

Edexcel GCSE

Mathematics (Linear) – 1MA0

CUMULATIVE

FREQUENCY & BOX

PLOTS

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil



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.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.

Questions labelled with an **asterisk (*)** are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

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.

1. All the students in Mathstown school had a test.

The lowest mark was 18

The highest mark was 86

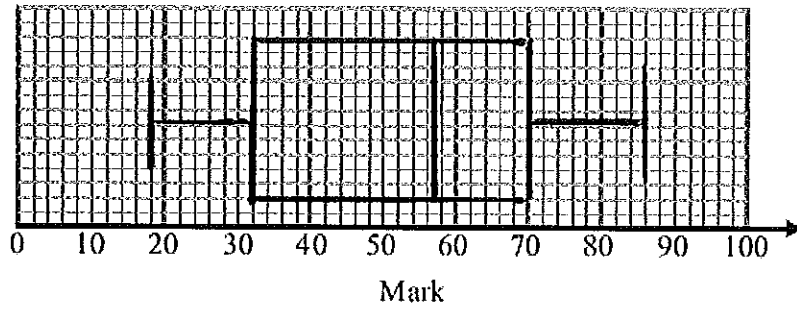
The median was 57

The lower quartile was 32

The interquartile range was 38

upper quartile = $32 + 38 = 70$

On the grid, draw a box plot to show this information.



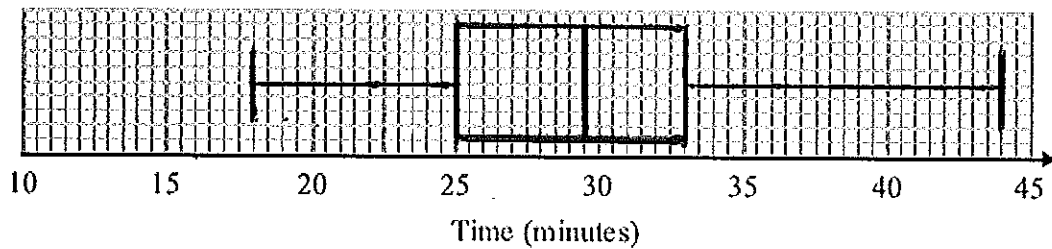
(3 marks)

2. Sameena recorded the times, in minutes, some girls took to do a jigsaw puzzle.

Sameena used her results to work out the information in this table.

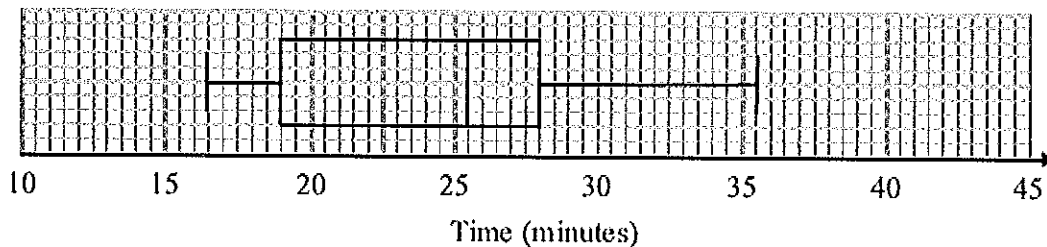
	Minutes
Shortest time	18
Lower quartile	25
Median	29
Upper quartile	33
Longest time	44

(a) On the grid, draw a box plot to show the information in the table.



(2)

The box plot below shows information about the times, in minutes, some boys took to do the same jigsaw puzzle.



(b) Compare the distributions of the girls' times and the boys' times.

- the median time taken by the boys was lower, on average they completed the puzzle quicker
- the inter-quartile range for the girls was lower - their times were less spread out

(2)

(4 marks)

3. This frequency table gives information about the ages of 60 teachers.

Age (A) in years	Frequency
$20 < A \leq 30$	12
$30 < A \leq 40$	15
$40 < A \leq 50$	18
$50 < A \leq 60$	12
$60 < A \leq 70$	3

(a) Complete the cumulative frequency table.

Age (A) in years	Cumulative frequency
$20 < A \leq 30$	12
$20 < A \leq 40$	27
$20 < A \leq 50$	45
$20 < A \leq 60$	57
$20 < A \leq 70$	60

(1)

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

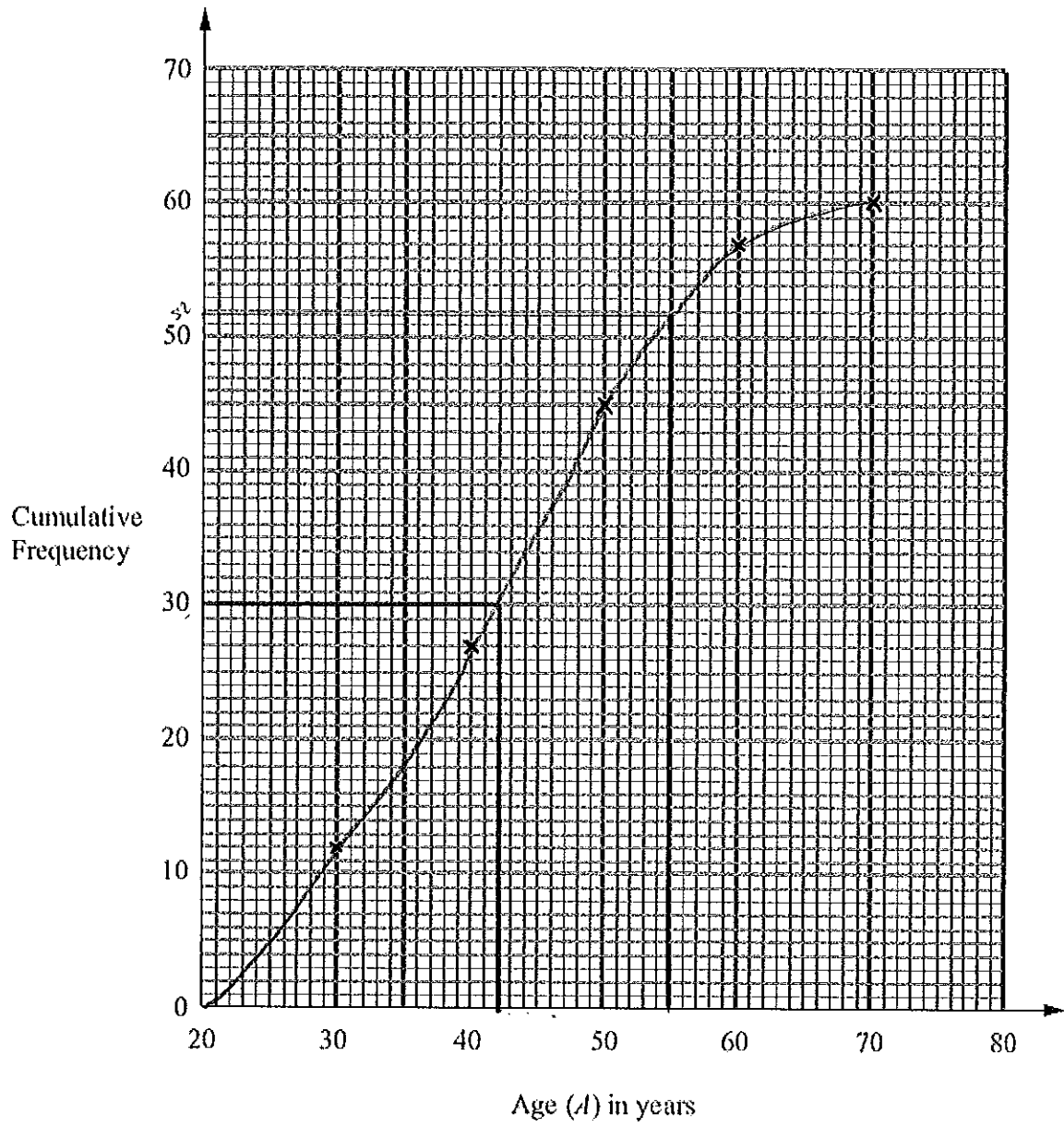
(2)

(c) Use your cumulative frequency graph to find an estimate for the median age.

.....42..... years
(2)

(d) Use your cumulative frequency graph to find an estimate for the number of teachers older than 55 years.

.....8.....
(2)

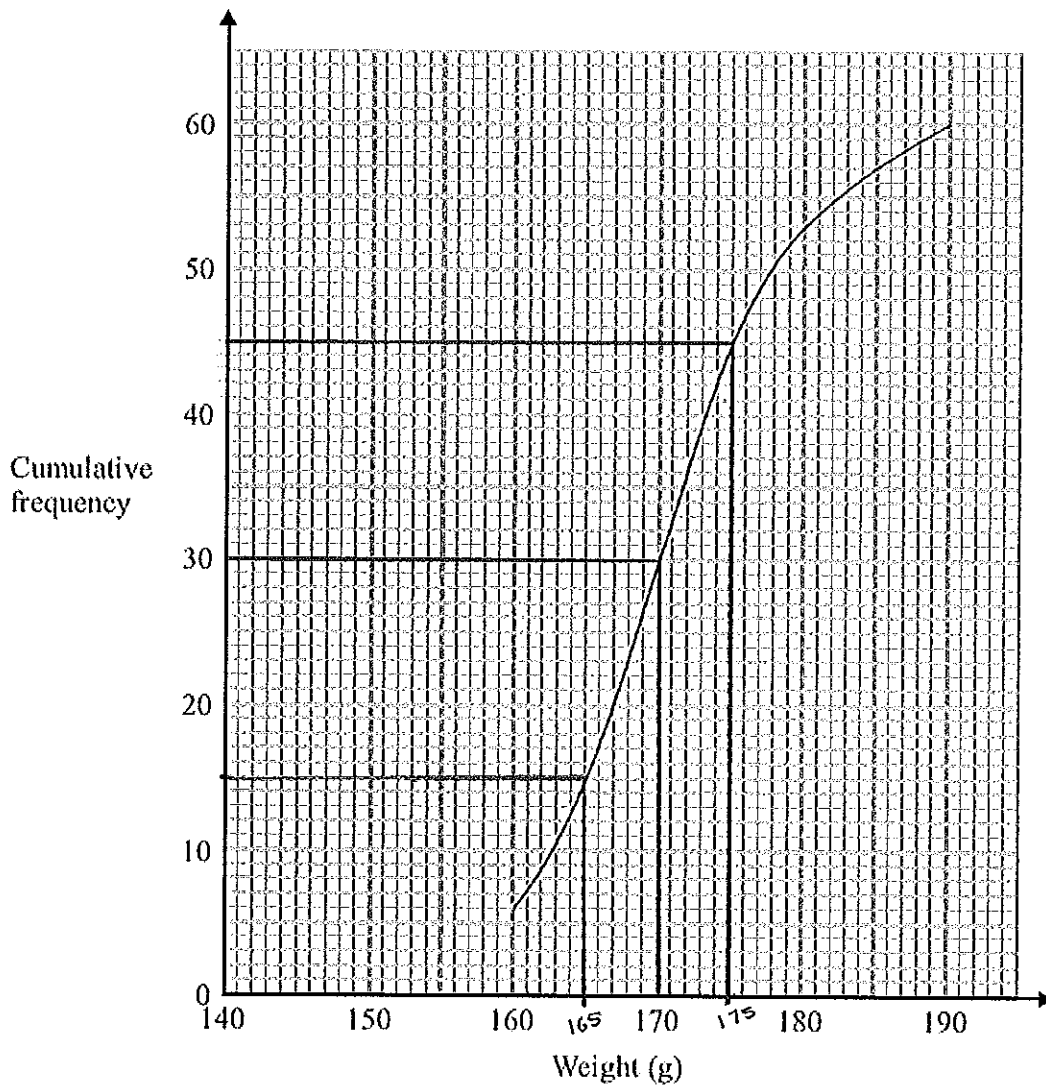


(7 marks)

4. Harry grows tomatoes.
This year he put his tomato plants into two groups, group A and group B.

Harry gave fertiliser to the tomato plants in group A.
He did not give fertiliser to the tomato plants in group B.

Harry weighed 60 tomatoes from group A.
The cumulative frequency graph shows some information about these weights.

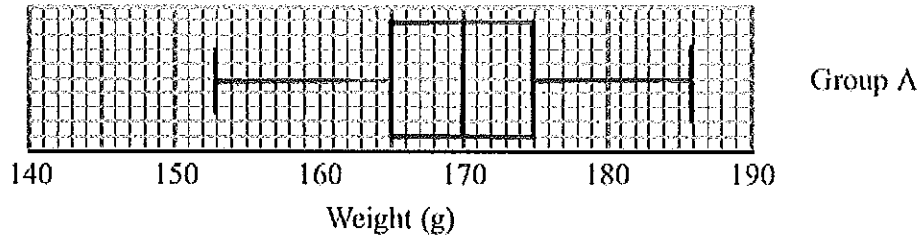


- (a) Use the graph to find an estimate for the median weight.

..... 170 g
(1)

The 60 tomatoes from group A
 had a minimum weight of 153 grams
 and a maximum weight of 186 grams.

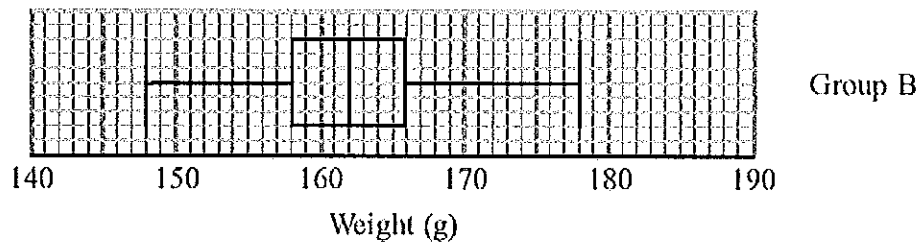
- (b) Use this information and the cumulative frequency graph to draw a box plot for the 60 tomatoes from group A.



(3)

Harry did not give fertiliser to the tomato plants in group B.

Harry weighed 60 tomatoes from group B.
 He drew this box plot for his results.



- (c) Compare the distribution of the weights of the tomatoes from group A with the distribution of the weights of the tomatoes from group B.

• the median weight in group A is higher (on average weights higher in group A)
 • the interquartile range in group B is smaller → (weights of tomatoes less spread out)

(2)

(6 marks)

5. The table shows information about the speeds of 100 lorries.

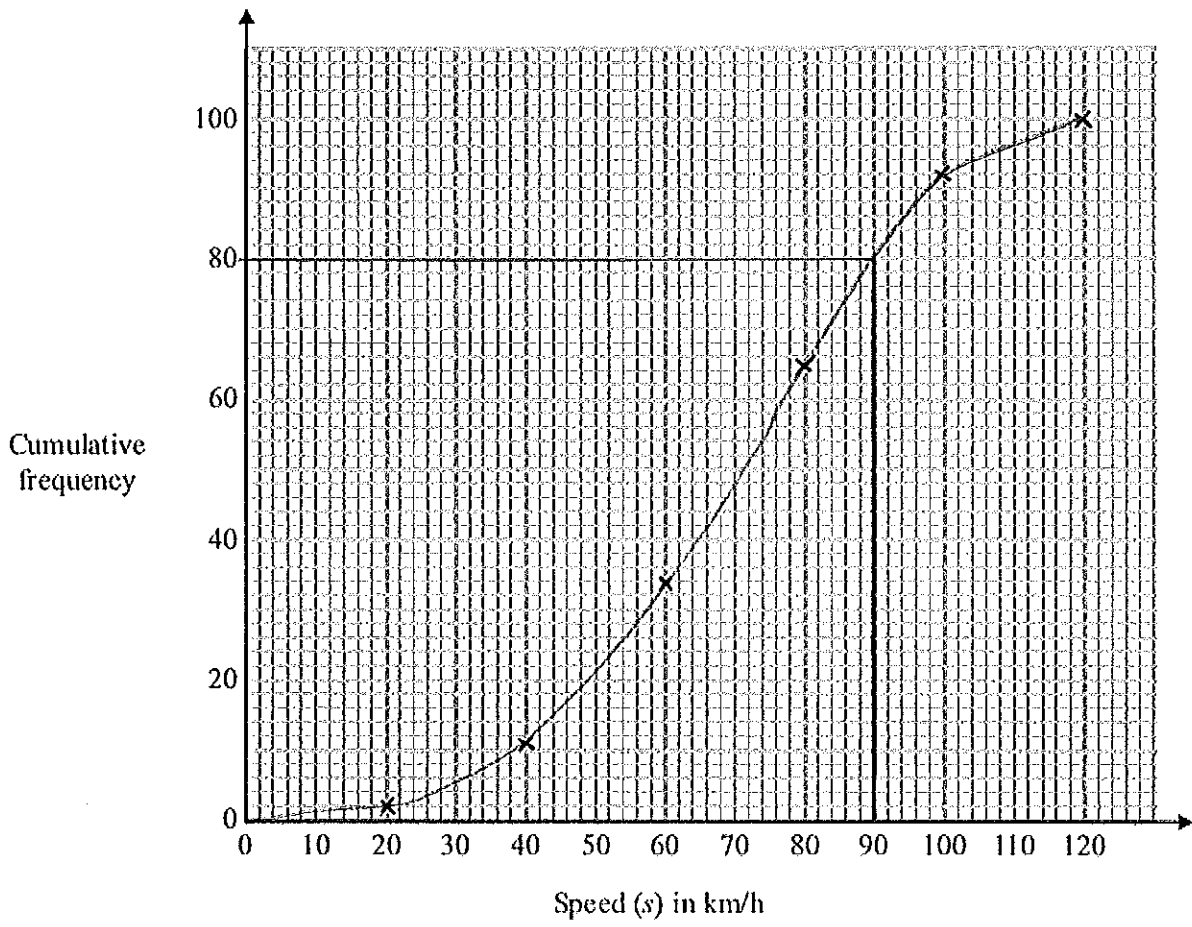
Speed (s) in km/h	Frequency
$0 < s \leq 20$	2
$20 < s \leq 40$	9
$40 < s \leq 60$	23
$60 < s \leq 80$	31
$80 < s \leq 100$	27
$100 < s \leq 120$	8

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

Speed (s) in km/h	Cumulative frequency
$0 < s \leq 20$	2
$0 < s \leq 40$	11
$0 < s \leq 60$	34
$0 < s \leq 80$	65
$0 < s \leq 100$	92
$0 < s \leq 120$	100

(1)

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



(2)

(c) Find an estimate for the number of lorries with a speed of more than 90 km/h.

$$100 - 80 = 20$$

..... 20

(2)

(5 marks)

6. The grouped frequency table shows information about the weekly wages of 80 factory workers.

Weekly wage (£ x)	Cumulative Frequency
$100 < x \leq 200$	8
$200 < x \leq 300$	15
$300 < x \leq 400$	30
$400 < x \leq 500$	17
$500 < x \leq 600$	7
$600 < x \leq 700$	3

(a) Complete the cumulative frequency table.

Weekly wage (£ x)	Cumulative Frequency
$100 < x \leq 200$	8
$100 < x \leq 300$	23
$100 < x \leq 400$	53
$100 < x \leq 500$	70
$100 < x \leq 600$	77
$100 < x \leq 700$	80

(1)

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

(2)

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

$$440 - 290$$

£150.....

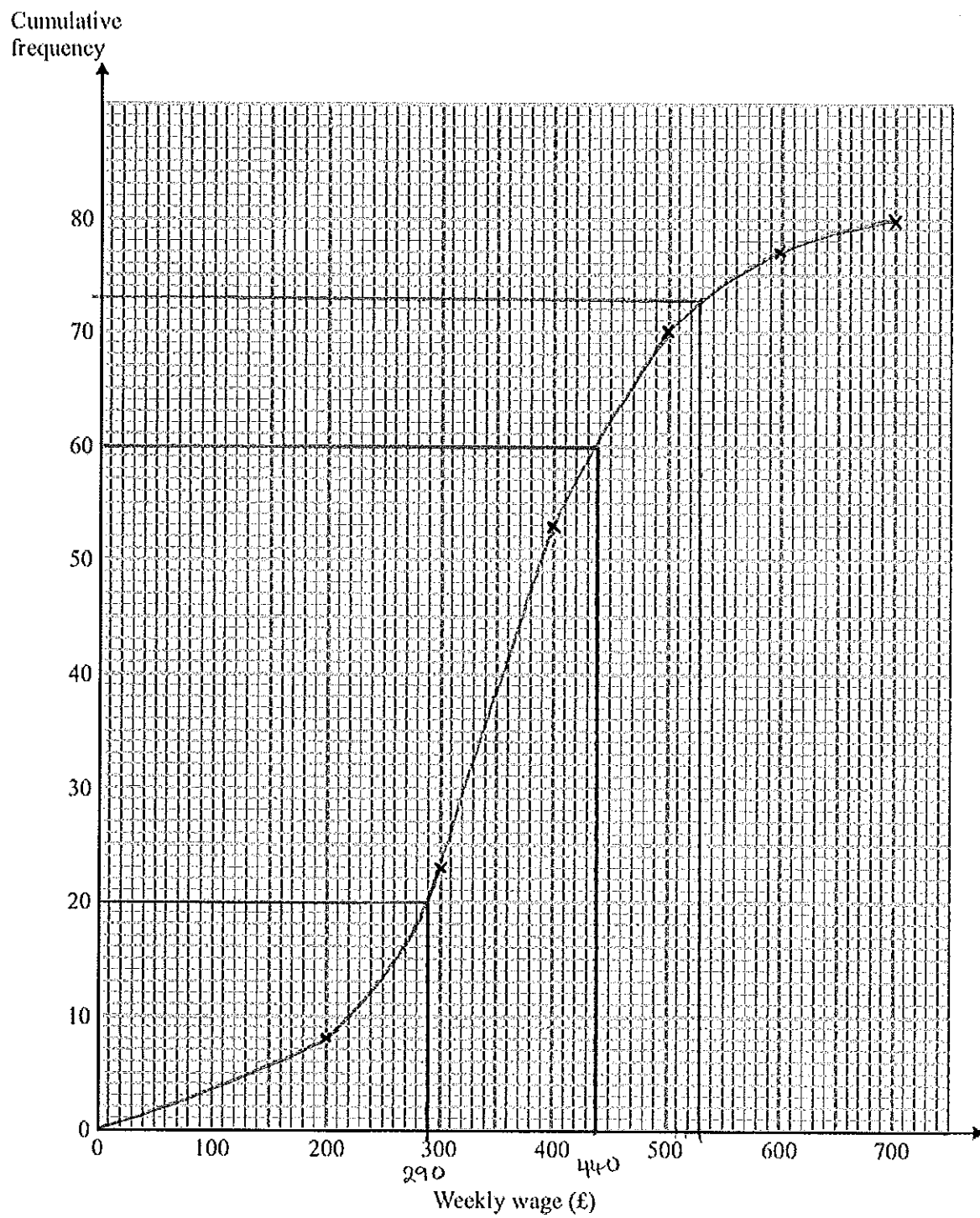
(2)

(d) Use your graph to find an estimate for the number of workers with a weekly wage of more than £530

$$80 - 73$$

.....7.....

(2)



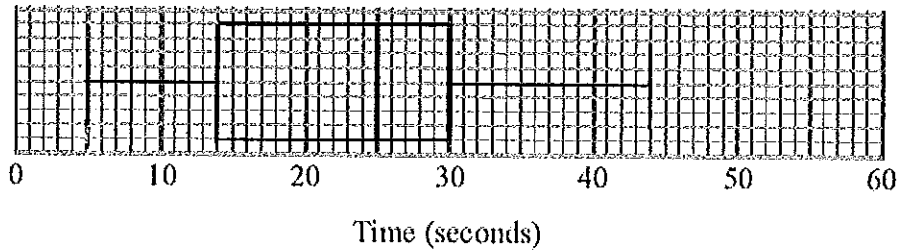
(7 marks)

7. Here are the times, in seconds, that 15 people waited to be served at Rose's garden centre.

5 9 11 14 15 20 22 25 27 27 28 30 32 35 44

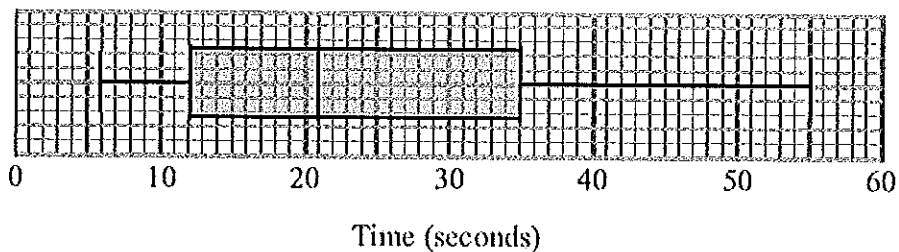
(a) On the grid, draw a box plot for this information.

$$\begin{aligned} \text{median} &= 25 \\ \text{LQ} &= 14 \\ \text{UQ} &= 30 \end{aligned}$$



(3)

The box plot below shows the distribution of the times that people waited to be served at Green's garden centre.



(b) Compare the distribution of the times that people waited at Rose's garden centre and the distribution of the times that people waited at Green's garden centre.

- the median waiting time at Rose's garden centre was higher (on average people waited longer)
- the interquartile range at Green's garden centre was higher (the times were less consistent)

(2)

(5 marks)