TRUE	FALSE
20 girls spent more than 60 hours revising.	TRUE	FALSE

(b)   140 boys were asked how long they spent revising for their GCSE examinations.
The cumulative frequency diagram below shows the results.
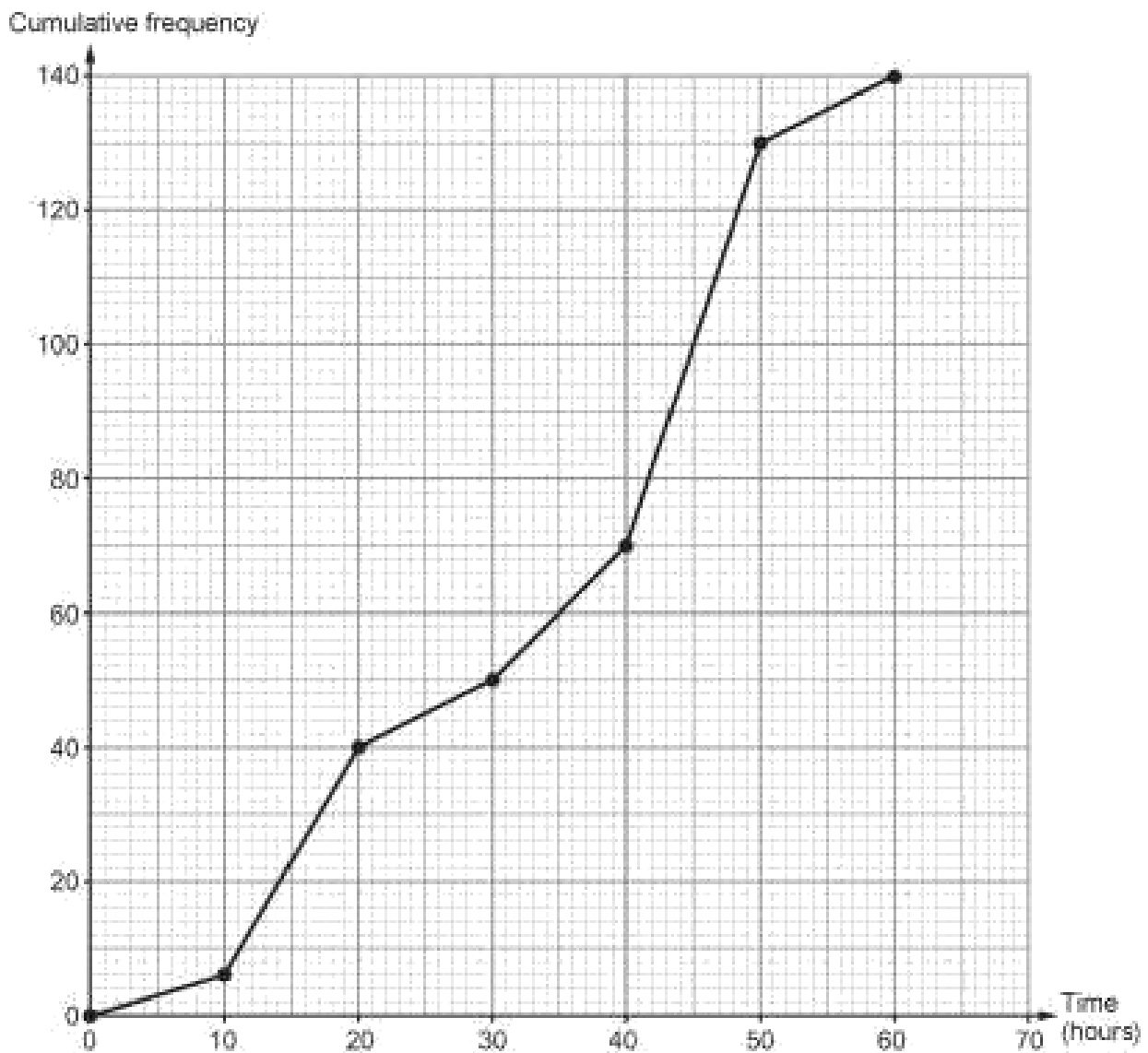
Trefor makes two statements.

> 1. The boys' interquartile range is greater than the girls' interquartile range.
>
> 2. On average, boys spent more time revising.

Are both Trefor's statements correct?
Show calculations and give reasons to support your answers. [4]

Statement 1: ....

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Statement 2: ....

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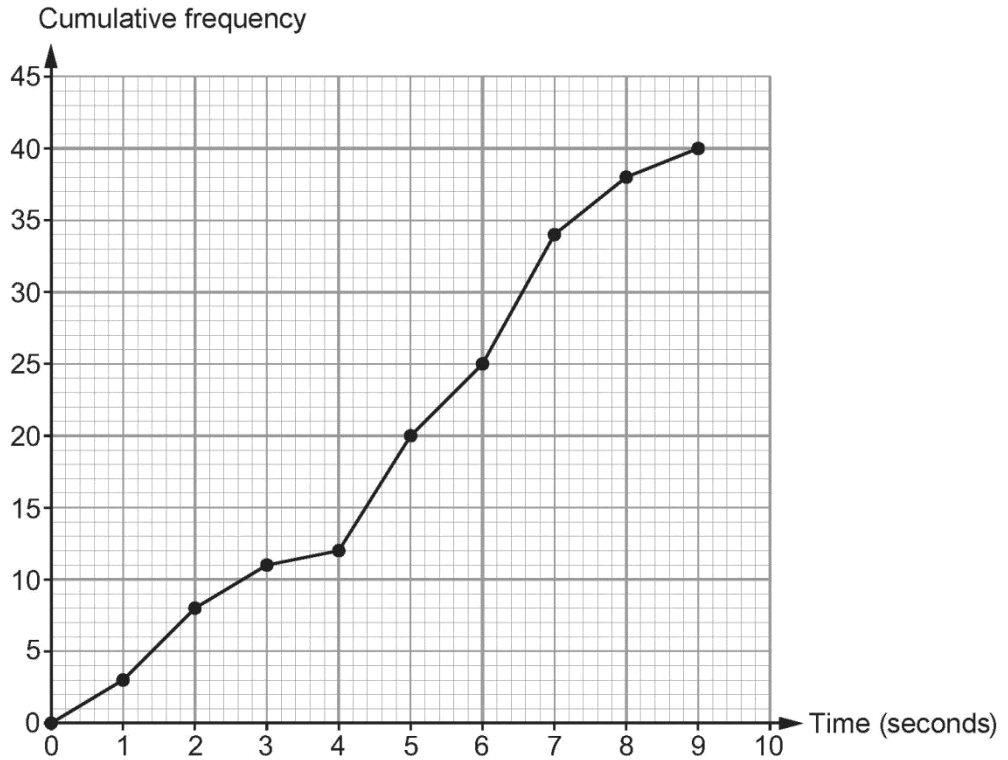
11) *Yellow Sky* is a hockey team.
When a player scores a goal, the time taken by the player, from gaining possession of the ball to scoring the goal, is recorded.
In one season, *Yellow Sky* scored 40 goals.
The details can be seen in the cumulative frequency diagram below.

(a)   For what percentage of the goals scored did the player have possession of the ball for more than 7 seconds?   [3]

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.... %

(b) What is the median time from gaining possession of the ball to scoring a goal?

Median time is .... seconds [1]

(c) Calculate the interquartile range of the times from gaining possession of the ball to scoring a goal.

Interquartile range is .... seconds

[2]

(d) *Noir Dust* is another hockey team. *Noir Dust*'s interquartile range of times from gaining possession of the ball to scoring a goal is 5.9 seconds.

On average, the scorers from which team spent less time from gaining possession to scoring a goal?

Circle the name

Yellow Sky   *Noir Dust*   Can't tell

Give a reason for your answer.

[1]

12) The grouped frequency table shows information about the weekly wages of 160 office workers.

Weekly wage, £x	Frequency
$100 < x \leqslant 200$	10
$200 < x \leqslant 300$	22
$300 < x \leqslant 400$	46
$400 < x \leqslant 500$	54
$500 < x \leqslant 600$	18
$600 < x \leqslant 700$	10

(a)   Complete the following cumulative frequency table.   [1]

Weekly wage, £x	Cumulative frequency
$x \leqslant 100$	0
$x \leqslant 200$	10
$x \leqslant 300$	
$x \leqslant 400$	
$x \leqslant 500$	
$x \leqslant 600$	
$x \leqslant 700$	

(b)   Use the graph paper opposite to draw a cumulative frequency diagram for the weekly wages of the 160 office workers.   [3]

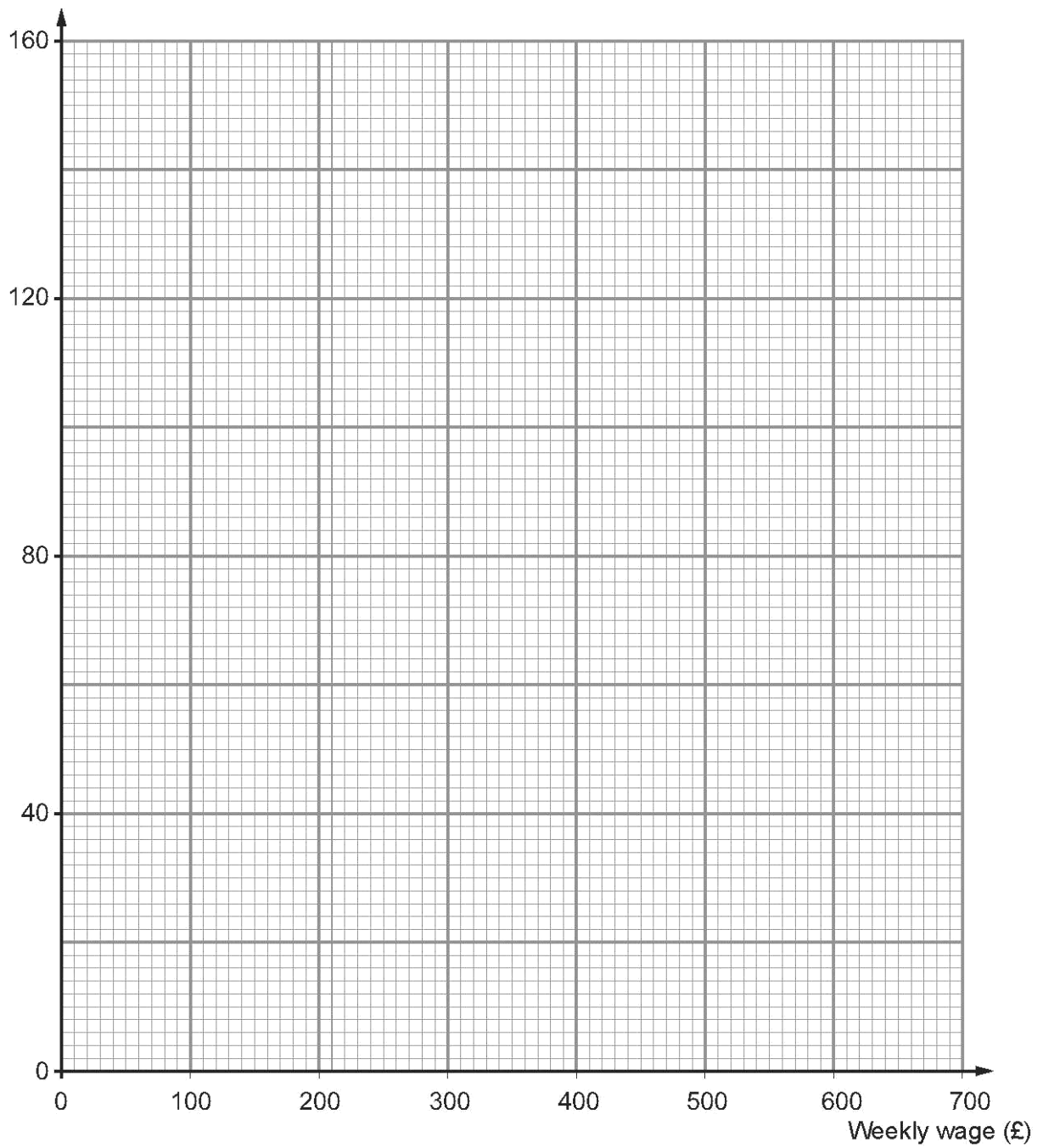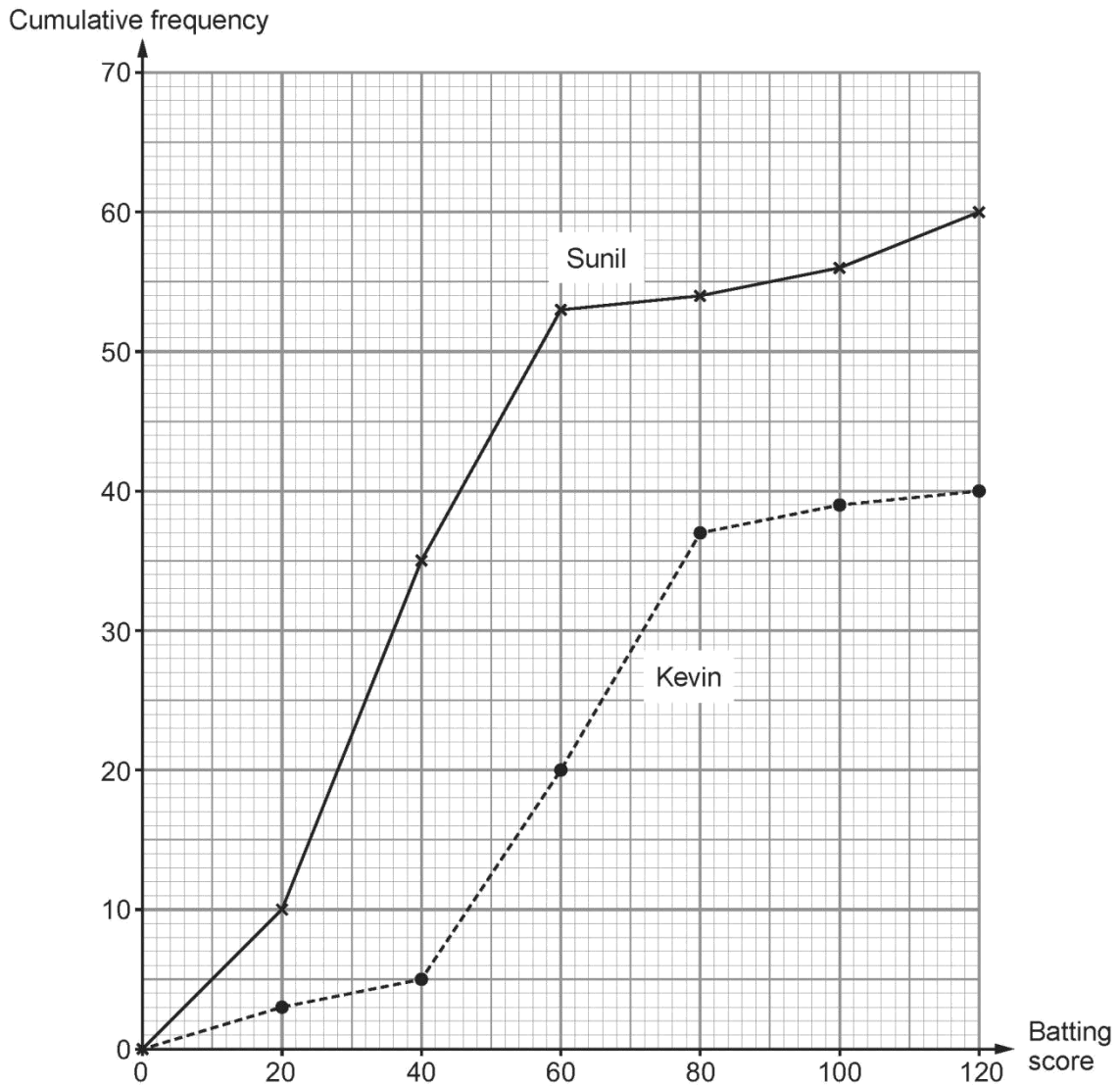(c)   Calculate an estimate for the interquartile range.   [2]

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....

....

(d)   Estimate the number of workers with a weekly wage of more than £520.   [1]

....

Cumulative frequency

Weekly wage (£)

13) Two cricketers, Sunil and Kevin, keep a record of their batting scores over a season.
The cumulative frequency diagram below shows their batting scores over this season.

(a)   Find the interquartile range for Sunil.   [2]

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(b) Who has the higher average batting score, Sunil or Kevin? Give a reason for your answer. [2]

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14) In a survey at a factory, 200 workers were asked to state their weekly earnings. The results of the survey are summarised in the table below.
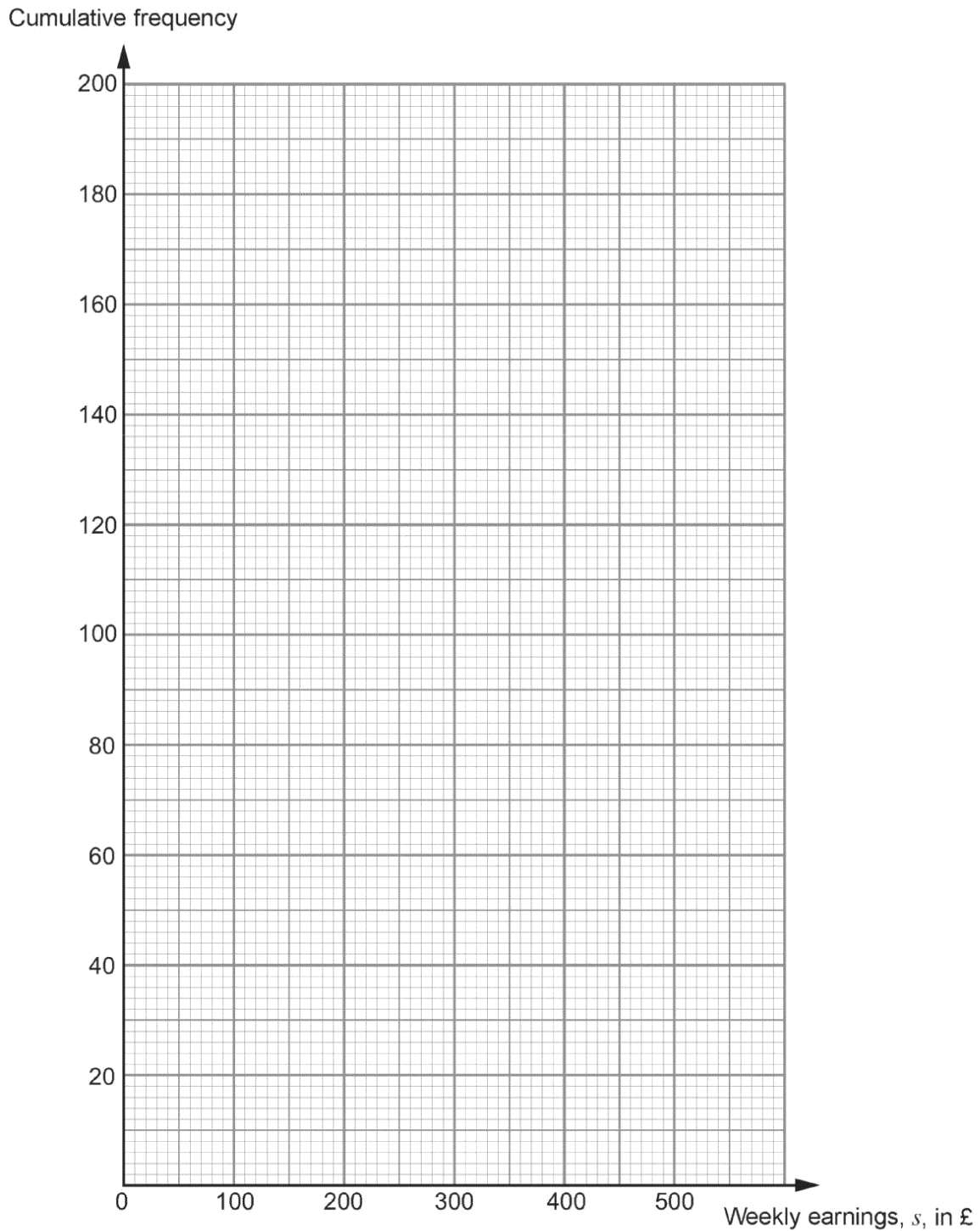
Weekly earnings, s, in £	Frequency
$0 < s \leqslant 100$	18
$100 < s \leqslant 200$	22
$200 < s \leqslant 300$	60
$300 < s \leqslant 400$	84
$400 < s \leqslant 500$	16

(a) Complete the table below. [1]

Weekly earnings, s, in £	$\leqslant 0$	$\leqslant 100$	$\leqslant 200$	$\leqslant 300$	$\leqslant 400$	$\leqslant 500$
Cumulative frequency	0					

(b)   Draw a cumulative frequency graph showing the earnings of the 200 workers. [3]

Cumulative frequency

(c)   Estimate the number of workers whose weekly earnings were more than £250.   [2]

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15)

Mark (less than)
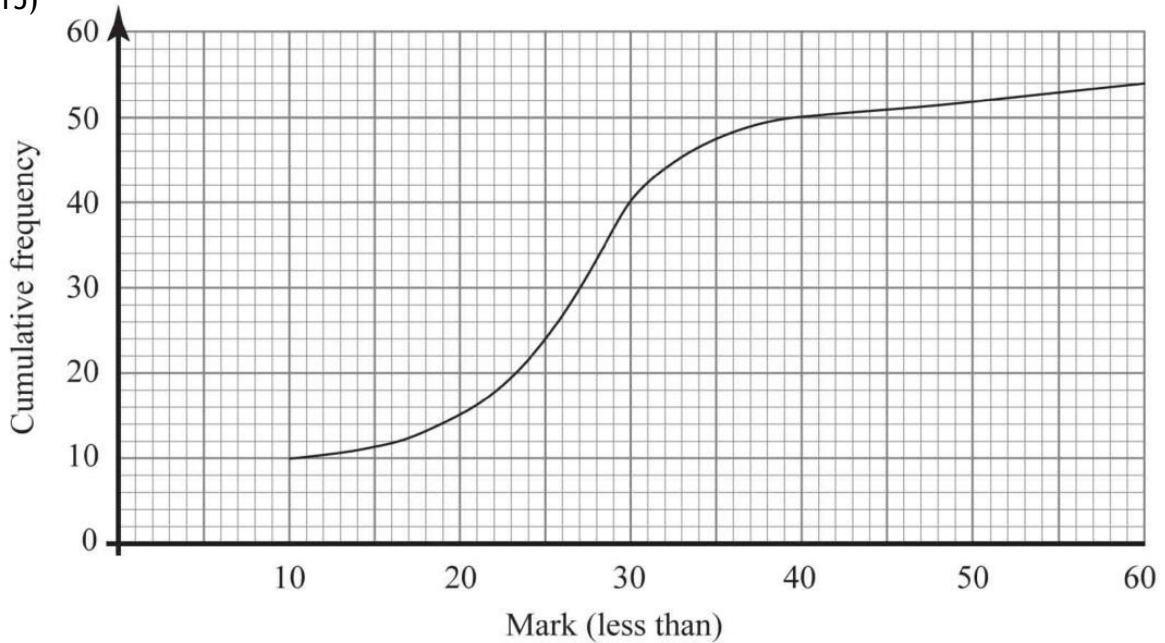
The cumulative frequency graph above illustrates the marks scored by pupils in a Physics test.

(a) Estimate the median mark.

Answer _____ [1]

(b) Estimate the interquartile range.

Answer _____ [2]

(c) The pass mark was set at 34. Estimate the number of pupils who passed.

Answer _____ [2]