Averages

GCSE MATHS

Name: _____

Teacher: _____

Learning objectives

By the end this pack you will be able to:

1. Calculate the: mean; mode; median and range
2. Construct stem and leaf diagrams
3. Estimate the mean from frequency tables

Q1.

Farah recorded the minimum temperature, in °C, on each of seven days in January.

Here are her results.

Day	Mon	Tues	Wed	Thur	Fri	Sat	Sun
Temp (°C)	−2	−1	2	0	−3	4	7

(a) Work out the difference between the temperature on Tuesday and the temperature on Wednesday.

....°C

(1)

(b) Work out the mean of the temperatures Farah recorded.

....°C

(2)

(Total for Question is 3 marks)

Q2.

Here is a list of numbers.

12   19   12   15   11   15   12   13   17

Find the median.

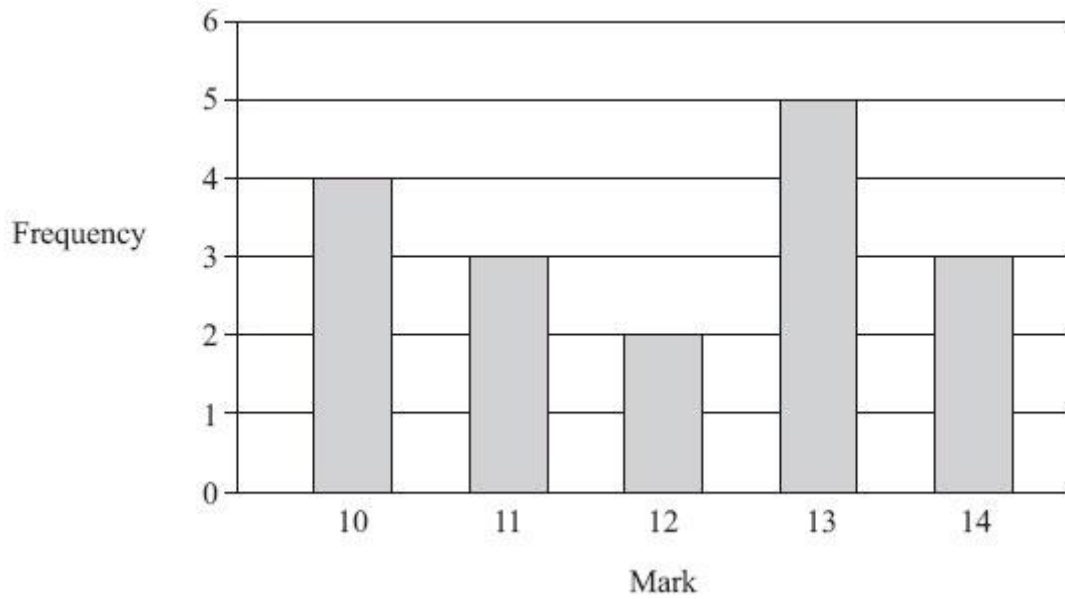...

(Total for Question is 2 marks)

Q3.

Mrs Smith gave her students a history test.

The bar chart shows information about the students' marks.

(a) Write down the number of students who got 10 marks.

....

(1)

(b) Write down the mode.

....

(1)

(c) Which two marks have the same frequency?

....

(1)

(d) Work out the range.

....

(2)

(e) How many students did the test?

....

(2)

(Total for Question is 7 marks)

Q4.

Kaz rolled a dice 10 times.

Here are her scores.

2	6	5	4	4	2	1	3	4	3

(a) Find the mode.

....

(1)

(b) Work out the mean.

....

(2)

(c) Work out the range.

....

(2)

(Total for Question is 5 marks)

Q5.

Here is the number of goals a hockey team scored in each of 10 matches.

3	4	3	2	5	3	5	6	2	4

Find

(i) the median

....

(ii) the range

....

(iii) the mean

....

(Total for Question is 6 marks)

Q6.

Chris works in a cafe.
At noon one day he records the number of customers sitting at each table in the cafe.

Here are his results.

Number of customers sitting at a table	Number of tables
0	4
1	5
2	10
3	7
4	3
5	1

(a) Work out the total number of tables in the cafe.

....

(1)

(b) Work out the total number of customers sitting at tables in the cafe.

....

(2)

(c) Work out the mean number of customers sitting at a table.

....

(2)

(Total for Question is 5 marks)

5

Q7.

Vicky counts the number of birds in her garden at 8 am on each of 10 days.

<div align="center">5   3   3   2   0   2   4   2   4   15</div>

(a) Write down the mode.

....

(1)

(b) Work out the mean.

....

(2)

Vicky counts the number of birds in her garden at 5 pm on each of 20 days.

She records the information in a frequency table.

Number of birds	Frequency
0	3
1	2
2	3
3	4
4	5
5	3

(c) Work out the total number of birds Vicky records in the frequency table.

....

(2)

(Total for Question is 5 marks)

Q8.
 Here are five cards.

4	5	7	8	

There is a whole number from 0 to 9 on each card.

The number on the last card is hidden.

The range of the five numbers is 6

(a) Write down the whole number on the last card.

....
(1)

Here is a different set of five cards.

7	4	3	6	

There is a different whole number from 0 to 9 on each card.

The number on the last card is hidden.

The median of the numbers on the five cards is 4

(b) Which whole numbers could be on the last card?

....
(2)
(Total for Question is 3 marks)

7

Q9.

Ed has 4 cards.
There is a number on each card.

| 12 | 6 | 15 | ? |
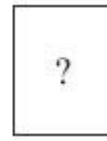
The mean of the 4 numbers on Ed's cards is 10

Work out the number on the 4th card.

. . . .

(Total for Question is 3 marks)

Q10.

Hertford Juniors is a basketball team.

At the end of 10 games, their mean score is 35 points per game.

At the end of 11 games, their mean score has gone down to 33 points per game.

How many points did the team score in the 11th game?

....

(Total for Question is 3 marks)

8

Q11.

The stem and leaf diagram shows some information about the speeds of 25 cars.

```
2 | 9
3 | 1 3 5 6 7 8 8 9
4 | 2 3 3 4 5 6 8 8 9 9
5 | 1 2 4 5 6
6 | 0
```
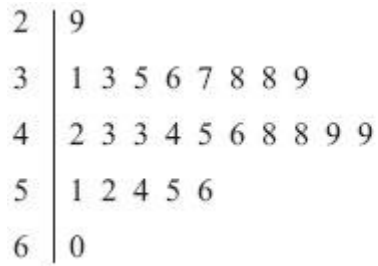
Key:

2 | 9 means 29 miles per hour

(a) How many of the 25 cars had a speed of more than 50 miles per hour?

. . . .

(1)

(b) Find the median speed.

. . . . miles per hour

(1)

(c) Work out the range of the speeds.

. . . . miles per hour

(2)

(Total for Question is 4 marks)

9

Q12.

Colin took a sample of 80 football players.

He recorded the total distance, in kilometres, each player ran in the first half of their matches on Saturday.

Colin drew this box plot for his results.

First half
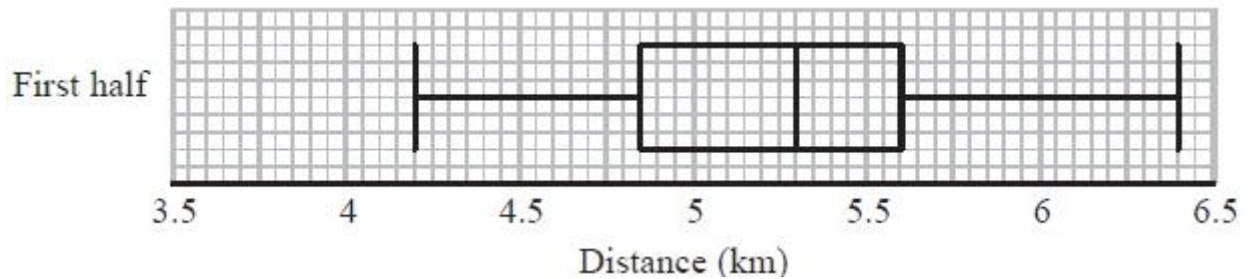
Distance (km)

(a) Work out the interquartile range.

....km

(2)

There were 80 players in Colin's sample.

(b) Work out the number of players who ran a distance of more than 5.6 km.

....

(2)

Colin also recorded the total distance each player ran in the second half of their matches.

He drew the box plot below for this information.

Second half
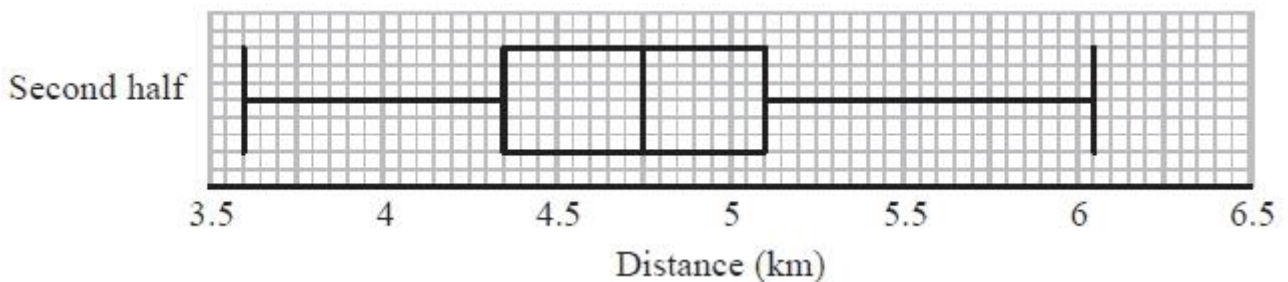
Distance (km)

(c) Compare the distribution of the distances run in the first half with the distribution of the distances run in the second half.

....

....

....

(2)

(Total for Question is 6 marks)

10

Q13.

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

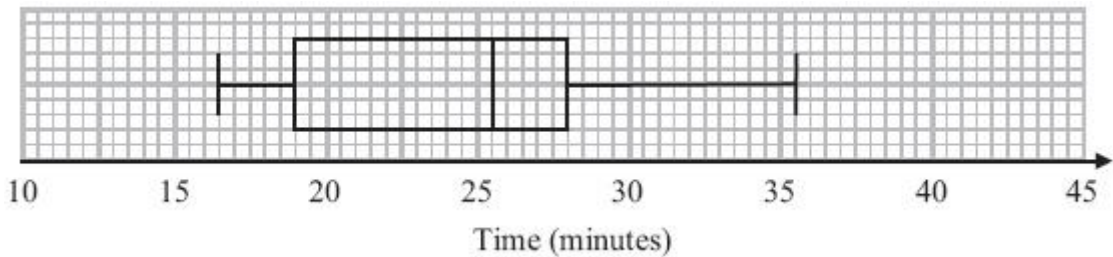Sameena used her results to work out the information in this table.

	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.
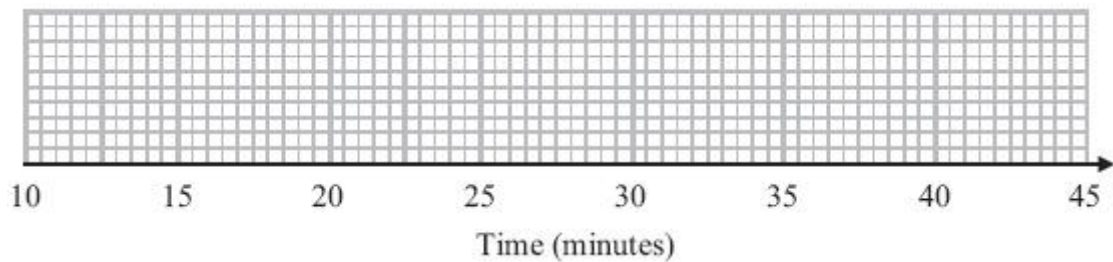
(2)

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.

....

....

....

....

(2)

(Total for Question is 4 marks)

Q14.

Some girls did a sponsored swim to raise money for charity.

The table shows information about the amounts of money (£) the girls raised.

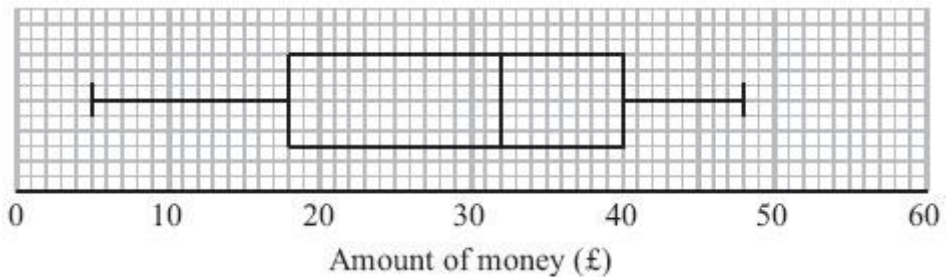| Least amount of money (£)	10
Greatest amount of money (£)	45
Median	25
Lower quartile	16
Upper quartile	42

(a) On the grid, draw a box plot for the information in the table.
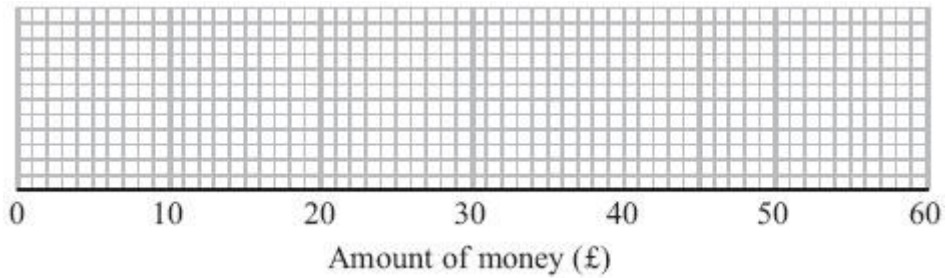
Amount of money (£)

(2)

Some boys also did the sponsored swim.

The box plot shows information about the amounts of money (£) the boys raised.

Amount of money (£)

(b) Compare the amounts of money the girls raised with the amounts of money the boys raised.

....

....

....

....

(2)

(Total for Question is 4 marks)

12

Q15.

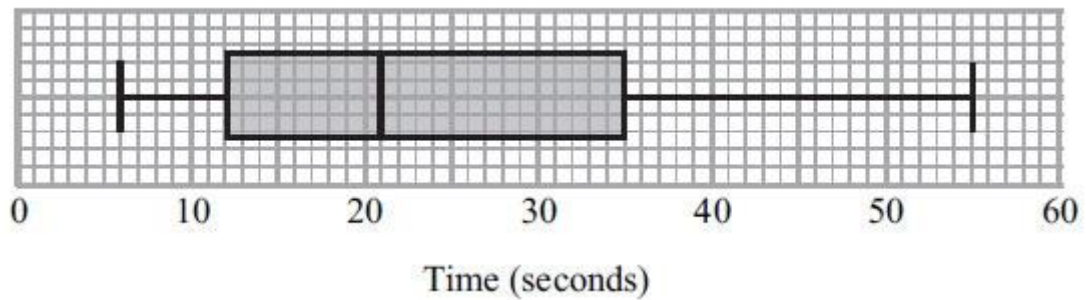Here are the times, in seconds, that 15 people waited to be served at Rose's garden centre.

  5   9   11   14   15   20   22   25   27   27   20   22   25   27

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

Time (seconds)
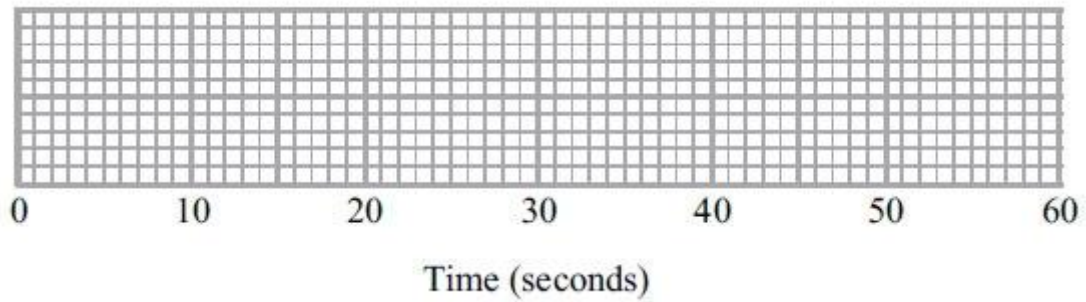
(3)

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

Time (seconds)

(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.

....

....

....

....

(2)

(Total for Question is 5 marks)

13

Q16.

Here are the speeds, in miles per hour, of 16 cars.

| 31 | 52 | 43 | 49 | 36 | 35 | 33 | 29 |
| 54 | 43 | 44 | 46 | 42 | 39 | 55 | 48 |

Draw an ordered stem and leaf diagram for these speeds.
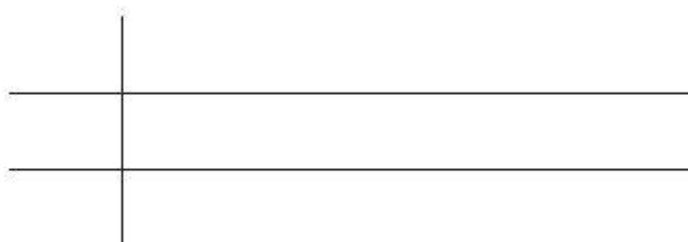
(Total for Question is 3 marks)

Q17.

Sixteen babies are born in a hospital.

Here are the weights of the babies in kilograms.

2.4 2.7 3.5 4.4 4.5 4.1 4.4 2.8

4.1 3.8 3.8 4.2 3.3 3.0 3.7 3.3

Show this information in an ordered stem and leaf diagram.

Key:

(Total for Question is 3 marks)

14

Q18.

Here are the times, in minutes, that 20 children took to walk to school.

13 21   19   27   31   5   23   29   18   25
34 15   28   23   22   40 16   19   32   9

Draw an ordered stem and leaf diagram for these times.

Key:

(Total for Question is 3 marks)

15

Here are the ages, in years, of 15 students.

19	18	20	25	37
33	21	17	29	20
42	18	23	37	22

Show this information in an ordered stem and leaf diagram.

Key:
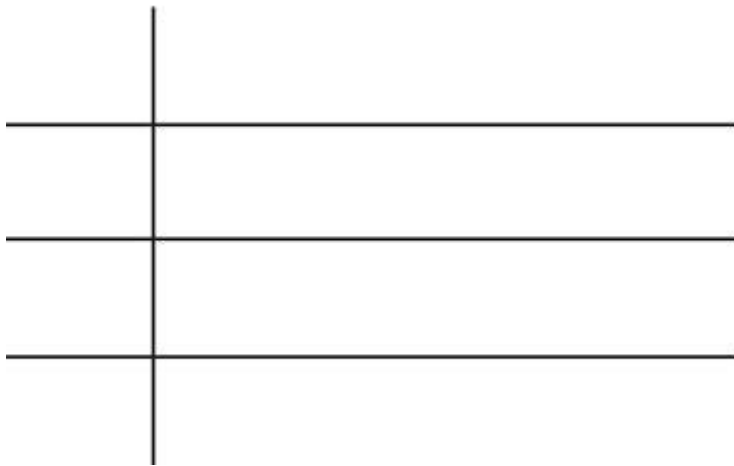
(Total for Question is 3 marks)

Q20.

Yan recorded the ages, in years, of a sample of people at a fairground.

He drew this stem and leaf diagram for his results.

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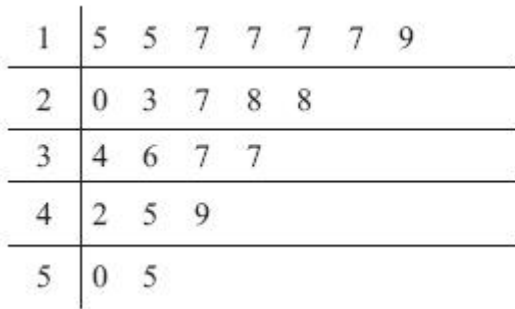
Key:

1|5 represents 15 years of age

(a) Write down the number of people in the sample.

....

(1)

(b) Write down the mode.

....years

(1)

(c) Work out the range.

....years

(2)

(Total for Question is 4 marks)

17

Q21.

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.
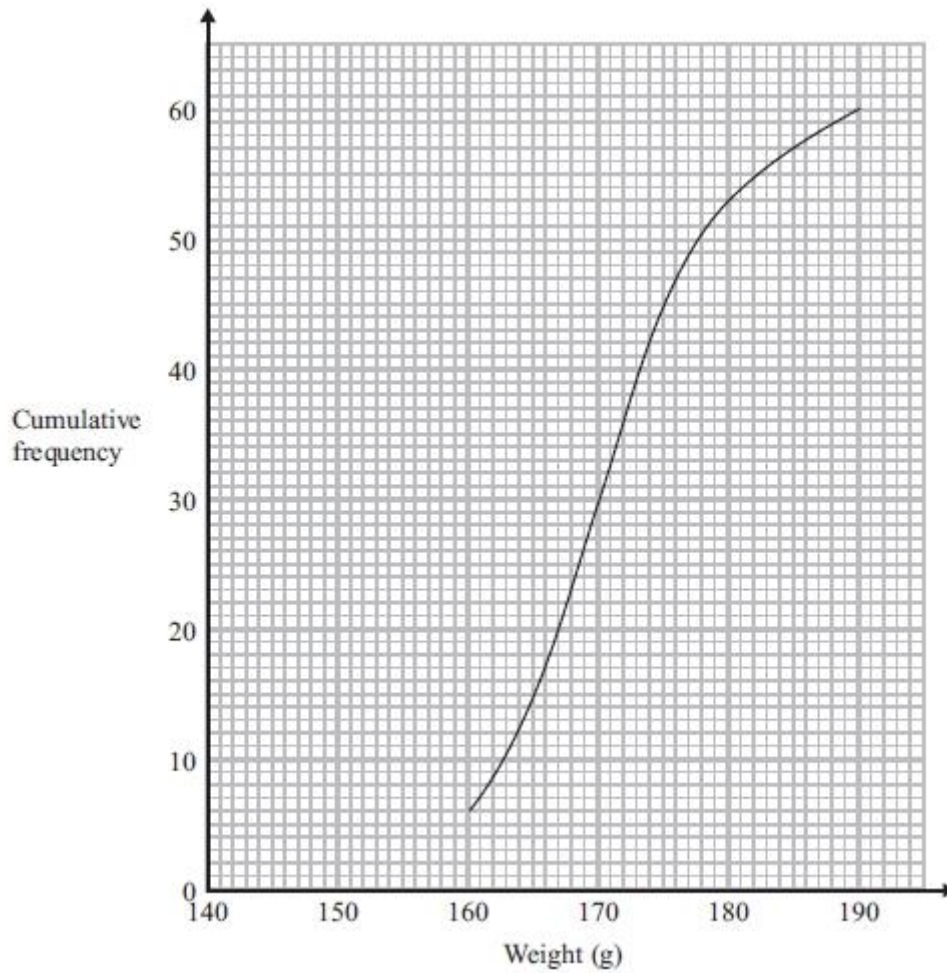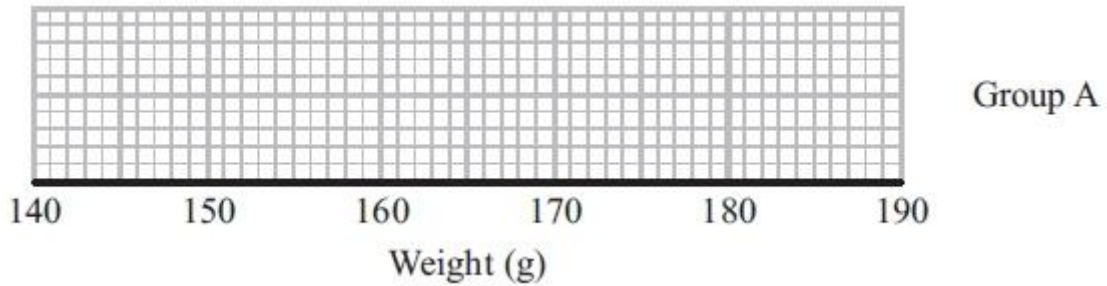

(a) Use the graph to find an estimate for the median weight.

. . . . g

(1)

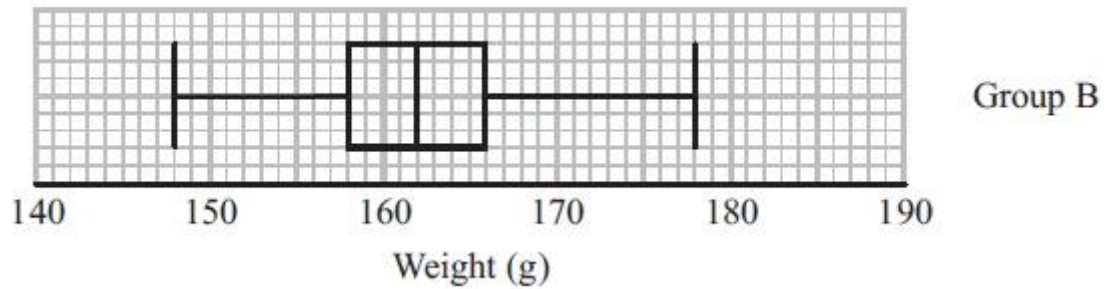The 60 tomatoes from group A
had a minimum weight of 153 grams
and a maximum weight of 186 grams.

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

Group A

140   150   160   170   180   190

Weight (g)

(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.

Group B

140   150   160   170   180   190

Weight (g)

(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.
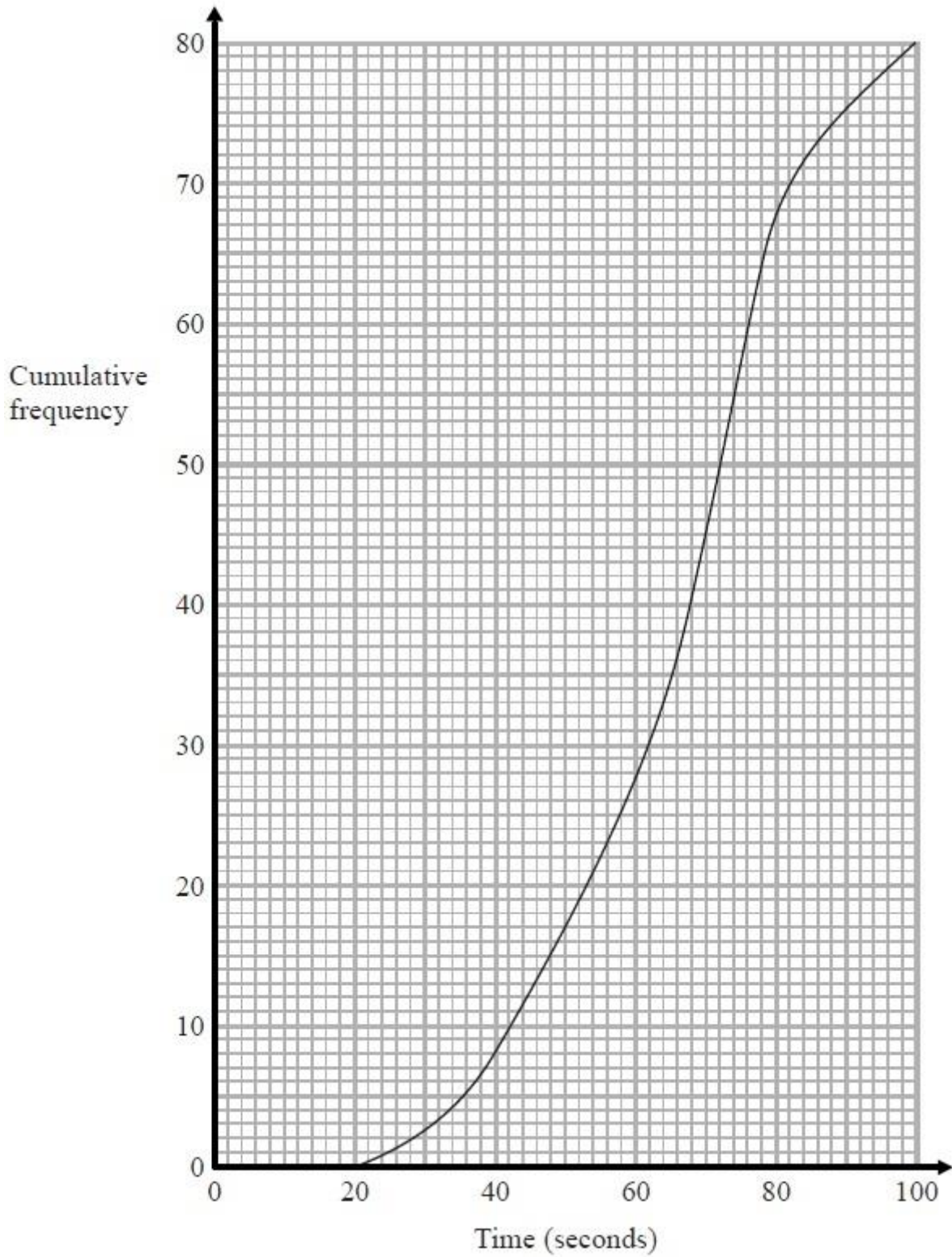
....
....
....
....

(2)

(Total for Question is 6 marks)

Q22.

The cumulative frequency graph shows information about the times 80 swimmers take to swim 50 metres.

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

.... seconds

(1)

A swimmer has to swim 50 metres in 60 seconds or less to qualify for the swimming team.

The team captain says,

"More than 25% of swimmers have qualified for the swimming team."

*(b) Is the team captain right?
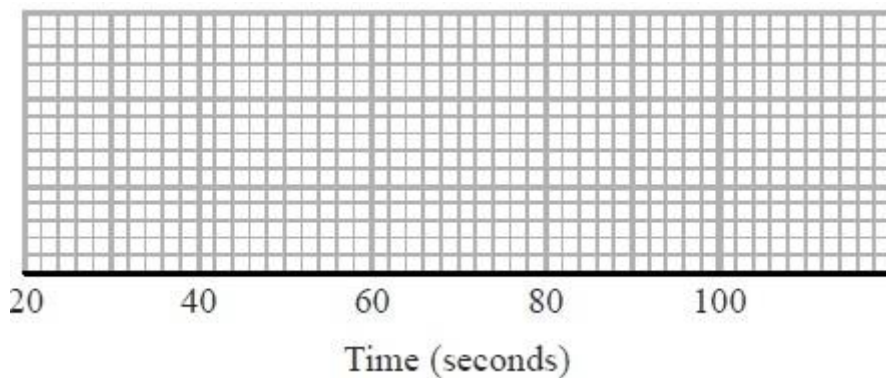
You must show how you got your answer.

(3)

For these 80 swimmers

the least time taken was 28 seconds

and the greatest time taken was 96 seconds.

(c) Use the cumulative frequency graph and the information above to draw a box plot for the times taken by the swimmers.

20   40   60   80   100

Time (seconds)

(3)

(Total for Question is 7 marks)

Q23.

Bob asked each of 40 friends how many minutes they took to get to work.

The table shows some information about his results.

Time taken (*m* minutes)	Frequency
$0 < m \le 10$	3
$10 < m \le 20$	8
$20 < m \le 30$	11
$30 < m \le 40$	9
$40 < m \le 50$	9

Work out an estimate for the mean time taken.

. . . . minutes

(Total for Question is 4 marks)

Q24.

The table gives information about the temperature, T °C, at noon in a town for 50 days.

Temperature (T °C)	Frequency
$8 < T \leqslant 12$	6
$12 < T \leqslant 16$	8
$16 < T \leqslant 20$	13
$20 < T \leqslant 24$	21
$24 < T \leqslant 28$	2

(a) Write down the modal class interval.

....

(1)

(b) Calculate an estimate for the mean temperature.

.... ° C

(4)

(c) Draw a frequency polygon for the information in the table.
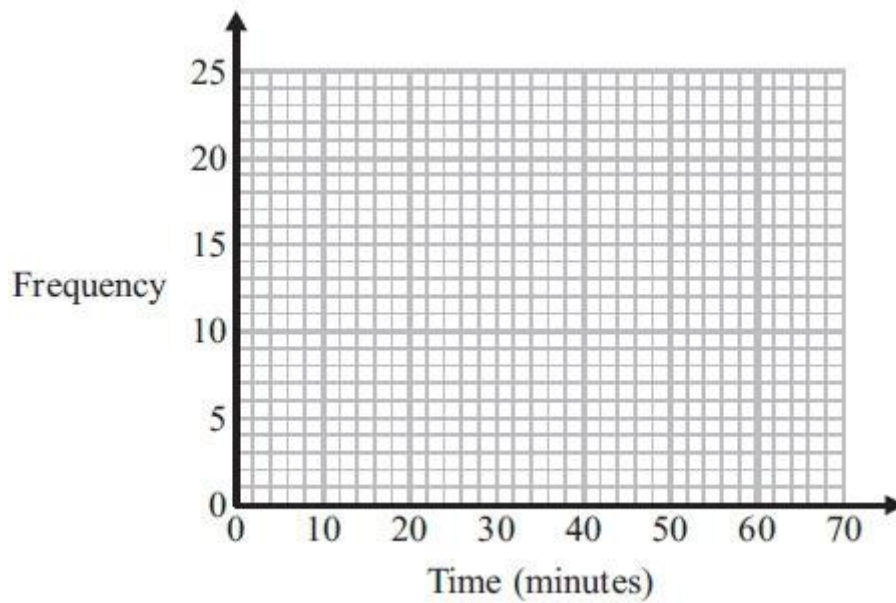

Temperature $(T \, °C)$

(2)
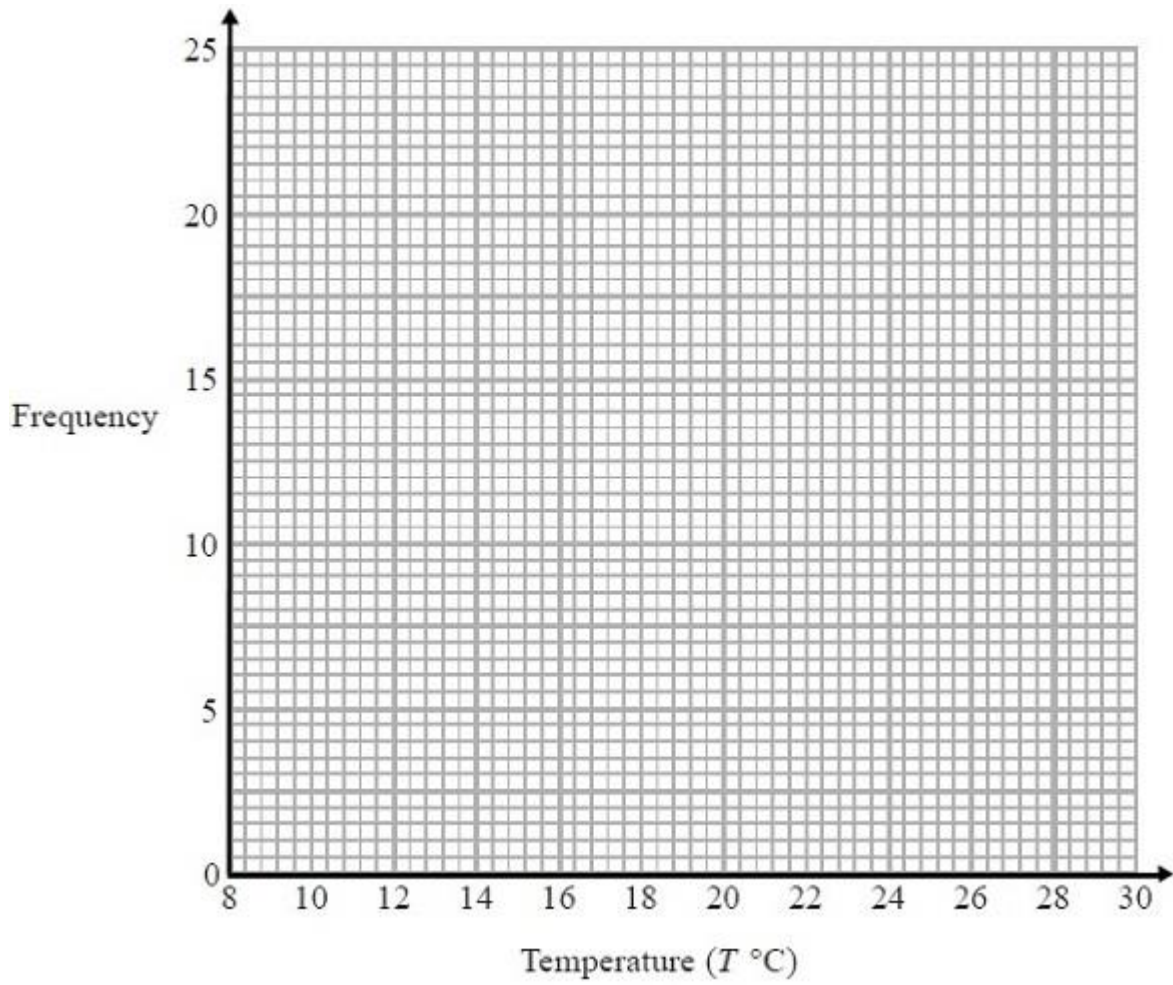
(Total for Question is 7 marks)

Q25.

The frequency table gives information about the times it took some office workers to get to the office one day.

Time (*t* minutes)	Frequency
0 < *t* ≤10	4
10 < *t* ≤20	8
20 < *t* ≤30	14
30 < *t* ≤40	16
40 < *t* ≤50	6
50 < *t* ≤60	2

(a) Draw a frequency polygon for this information.

(2)

(b) Write down the modal class interval.

....

(1)

One of the office workers is chosen at random.

(c) Work out the probability that this office worker took more than 40 minutes to get to the office.

....

(2)

(Total for Question is 5 marks)

25

Q26.

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

Weekly wage (£x)	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
$100 < x \leq 200$	
$200 < x \leq 300$	
$300 < x \leq 400$	
$400 < x \leq 500$	
$500 < x \leq 600$	
$600 < x \leq 700$	

(1)

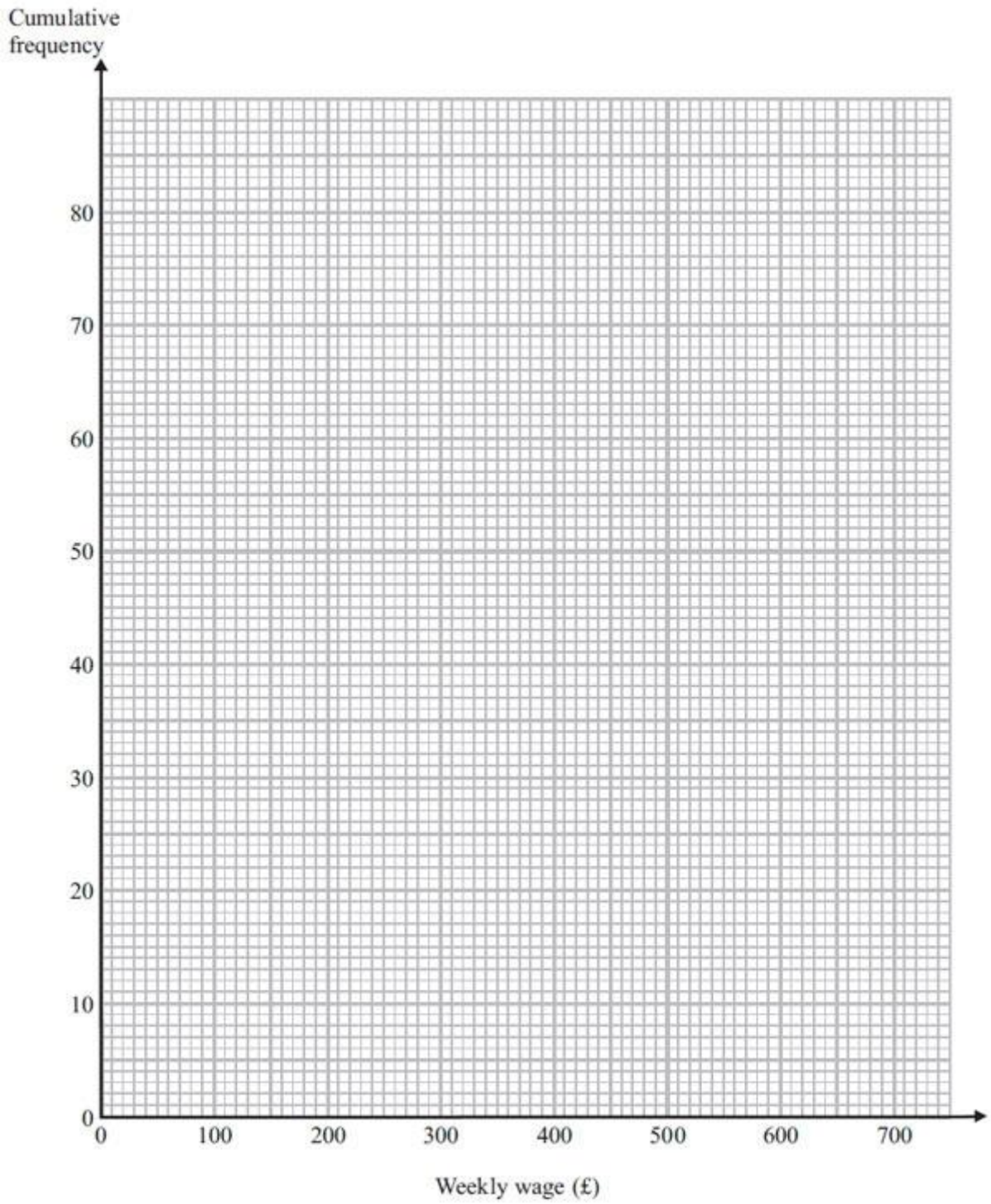(b) On the grid opposite, draw a cumulative frequency graph for your table.

(2)

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

....

(2)

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

....

(2)

Cumulative frequency

Weekly wage (£)

(Total for Question is 7 marks)

Q27.

The table shows information about the speeds of 100 lorries.

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

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

Speed (*s*) in km/h	Cumulative frequency
0 < *s* ≤ 20	2
0 < *s* ≤ 40	
0 < *s* ≤ 60	
0 < *s* ≤ 80	
0 < *s* ≤ 100	
0 < *s* ≤ 120	

(1)

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

(2)

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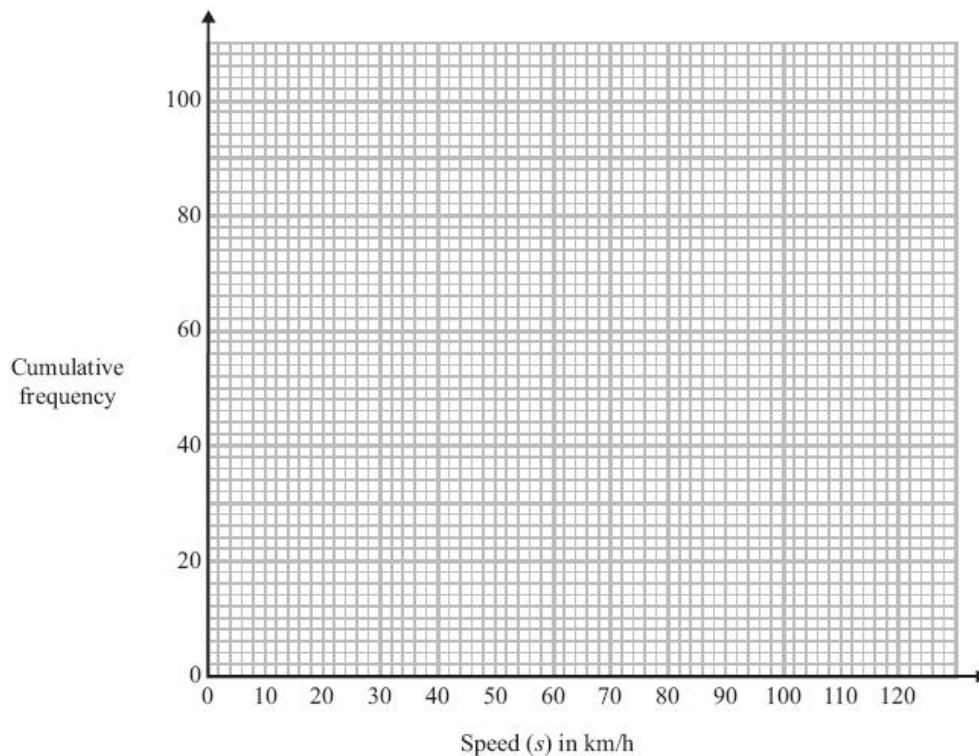
(c) Find an estimate for the number of lorries with a speed of more than 90 km/h.

....

(2)

(Total for Question is 5 marks)

Q28.

The table below shows information about the heights of 60 students.

Height (x cm)	Number of students
$140 < x \leqslant 150$	4
$150 < x \leqslant 160$	5
$160 < x \leqslant 170$	16
$170 < x \leqslant 180$	27
$180 < x \leqslant 190$	5
$190 < x \leqslant 200$	3

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

(3)
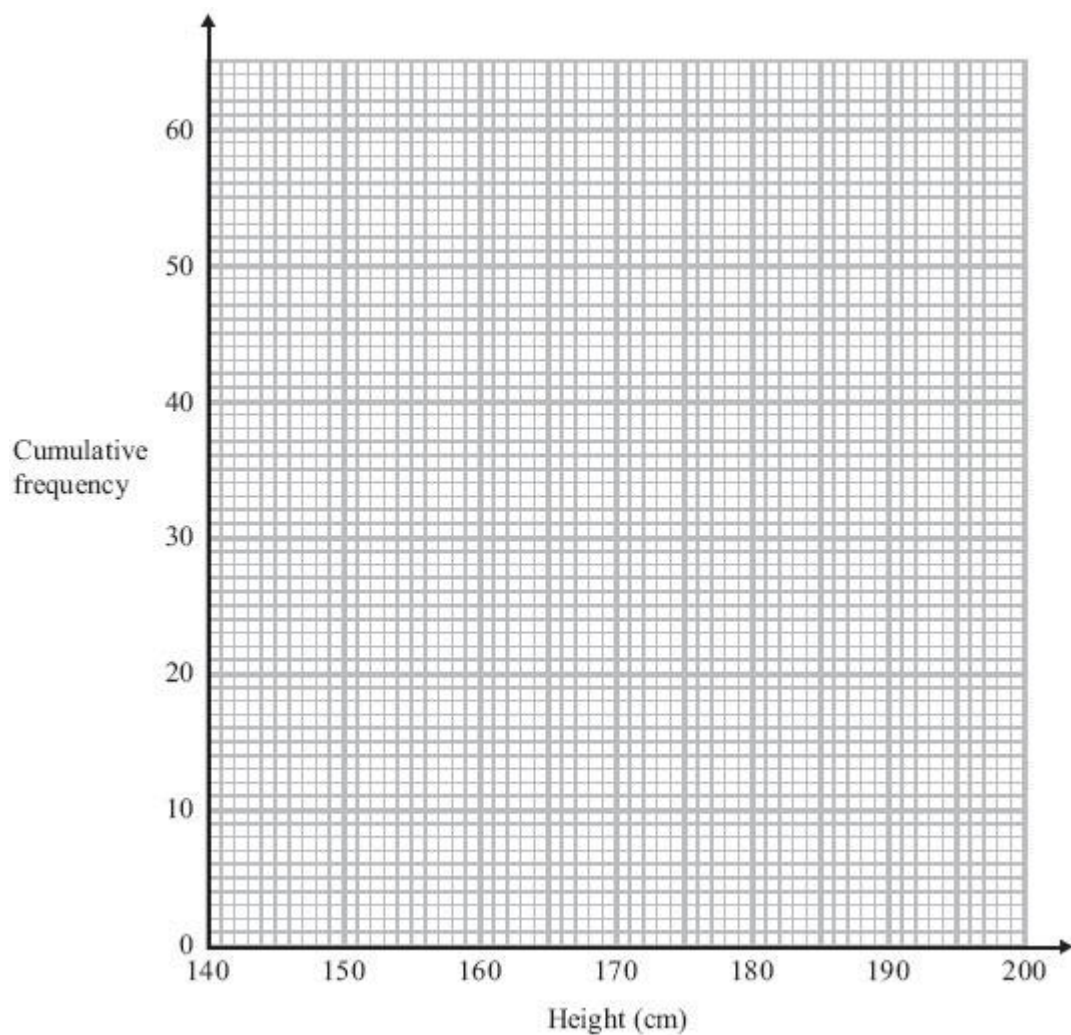
(b) Find an estimate

  (i) for the median,

....

  (ii) for the interquartile range.

....

(3)

(Total for Question is 6 marks)