

Exam Questions

Cumulative Frequency & Box Plots

Cumulative Frequency / Drawing Cumulative Frequency Diagrams / Interpreting Cumulative Frequency Diagrams / Box Plots

Easy (13 questions)	/55
Medium (18 questions)	/98
Hard (22 questions)	/113
Total Marks	/266

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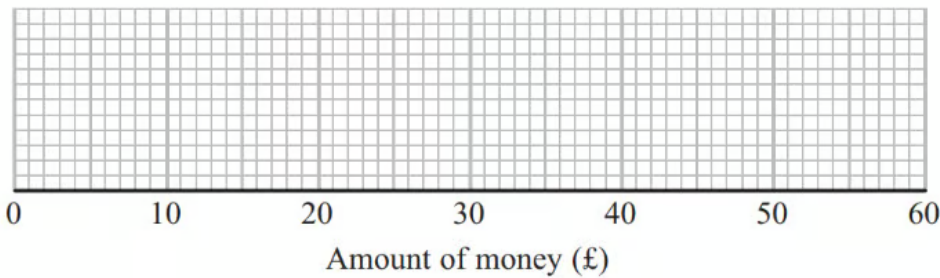


Easy Questions

- 1 (a) 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

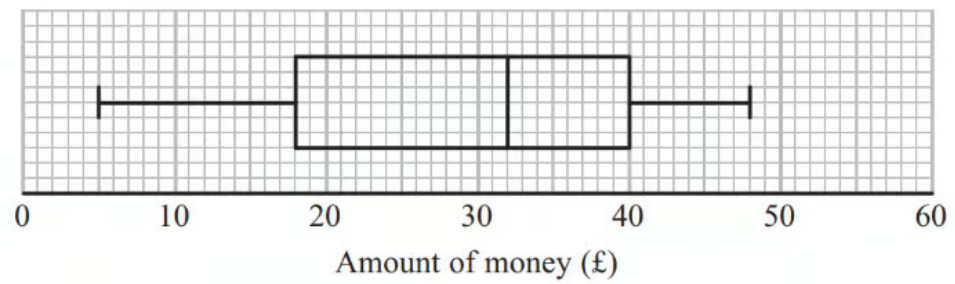
On the grid, draw a box plot for the information in the table.



(2 marks)

- (b) Some boys also did the sponsored swim.

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



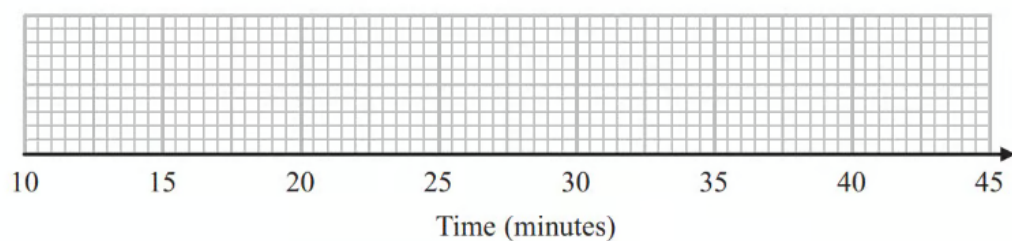
Compare the amounts of money the girls raised with the amounts of money the boys raised.

(2 marks)

- 2 (a)** 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

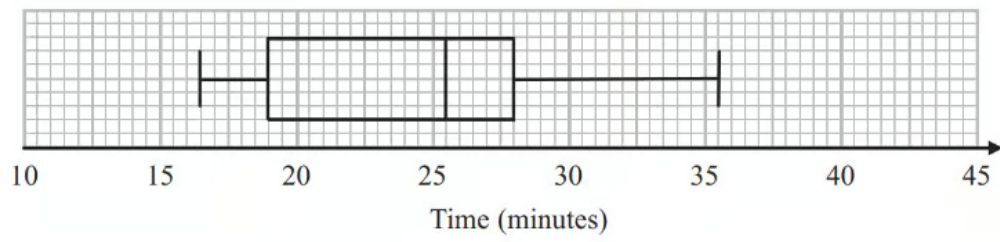
On the grid, draw a box plot to show the information in the table.



(2 marks)

- (b)** The box plot below shows information about the times, in minutes, some boys took to

do the same jigsaw puzzle.



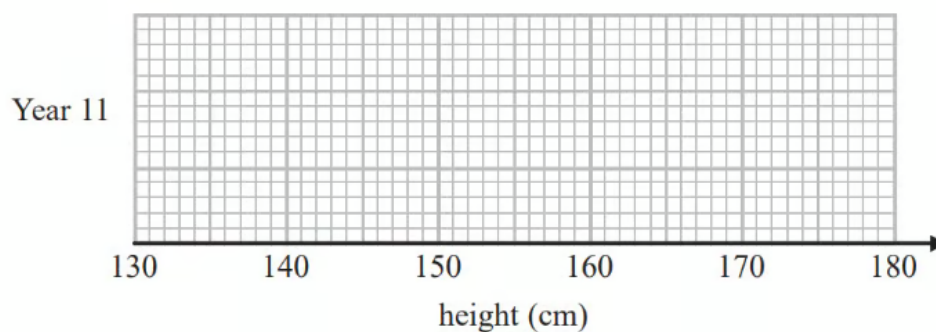
Compare the distributions of the girls' times and the boys' times.

(2 marks)

3 (a) The table shows information about the heights, in cm, of a group of Year 11 girls.

	height (cm)
least height	154
median	165
lower quartile	161
interquartile range	7
range	20

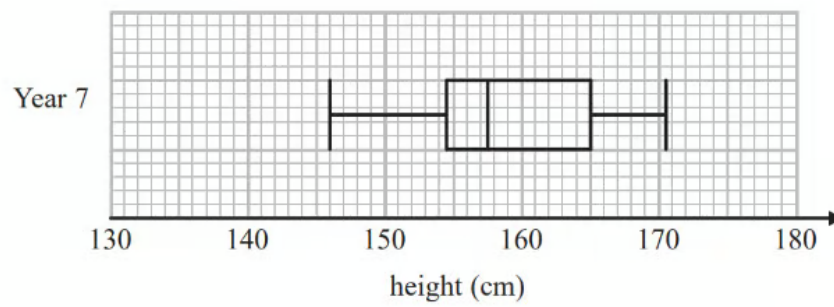
Draw a box plot for this information.



(3 marks)

(b) The box plot below shows information about the heights, in cm, of a group of Year 7

girls.



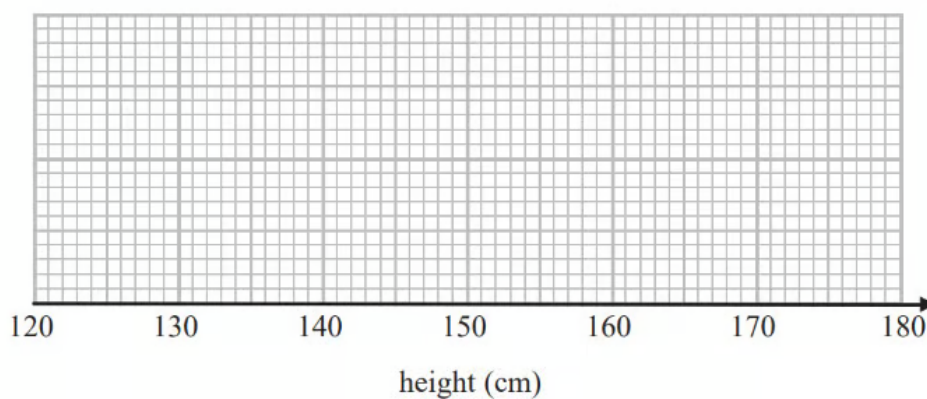
Compare the distribution of heights of the Year 7 girls with the distribution of heights of the Year 11 girls.

(2 marks)

4 (a) The table gives some information about the heights of 80 girls.

Least height	133 cm
Greatest height	170 cm
Lower quartile	145 cm
Upper quartile	157 cm
Median	151 cm

Draw a box plot to represent this information.



(3 marks)

(b) Work out an estimate for the number of these girls with a height between 133 cm and 157 cm.

(2 marks)

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

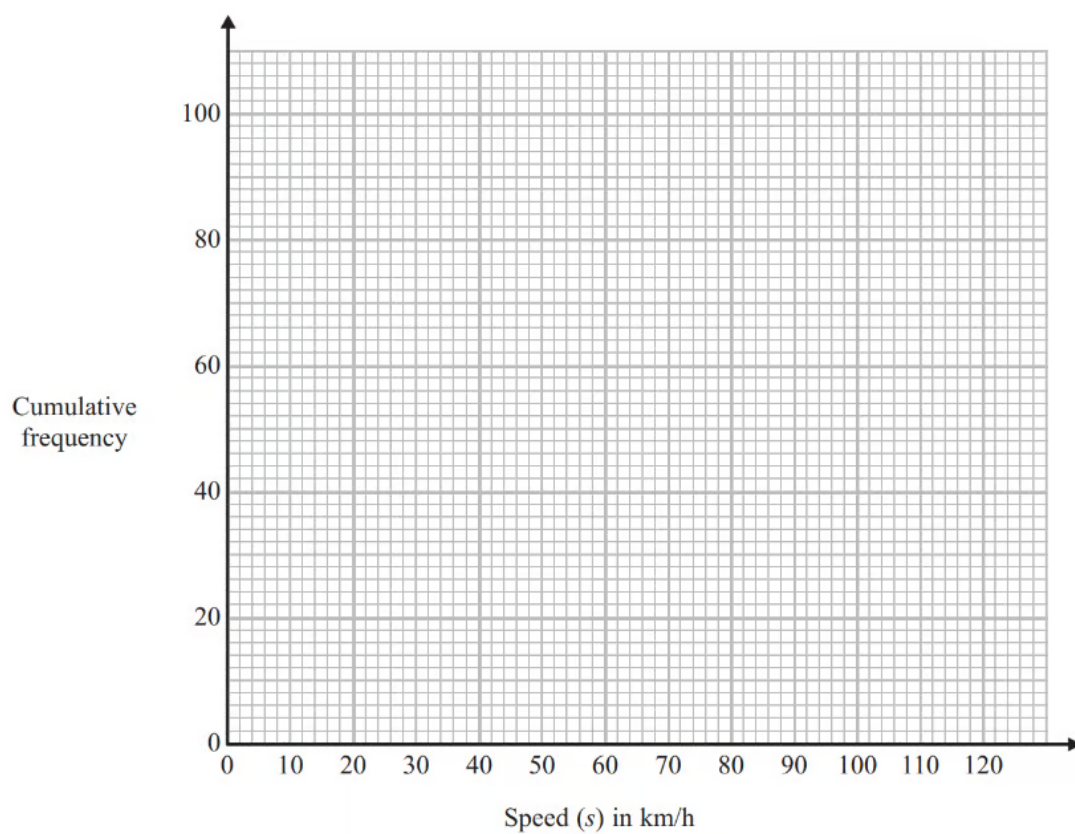
Speed (s) in km/h	Frequency
$0 < s \leq 20$	2
$20 < s \leq 40$	9
$40 < s \leq 60$	23
$60 < s \leq 80$	31
$80 < s \leq 100$	27
$100 < s \leq 120$	8

Complete the cumulative frequency table for this information.

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

(1 mark)

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



(2 marks)

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

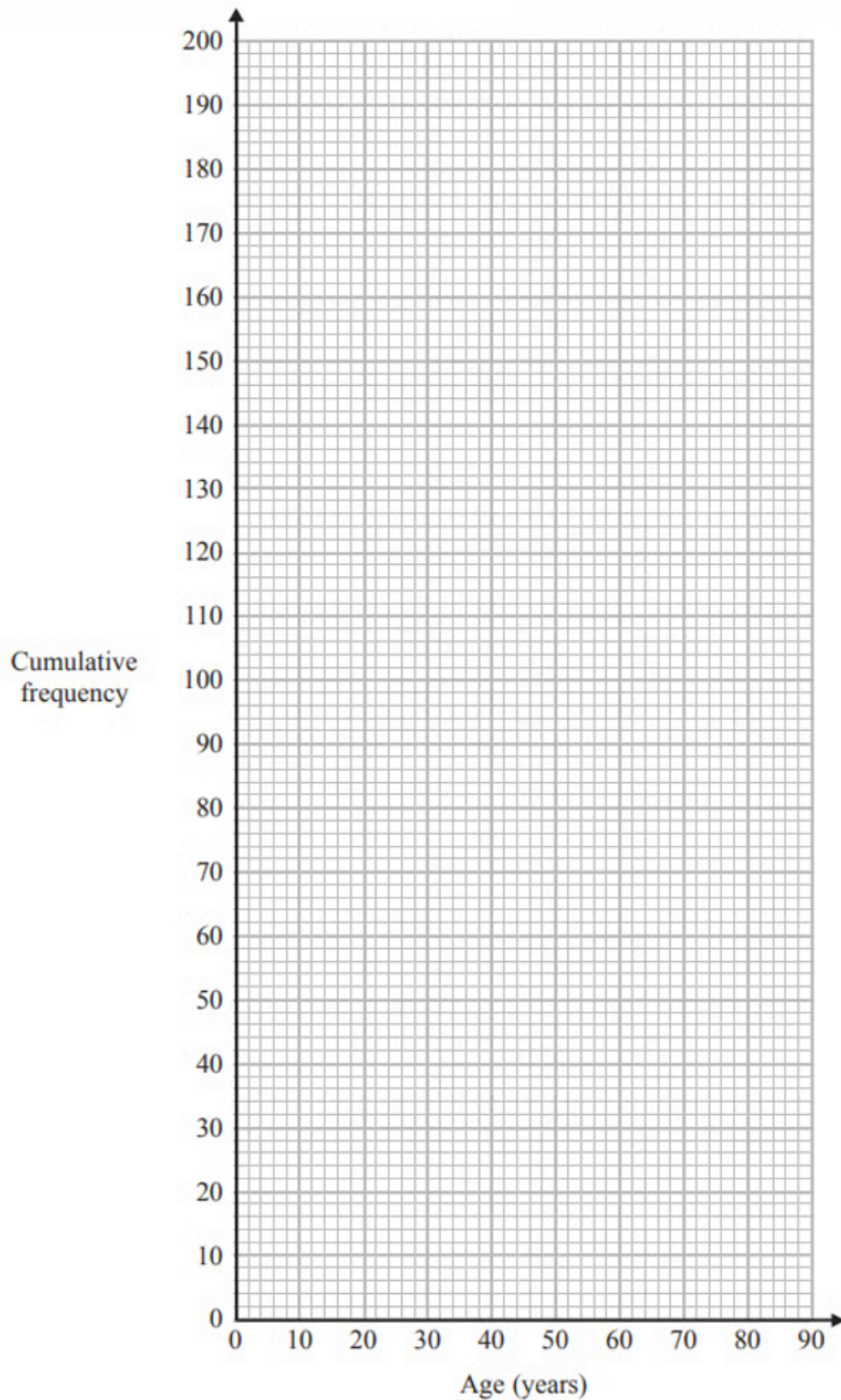
(2 marks)

6 (a) There are 200 workers at a factory.

The cumulative frequency table gives information about their ages.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	25
$0 < a \leq 30$	70
$0 < a \leq 40$	138
$0 < a \leq 50$	175
$0 < a \leq 60$	186
$0 < a \leq 70$	194
$0 < a \leq 80$	200

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



(2 marks)

- (b) Graham says,
"10% of workers at the factory are older than 65"

Is Graham correct?

You must show how you get your answer.

(2 marks)

7 (a) Sue works for a company that delivers parcels.

One day the company delivered 80 parcels.

The table shows information about the weights, in kg, of these parcels.

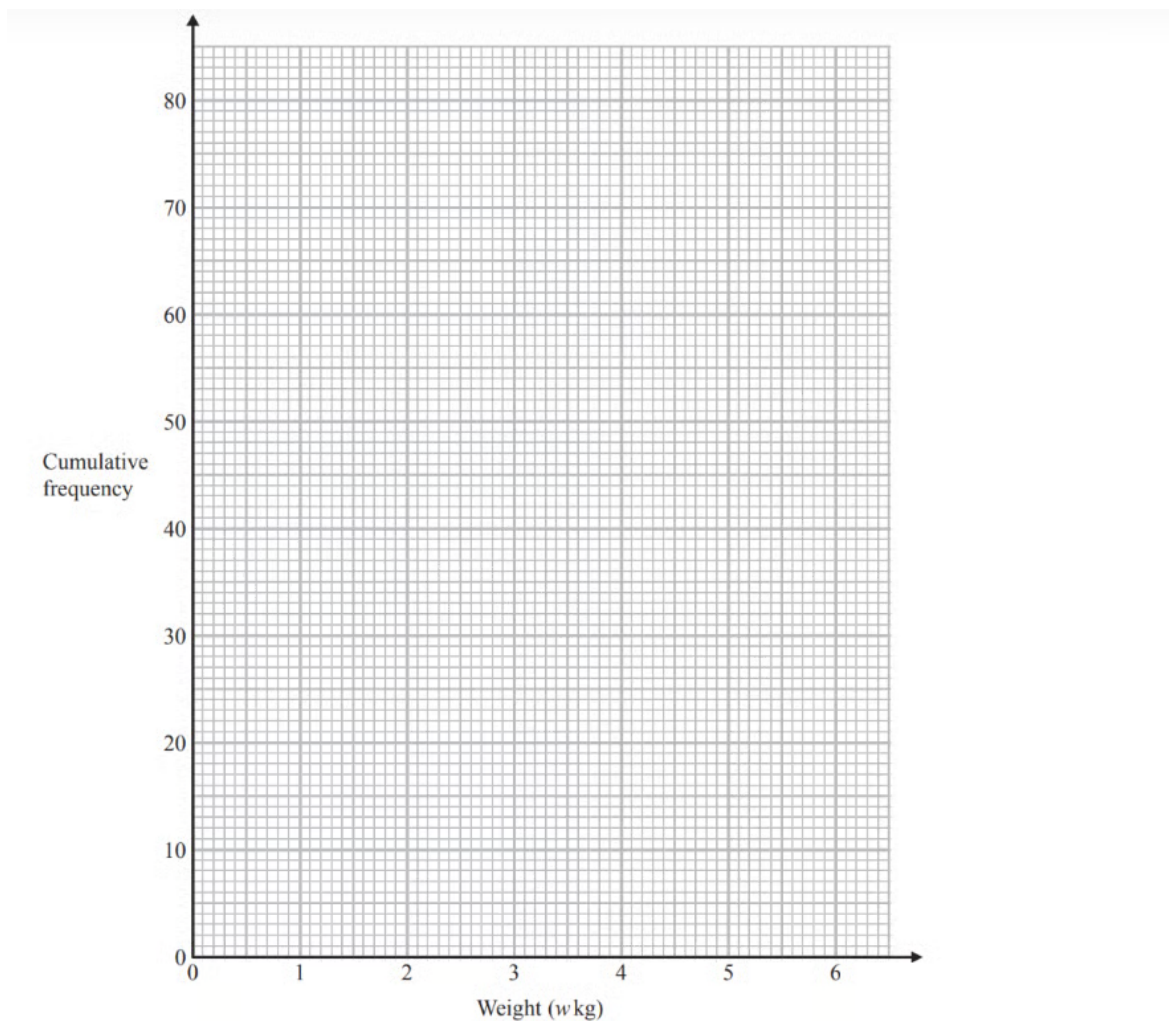
Weight (w kg)	Frequency
$0 < w \leq 1$	19
$1 < w \leq 2$	17
$2 < w \leq 3$	15
$3 < w \leq 4$	12
$4 < w \leq 5$	10
$5 < w \leq 6$	7

Complete the cumulative frequency table.

Weight (w kg)	Cumulative frequency
$0 < w \leq 1$	
$0 < w \leq 2$	
$0 < w \leq 3$	
$0 < w \leq 4$	
$0 < w \leq 5$	
$0 < w \leq 6$	

(1 mark)

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



(2 marks)

(c) Sue says,

"75 % of the parcels weigh less than 3.4 kg."

Is Sue correct?

You must show how you get your answer.

(3 marks)

8 (a) The table gives information about the marks gained by some students in an exam.

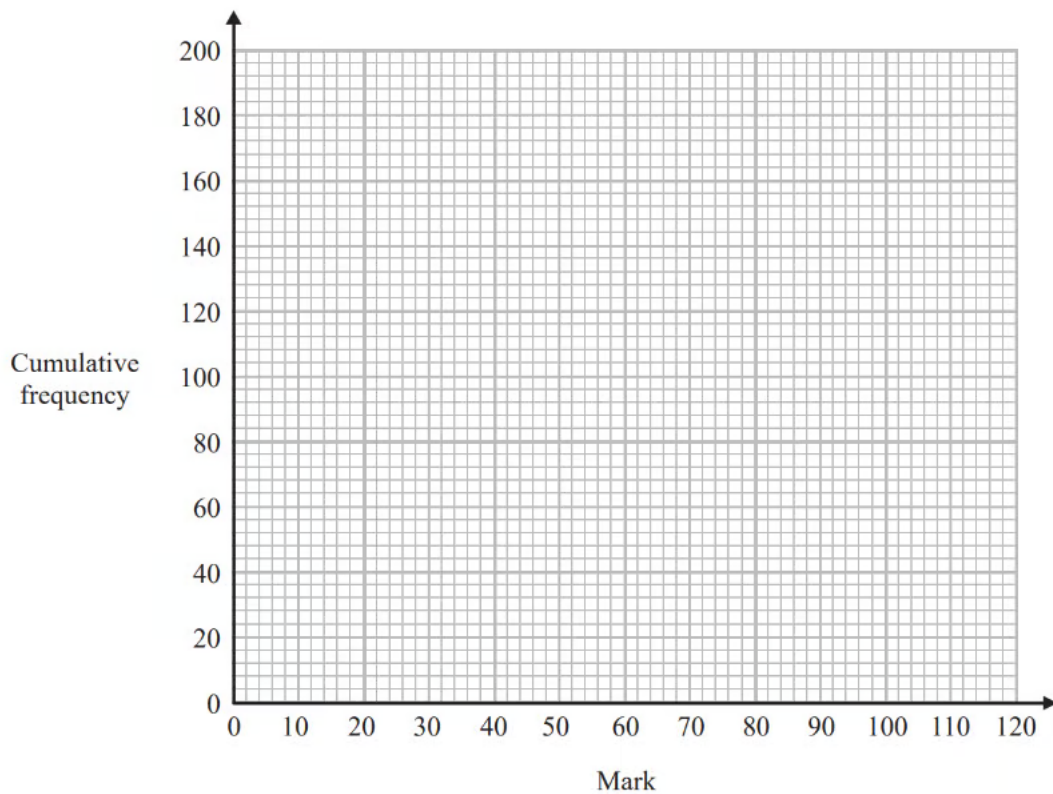
Mark (m)	Frequency
$0 < m \leq 20$	40
$20 < m \leq 40$	70
$40 < m \leq 60$	60
$60 < m \leq 80$	15
$80 < m \leq 100$	10
$100 < m \leq 120$	5

Complete the cumulative frequency table for this information.

Mark (m)	Cumulative frequency
$0 < m \leq 20$	
$0 < m \leq 40$	
$0 < m \leq 60$	
$0 < m \leq 80$	
$0 < m \leq 100$	
$0 < m \leq 120$	

(1 mark)

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



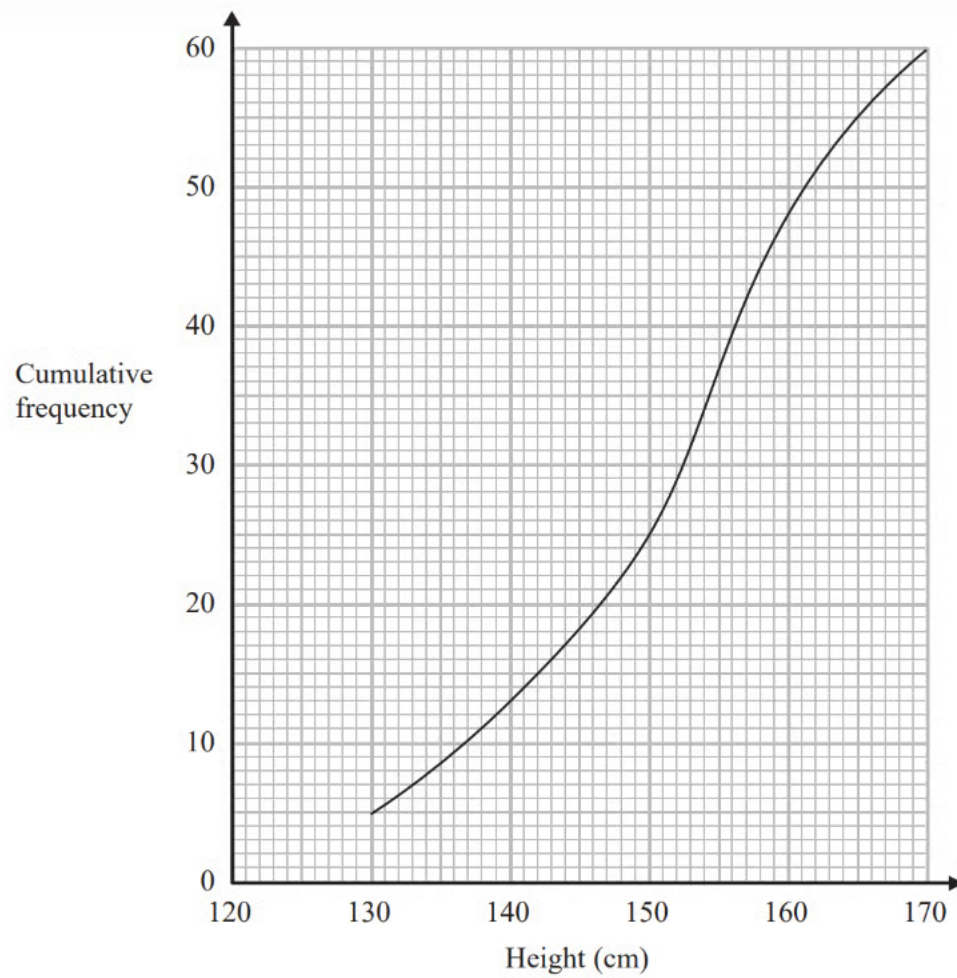
(2 marks)

(c) Use your graph to find an estimate for the number of students who gained a mark of more than 54.

(2 marks)

9 The cumulative frequency graph shows some information about the heights, in cm, of 60

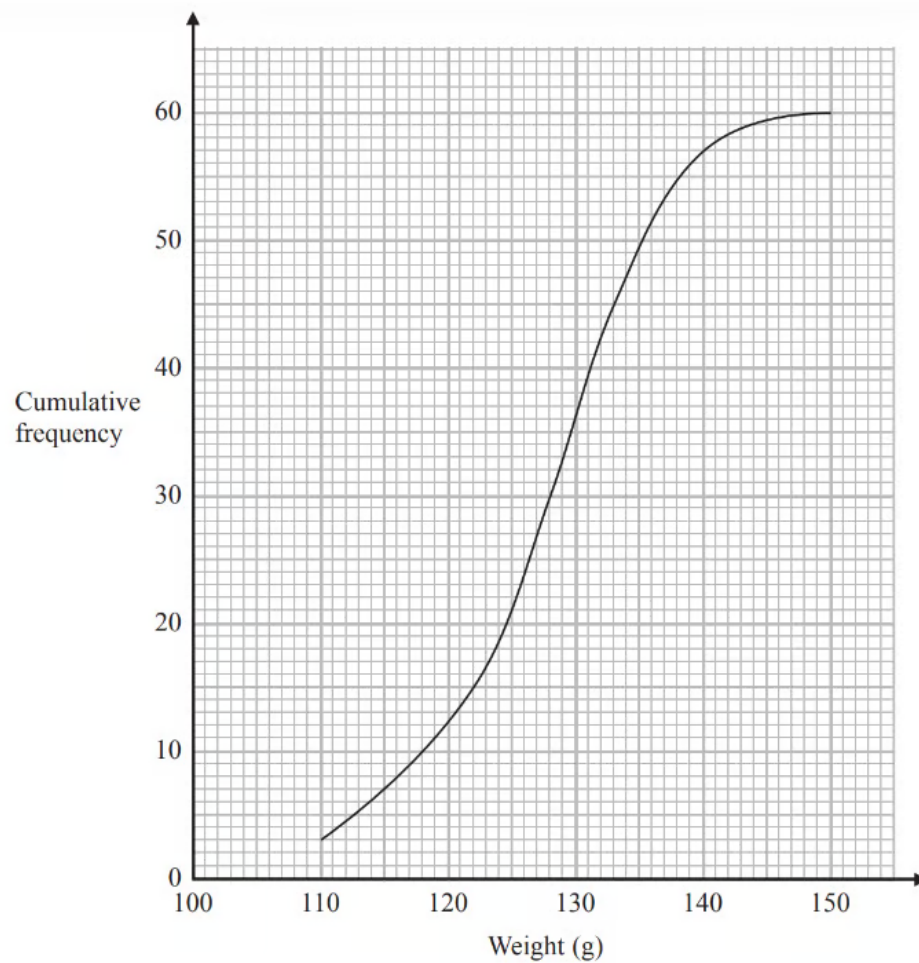
students.



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

(2 marks)

10 (a) The cumulative frequency graph shows information about the weights of 60 apples.



Use the graph to find an estimate for the median weight.

(1 mark)

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

(2 marks)

- 11 (a)** The grouped frequency table gives information about the times, in minutes, that 80 office workers take to get to work.

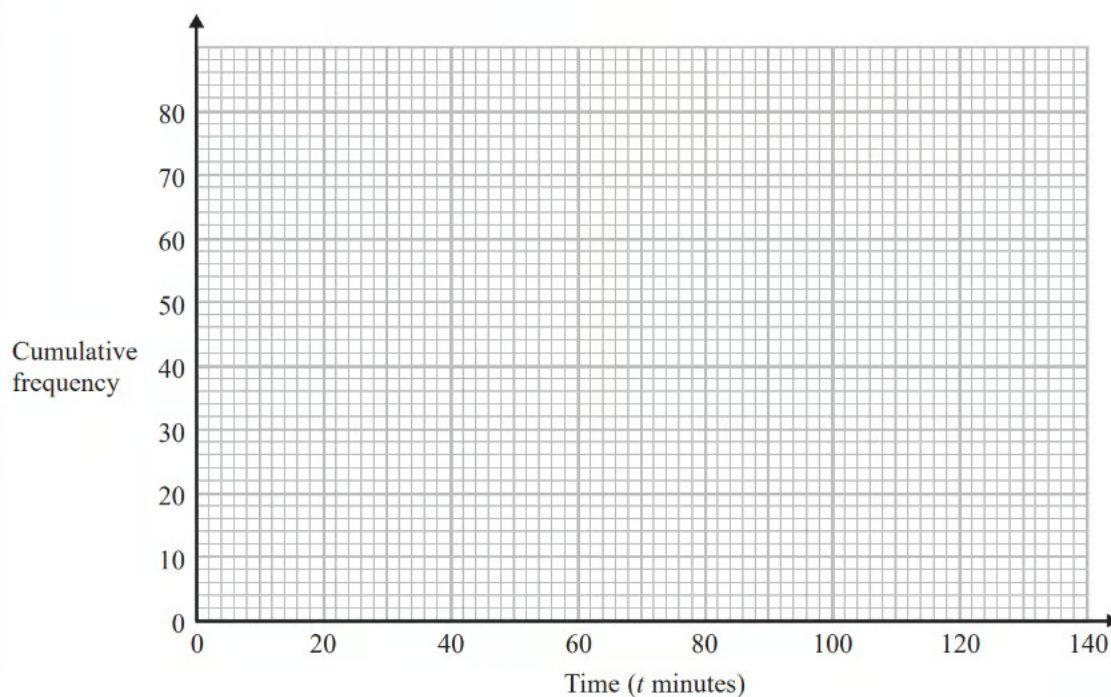
Time (t minutes)	Frequency
$0 < t \leq 20$	5
$20 < t \leq 40$	30
$40 < t \leq 60$	20
$60 < t \leq 80$	15
$80 < t \leq 100$	8
$100 < t \leq 120$	2

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 mark)

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



(2 marks)

- (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 marks)

12 (a) The frequency table gives information about the ages of the 80 people in a train carriage.

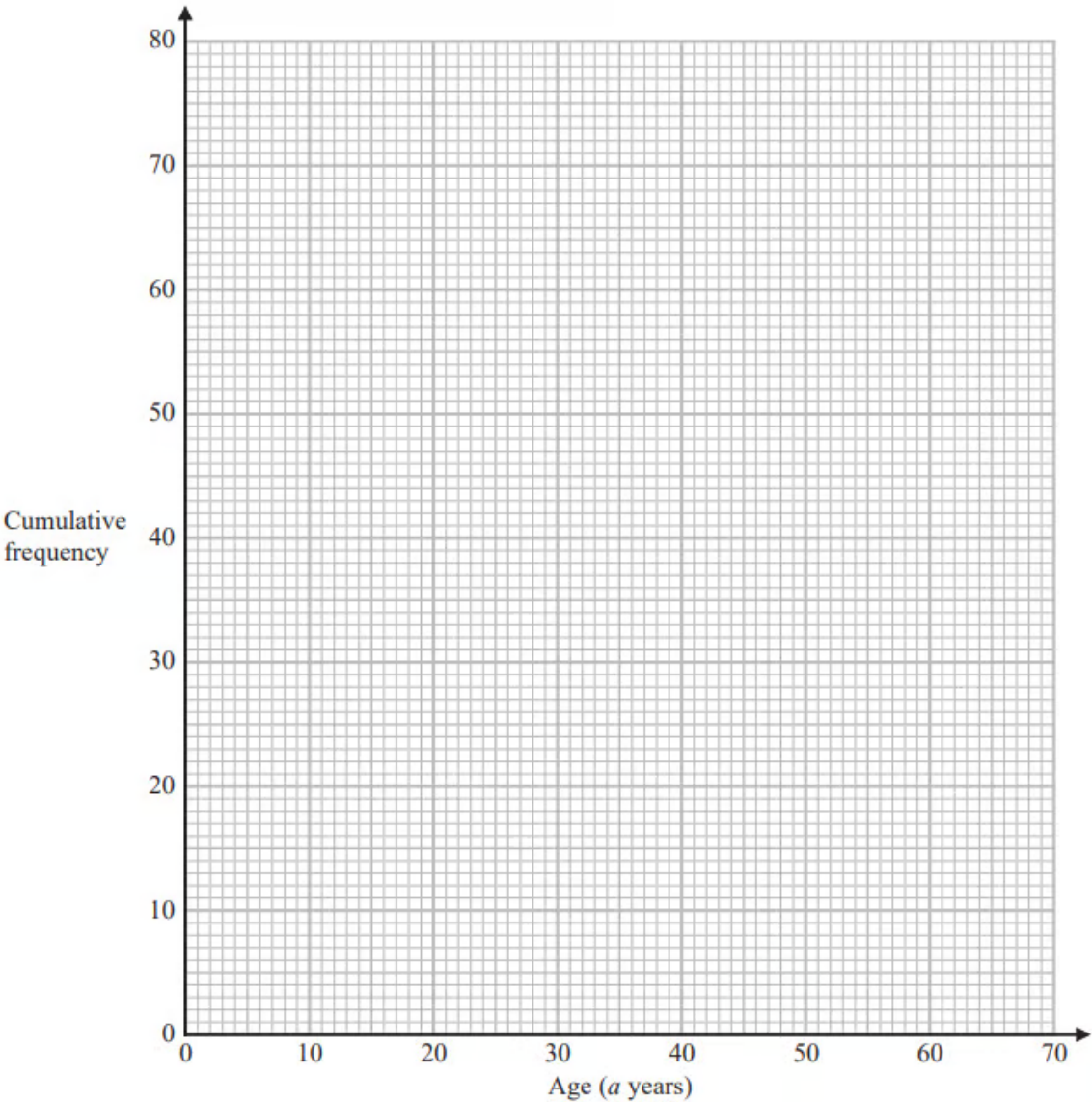
Age (a years)	Frequency
$0 < a \leq 20$	9
$20 < a \leq 30$	19
$30 < a \leq 40$	17
$40 < a \leq 50$	18
$50 < a \leq 60$	13
$60 < a \leq 70$	4

Complete the cumulative frequency table.

Age (a years)	Cumulative frequency
$0 < a \leq 20$	
$0 < a \leq 30$	
$0 < a \leq 40$	
$0 < a \leq 50$	
$0 < a \leq 60$	
$0 < a \leq 70$	

(1 mark)

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



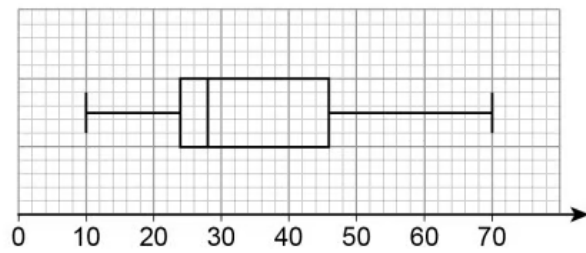
(2 marks)

(c) Use your graph to find an estimate for the median age of the people in the train carriage.

..... years

(2 marks)

13 Here is a box plot.



Choose the median value.

- A.** 28
- B.** 35
- C.** 24
- D.** 22

(1 mark)

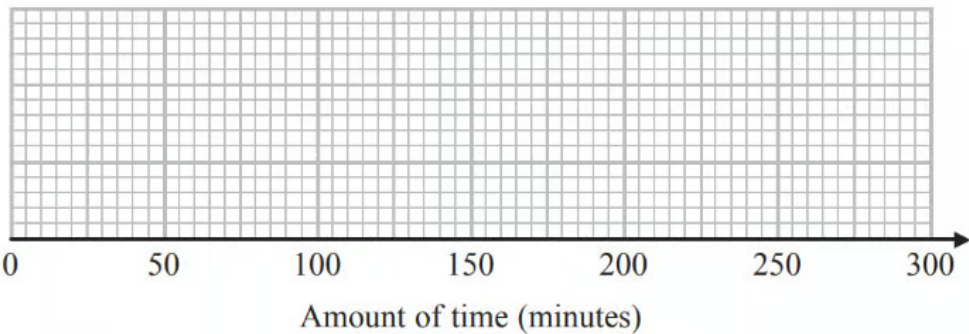
Medium Questions

1 (a) The students in a class kept a record of the amount of time, in minutes, they spent doing homework last week.

The table shows information about the amount of time the girls spent doing homework last week.

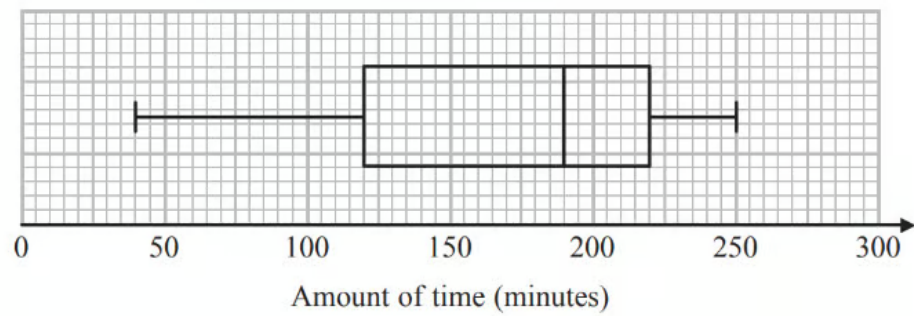
	Minutes
Least amount of time	60
Range	230
Median	170
Lower quartile	100
Upper quartile	220

On the grid, draw a box plot for the information in the table.



(2 marks)

- (b) The box plot below shows information about the amount of time the boys spent doing homework last week.



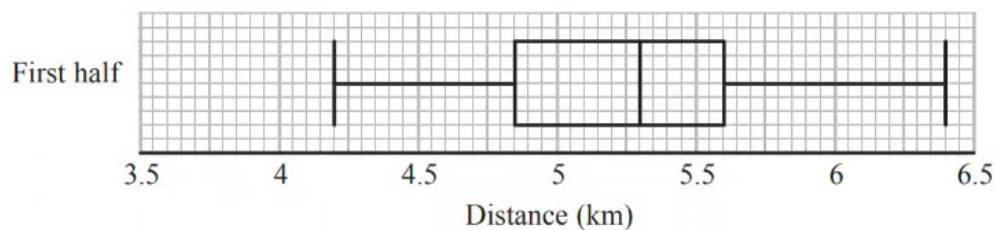
Compare the amount of time the girls spent doing homework with the amount of time the boys spent doing homework.

(2 marks)

2 (a) 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.



Work out the interquartile range.

(2 marks)

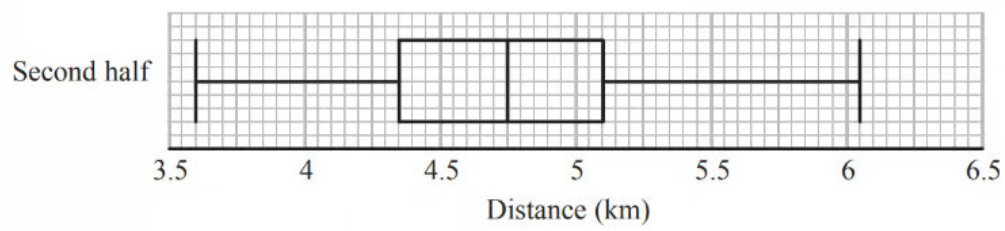
(b) There were 80 players in Colin's sample.

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

(2 marks)

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

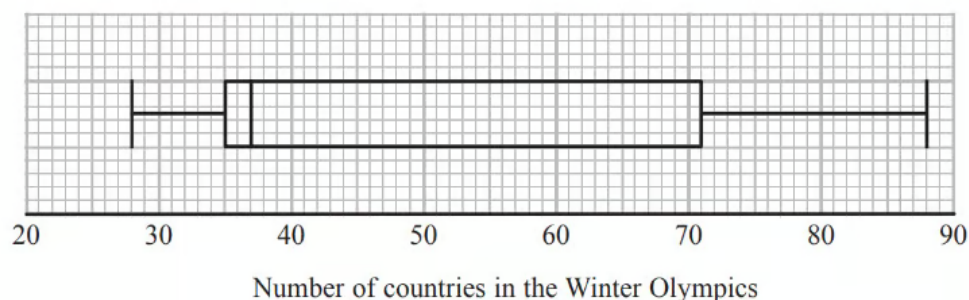
He drew the box plot below for this information.



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

(2 marks)

- 3 (a)** The box plot shows information about the number of countries competing in each Winter Olympic Games since 1948.



Write down the median.

(1 mark)

- (b)** Work out the interquartile range.

(2 marks)

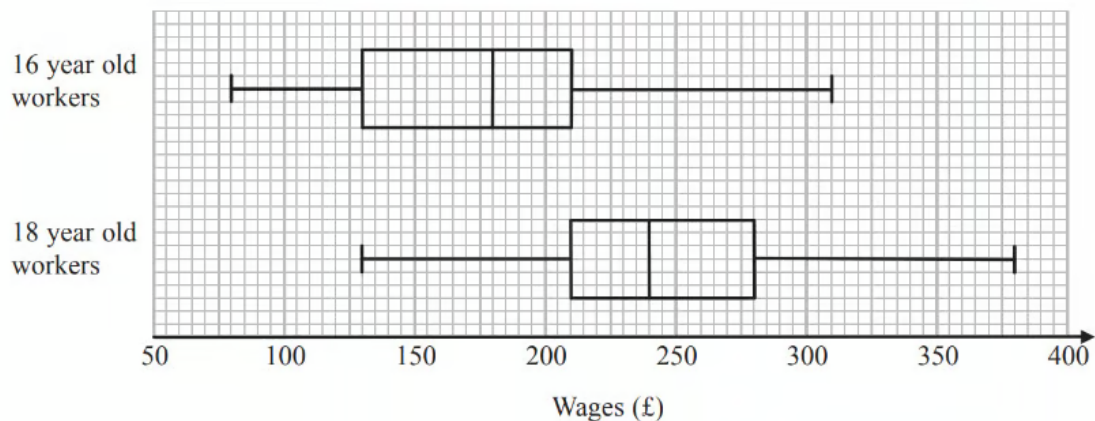
- (c)** The table below shows information about the number of countries competing in each Summer Olympic Games since 1948.

	Smallest	Lower quartile	Median	Upper quartile	Largest
Number of countries	59	83	121	199	204

Compare the two distributions.

(2 marks)

- 4 (a)** The box plots give information about the wages of a group of 16 year old workers and a group of 18 year old workers.



Compare the distribution of the wages of the 16 year old workers with the distribution of the wages of the 18 year old workers.

(3 marks)

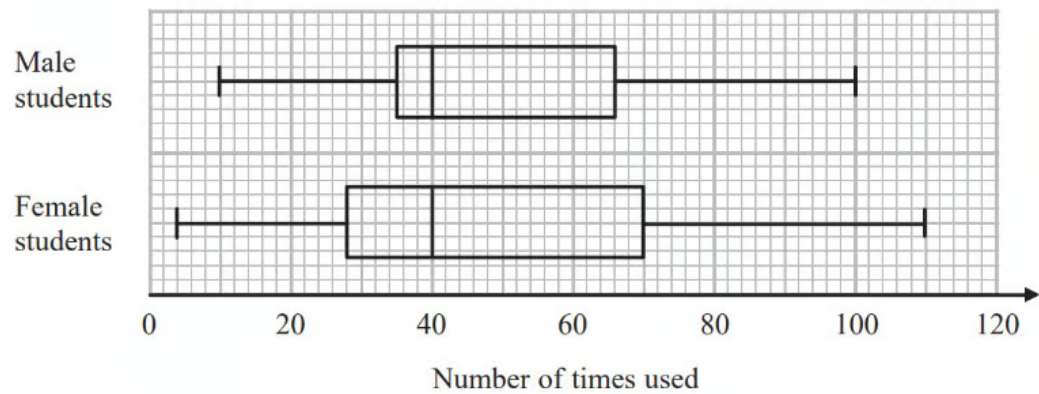
- (b)** There are 200 workers who are 16 years old.

Work out an estimate for the number of these workers whose wages are £130 or more.

(2 marks)

- 5** Some students were asked how many times they each used their mobile phones last week.

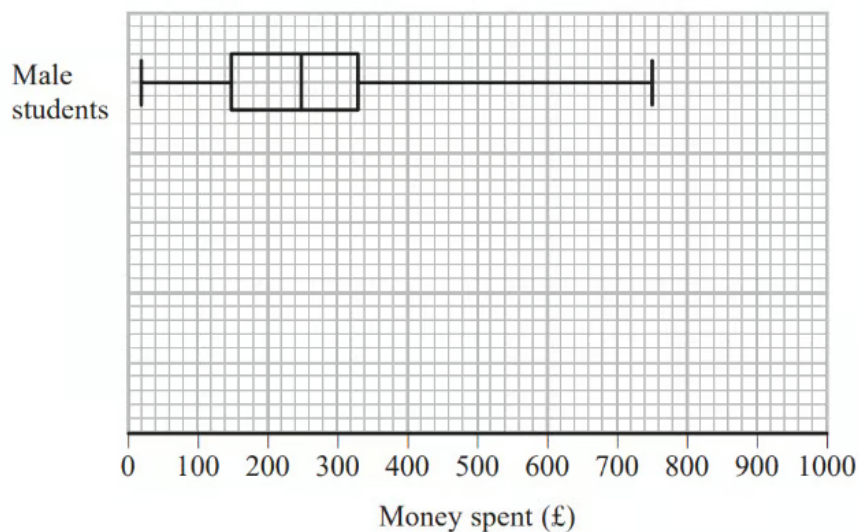
The box plots give information about the male students' answers and about the female students' answers.



Compare the two distributions represented by the box plots.

(3 marks)

- 6 (a)** The box plot shows information about the distribution of the amounts of money spent by some male students on their holidays.



Work out the interquartile range for the amounts of money spent by these male students.

(2 marks)

- (b)** The table below shows information about the distribution of the amounts of money spent by some female students on their holidays.

	Smallest	Lower quartile	Median	Upper quartile	Largest
Money spent (£)	60	180	300	350	650

On the grid above, draw a box plot for the information in the table.

(2 marks)

(c) Chris says,

"The box plots show that the female students spent more money than the male students."

Is Chris correct?

Give a reason for your answer.

(1 mark)

7 (a) Charlotte grows some potatoes.

The table shows information about the weights of her potatoes.

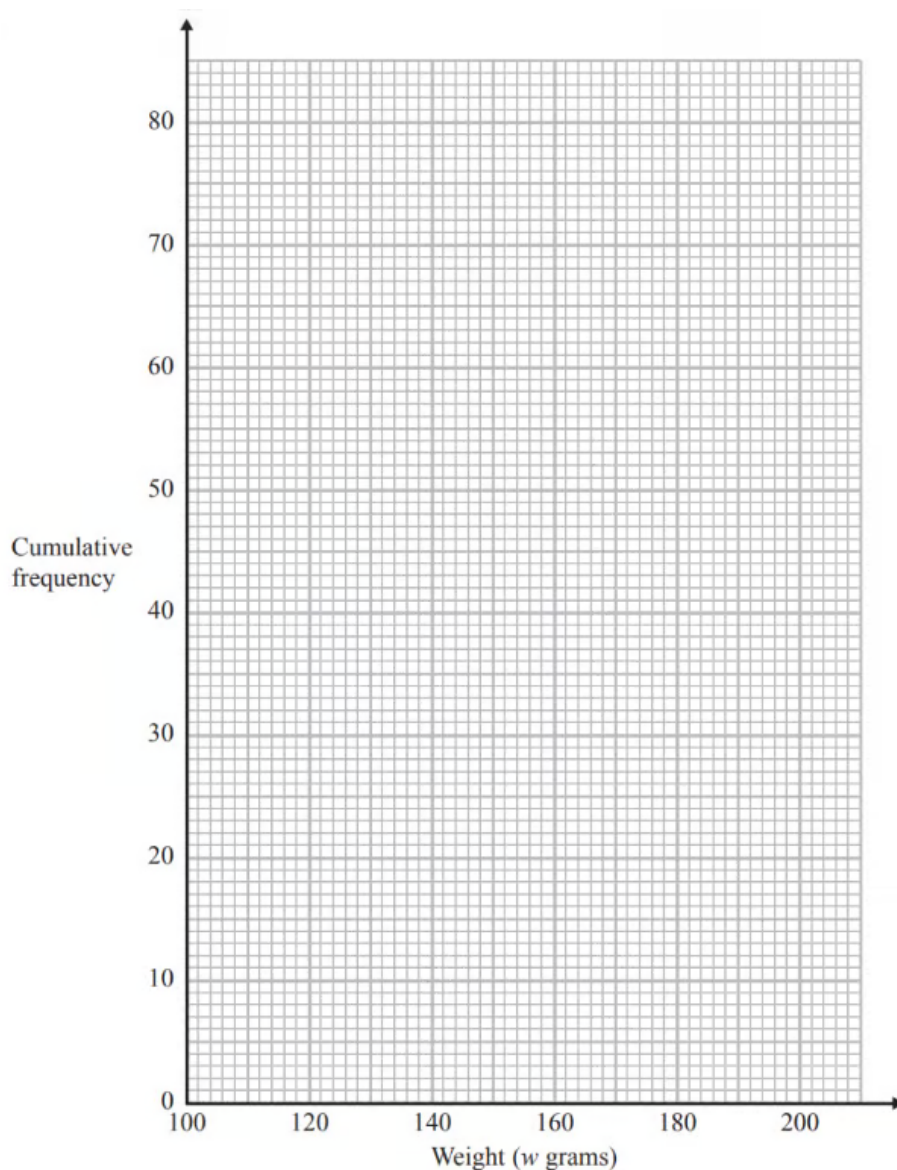
Weight (w grams)	Frequency
$100 < w \leq 120$	5
$120 < w \leq 140$	25
$140 < w \leq 160$	30
$160 < w \leq 180$	15
$180 < w \leq 200$	5

Complete the cumulative frequency table.

Weight (w grams)	Cumulative frequency
$100 < w \leq 120$	
$100 < w \leq 140$	
$100 < w \leq 160$	
$100 < w \leq 180$	
$100 < w \leq 200$	

(1 mark)

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



(2 marks)

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

(2 marks)

(d) Use your graph to find an estimate for the percentage of Charlotte's potatoes with a weight less than 150 grams.

(3 marks)

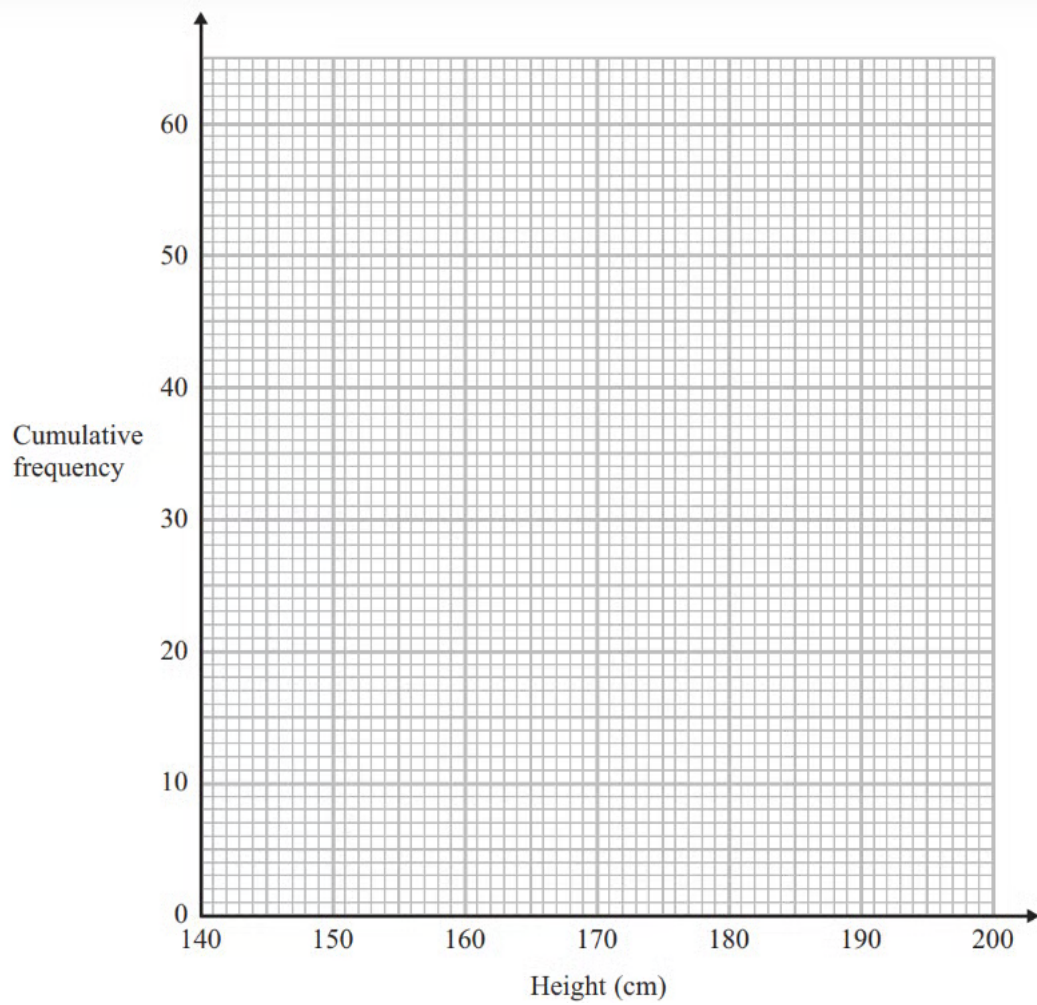
8 (a) The table below shows information about the heights of 60 students.

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

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

(3 marks)

(b)



Find an estimate

i) for the median,

[2]

ii) for the interquartile range.

[1]

(3 marks)

- 9 (a)** The grouped frequency table shows information about the weekly wages of 80 factory workers.

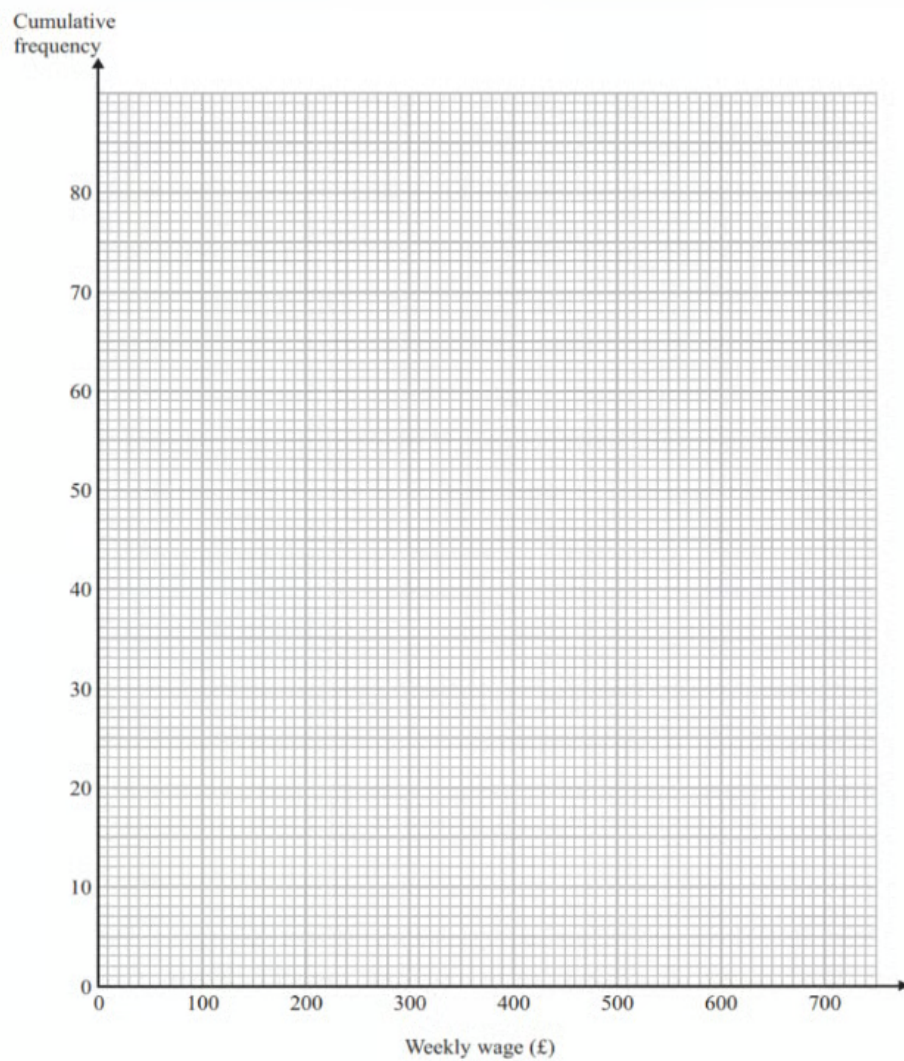
Weekly wage(£ x)	Frequency
$100 < x \leq 200$	8
$200 < x \leq 300$	15
$300 < x \leq 400$	30
$400 < x \leq 500$	17
$500 < x \leq 600$	7
$600 < x \leq 700$	3

Complete the cumulative frequency table.

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

(1 mark)

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



(2 marks)

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

(2 marks)

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

(2 marks)

10 (a) The table shows information about the times taken by 100 people in a fun run.

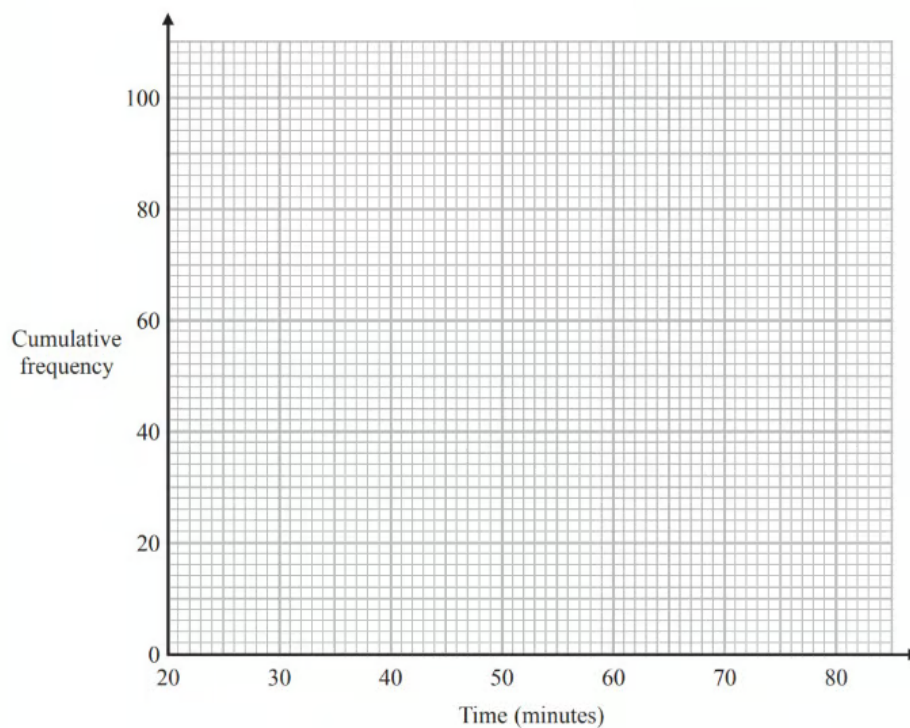
Time (t minutes)	Frequency
$20 < t \leq 30$	4
$30 < t \leq 40$	16
$40 < t \leq 50$	36
$50 < t \leq 60$	24
$60 < t \leq 70$	14
$70 < t \leq 80$	6

Complete the cumulative frequency table for this information.

Time (t minutes)	Cumulative frequency
$20 < t \leq 30$	
$20 < t \leq 40$	
$20 < t \leq 50$	
$20 < t \leq 60$	
$20 < t \leq 70$	
$20 < t \leq 80$	

(1 mark)

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



(2 marks)

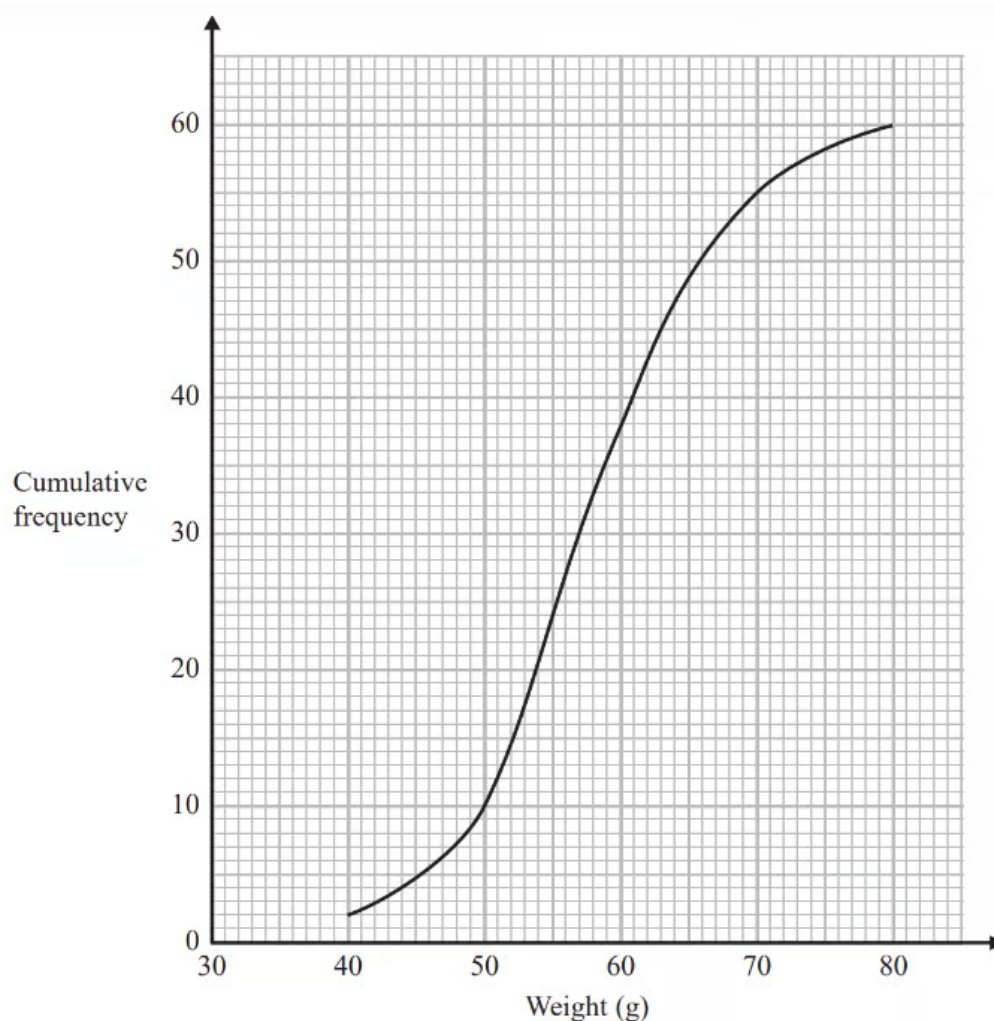
(c) Use your graph to find an estimate for the median time.

(1 mark)

(d) Use your graph to find an estimate for the number of people who took longer than 63 minutes.

(2 marks)

11 (a) The cumulative frequency graph shows information about the weights of 60 potatoes.



Use the graph to find an estimate for the median weight.

(1 mark)

(b) Jamil says,
"80 - 40 = 40 so the range of the weights is 40 g."

Is Jamil correct?

You must give a reason for your answer.

(1 mark)

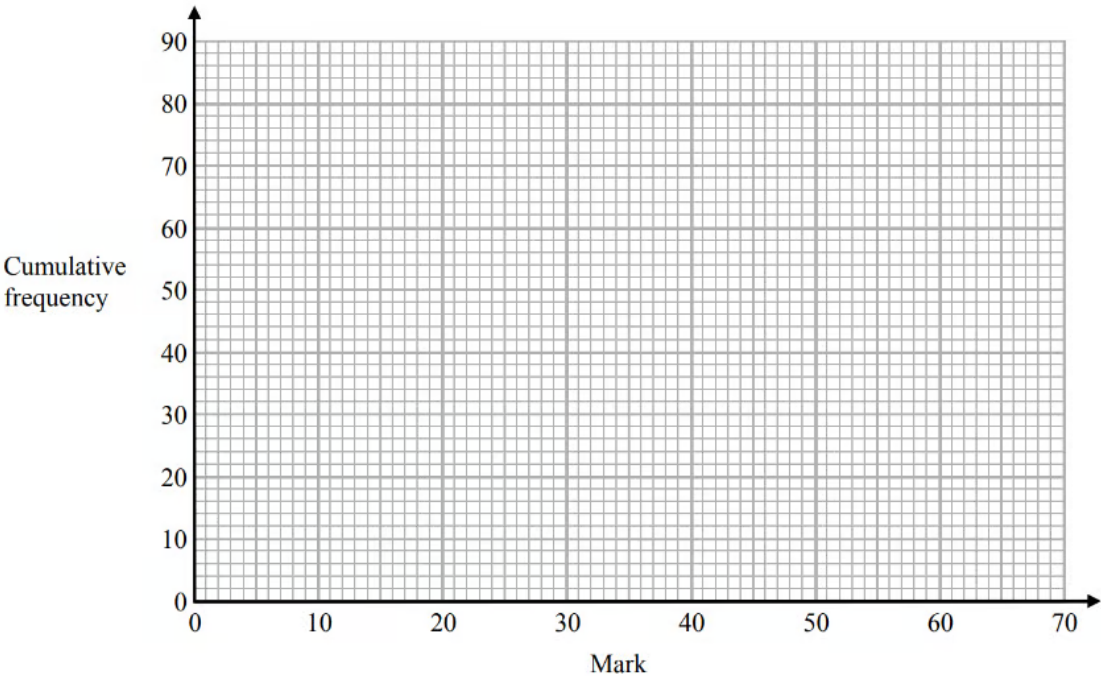
(c) Show that less than 25% of the potatoes have a weight greater than 65 g.

(2 marks)

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

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

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



(2 marks)

(b) Find the median mark.

(1 mark)

(c) 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.

Find an estimate for the lowest possible pass mark.

(3 marks)

- 13 (a)** The table gives information about the times, in minutes, taken by 80 customers to do their shopping in a supermarket.

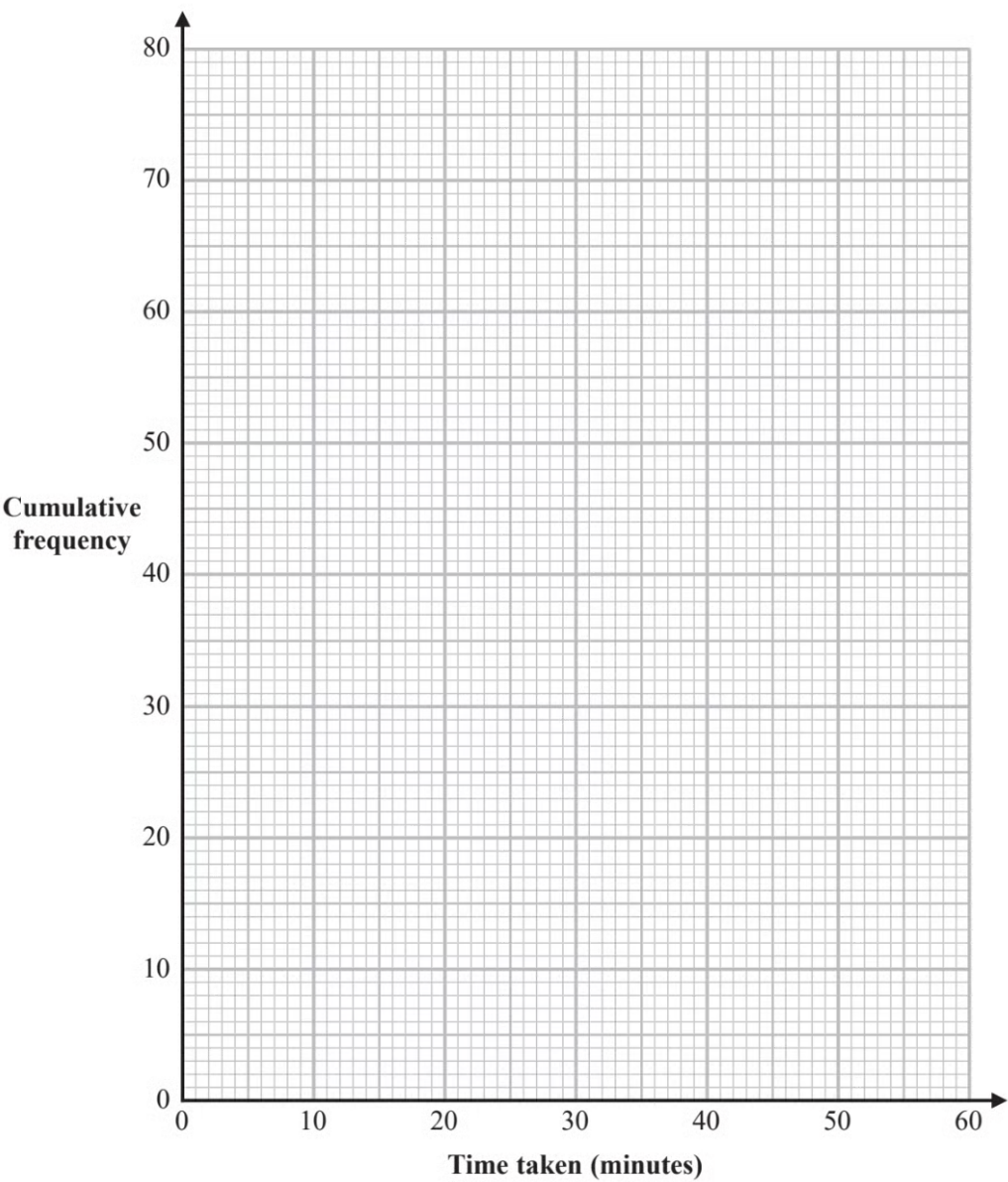
Time taken (t minutes)	Frequency
$0 < t \leq 10$	7
$10 < t \leq 20$	26
$20 < t \leq 30$	24
$30 < t \leq 40$	14
$40 < t \leq 50$	7
$50 < t \leq 60$	2

Complete the cumulative frequency table.

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

(1 mark)

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



(2 marks)

(c) Use your graph to find an estimate for the median time taken.

..... minutes

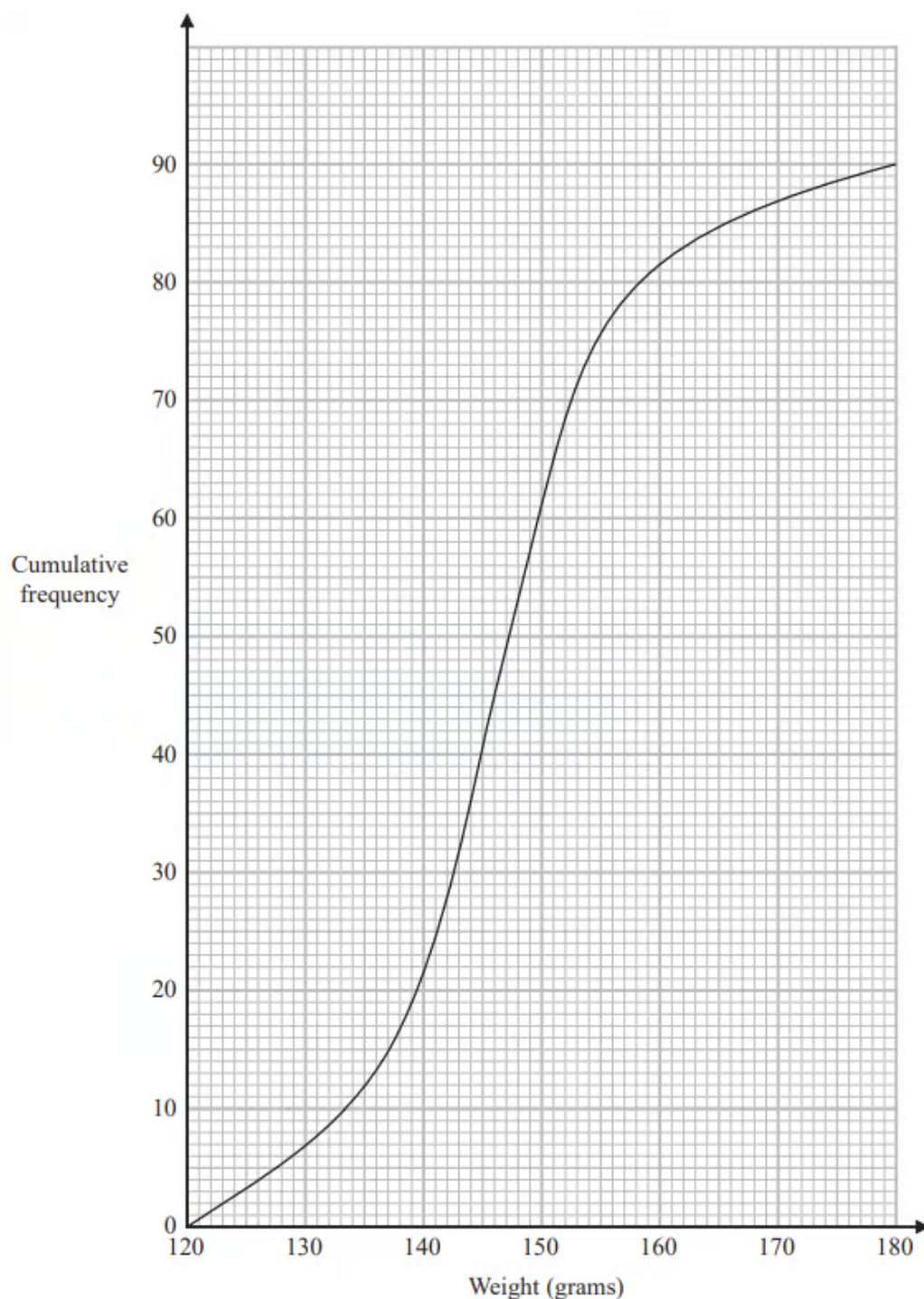
(1 mark)

(d) One of the 80 customers is chosen at random.

Use your graph to find an estimate for the probability that the time taken by this customer was more than 42 minutes.

(2 marks)

- 14 (a)** The cumulative frequency graph gives information about the weights, in grams, of 90 bags of sweets.



Find an estimate for the median of the weights of these bags of sweets.

..... grams

(2 marks)

(b) Roberto sells the bags of sweets to raise money for charity.

Bags with a weight greater than d grams are labelled large bags and sold for 3.75 euros each bag.

The total amount of money he receives by selling all the large bags is 93.75 euros.

Find the value of d .

(3 marks)

- 15 (a)** The manager of a call centre asked the 120 people, who rang the call centre last week, how long they each waited before their call was answered.

The table gives information about their replies.

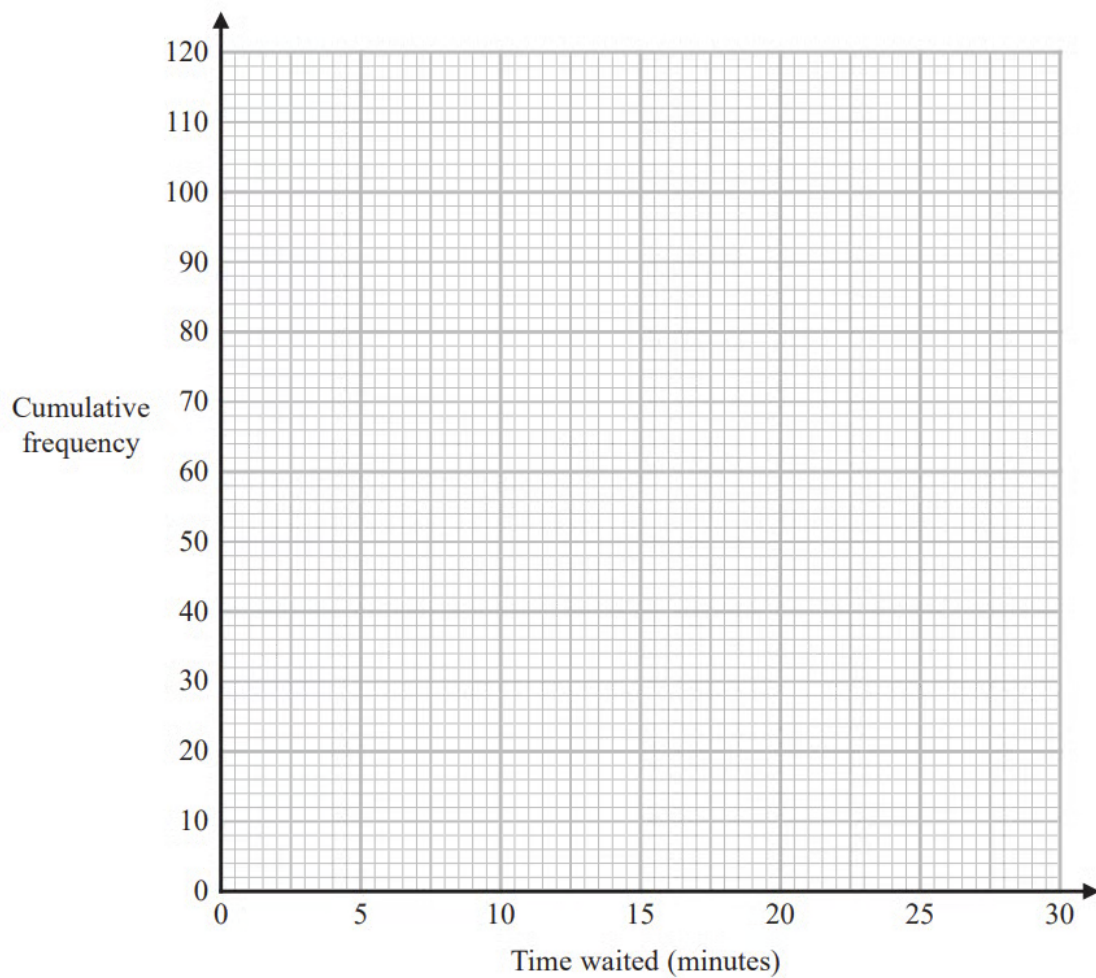
Time waited (t minutes)	Frequency
$0 < t \leq 5$	8
$5 < t \leq 10$	15
$10 < t \leq 15$	17
$15 < t \leq 20$	28
$20 < t \leq 25$	33
$25 < t \leq 30$	19

Complete the cumulative frequency table.

Time waited (t minutes)	Cumulative Frequency
$0 < t \leq 5$	
$0 < t \leq 10$	
$0 < t \leq 15$	
$0 < t \leq 20$	
$0 < t \leq 25$	
$0 < t \leq 30$	

(1 mark)

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



(2 marks)

(c) Use your graph to find an estimate for the median of the times waited.

..... minutes

(1 mark)

(d) Using your graph, find an estimate for the percentage of the 120 people who said that they waited longer than 23 minutes before their call was answered.
Show your working clearly.

.....%

(2 marks)

- 16 (a)** The table gives information about the times taken by 90 runners to complete a 10 km race.

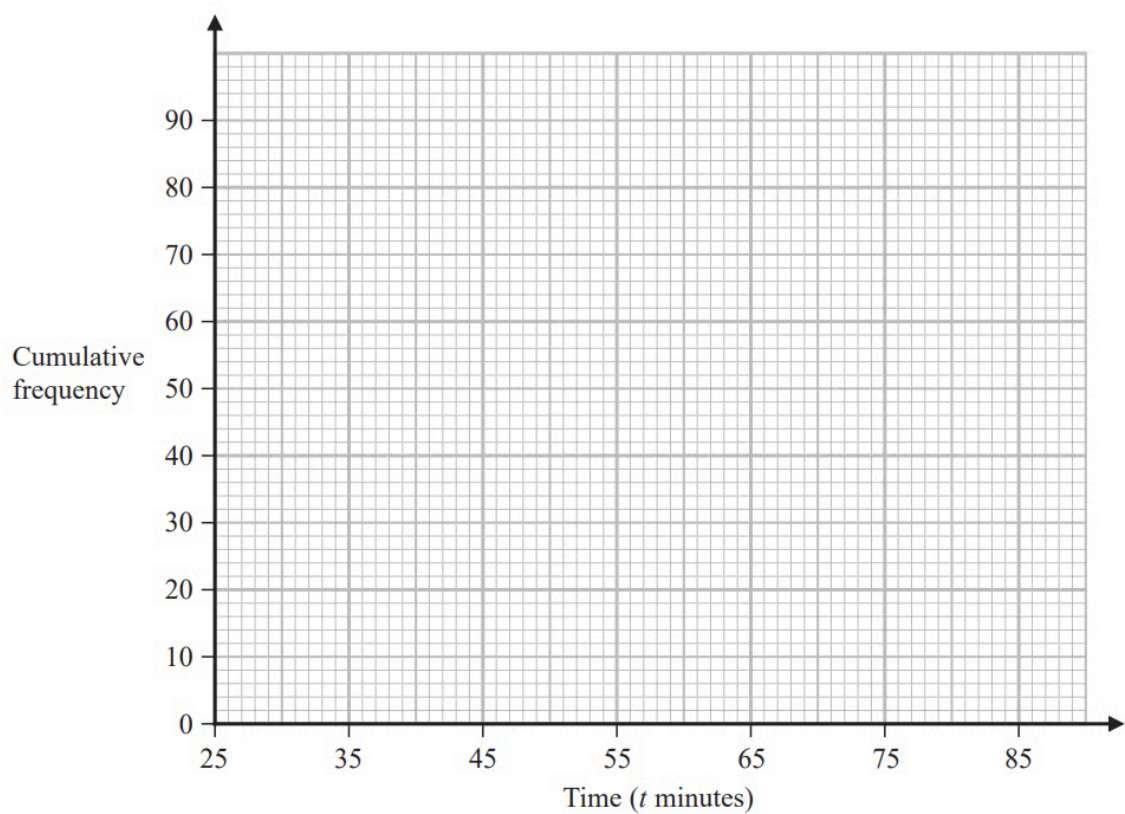
Time (t minutes)	Frequency
$25 < t \leq 35$	12
$35 < t \leq 45$	24
$45 < t \leq 55$	28
$55 < t \leq 65$	12
$65 < t \leq 75$	10
$75 < t \leq 85$	4

Complete the cumulative frequency table.

Time (t minutes)	Cumulative frequency
$25 < t \leq 35$	12
$25 < t \leq 45$	
$25 < t \leq 55$	
$25 < t \leq 65$	
$25 < t \leq 75$	
$25 < t \leq 85$	

(1 mark)

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



(2 marks)

(c) Any runner who completed the race in a time T minutes such that $42 < T \leq 52$ minutes was awarded a silver medal.

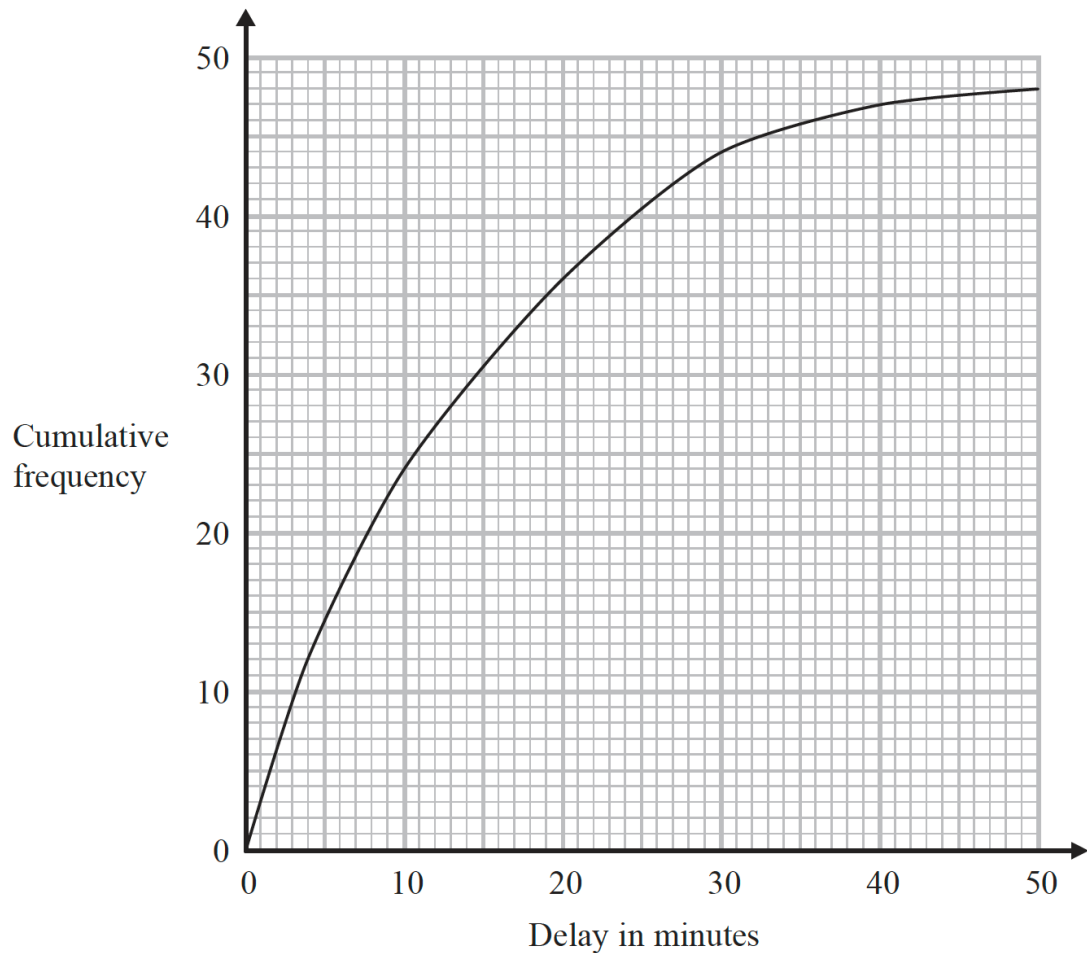
Use your graph to find an estimate for the number of runners who were awarded a silver medal.

..... runners

(2 marks)

17 (a) The times that 48 trains left a station on Monday were recorded.

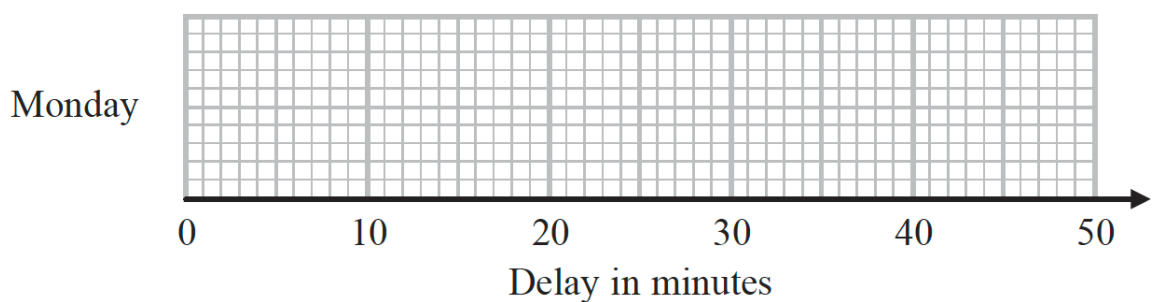
The cumulative frequency graph gives information about the numbers of minutes the trains were delayed, correct to the nearest minute.



The shortest delay was 0 minutes.

The longest delay was 42 minutes.

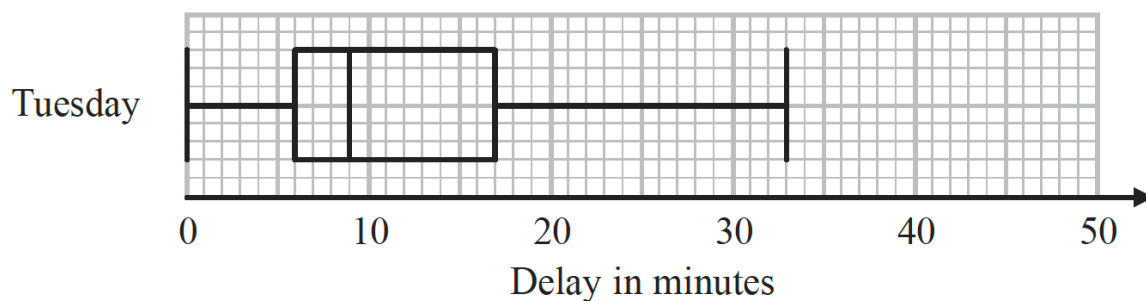
On the grid below, draw a box plot for the information about the delays on Monday.



(3 marks)

(b) 48 trains left the station on Tuesday.

The box plot below gives information about the delays on Tuesday.



Compare the distribution of the delays on Monday with the distribution of the delays on Tuesday.

.....

.....

(2 marks)

(c) Mary says,

"The longest delay on Tuesday was 33 minutes.

This means that there must be some delays of between 25 minutes and 30 minutes."

Is Mary right?

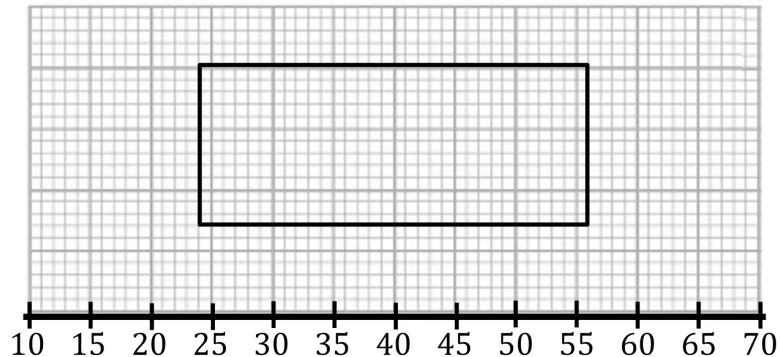
You must give a reason for your answer.

(1 mark)

18 (a) Mina recorded the number of toddlers in a park on each of 60 days.

The incomplete table and the incomplete box plot give information about her results.

	Number of Toddlers
Least number	12
Lower quartile	
Median	32
Upper quartile	
Range	48



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

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

(3 marks)

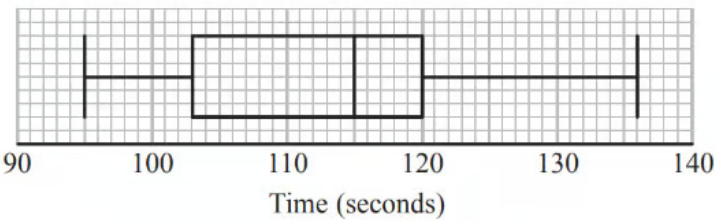
(b) On some of these 60 days Mina saw fewer than 24 toddlers at the park.

Work out an estimate for the number of days Mina saw fewer than 24 toddlers at the park.

(2 marks)

Hard Questions

- 1 Tom recorded the times, in seconds, some boys took to complete an obstacle course. He drew this box plot for his results.



Tom also recorded the times some girls took to complete the obstacle course.

Here are the times, in seconds, for the girls.

99	101	103	106	108	109	110	110	111	112
113	114	115	115	117	120	124	125	132	

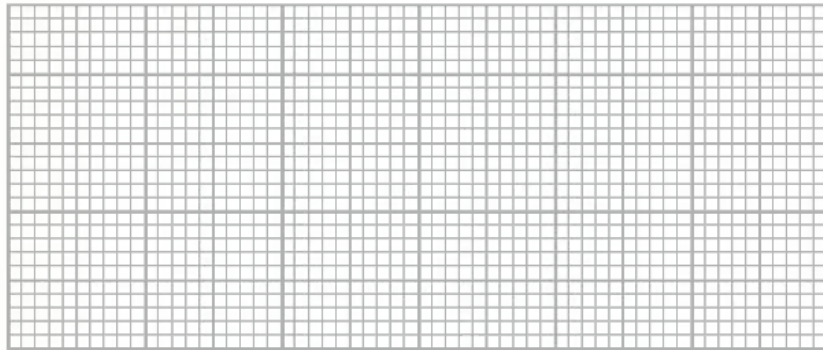
Compare the distribution of the times for the boys with the distribution of the times for the girls.

(4 marks)

- 2 (a) Ben played 15 games of basketball. Here are the points he scored in each game.

17	18	18	18	19	20	20	22	23	23	23	26	27	28	28
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Draw a box plot for this information.



(3 marks)

(b) Sam plays in the same 15 games of basketball.

The median number of points Sam scored is 23

The interquartile range of these points is 12

The range of these points is 20

Who is more consistent at scoring points, Sam or Ben?

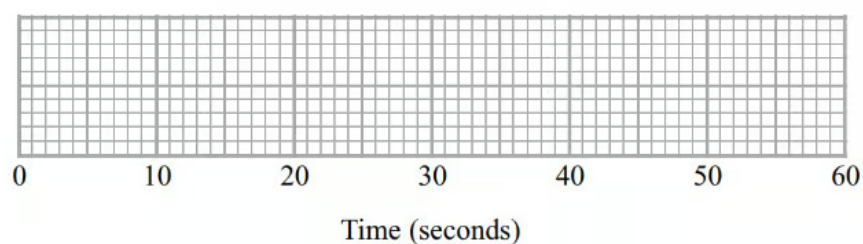
You must give a reason for your answer.

(2 marks)

- 3 (a)** Here are the times, in seconds, that 15 people waited to be served at Rose's garden centre.

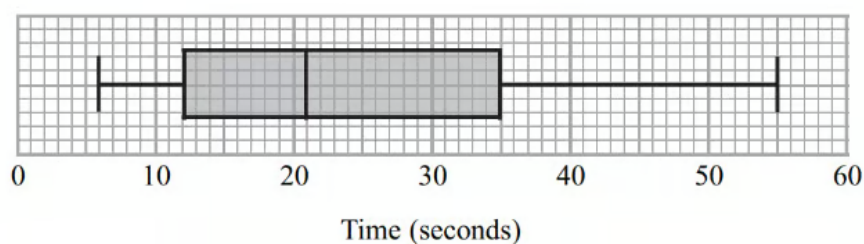
5	9	11	14	15	20	22	25	27	27	28	30	32	35	44
---	---	----	----	----	----	----	----	----	----	----	----	----	----	----

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



(3 marks)

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



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 marks)

4 (a) Harry grows tomatoes.

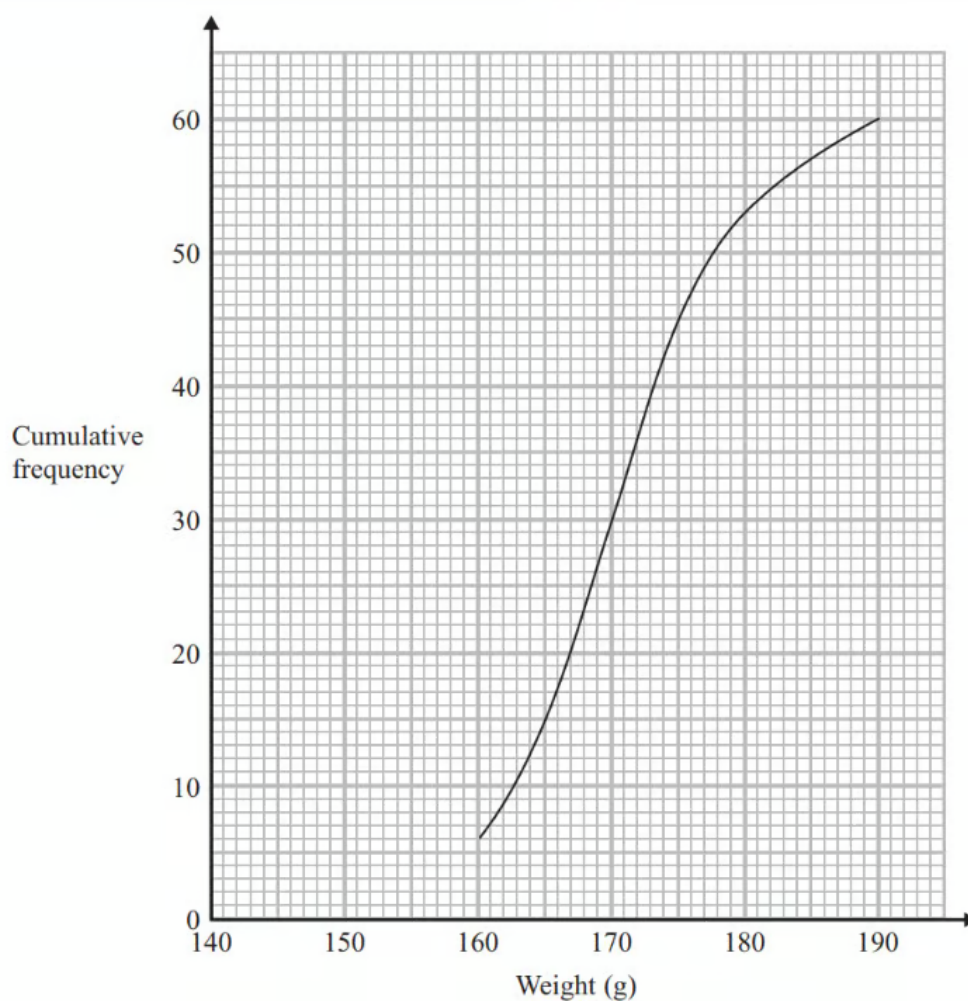
This year he put his tomato plants into two groups, group A and group B.

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.

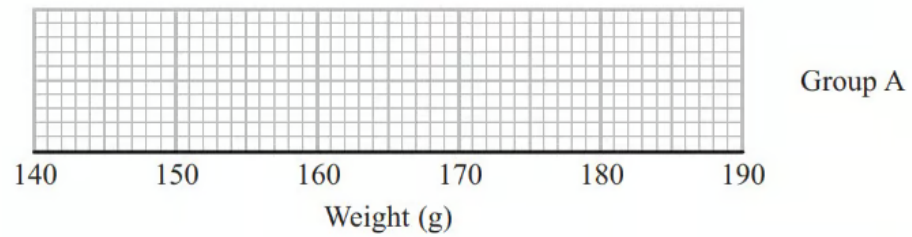


Use the graph to find an estimate for the median weight.

(1 mark)

- (b)** The 60 tomatoes from group A
had a minimum weight of 153 grams
and a maximum weight of 186 grams.

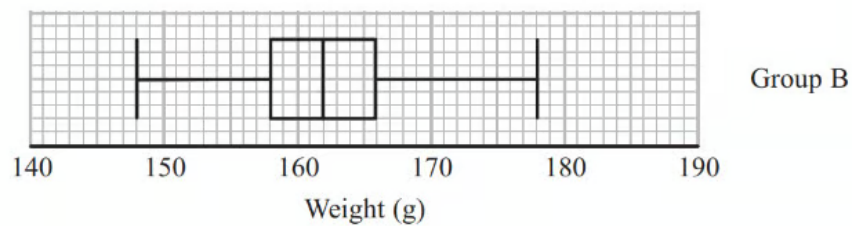
Use this information and the cumulative frequency graph to draw a box plot for the 60 tomatoes from group A.



(3 marks)

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

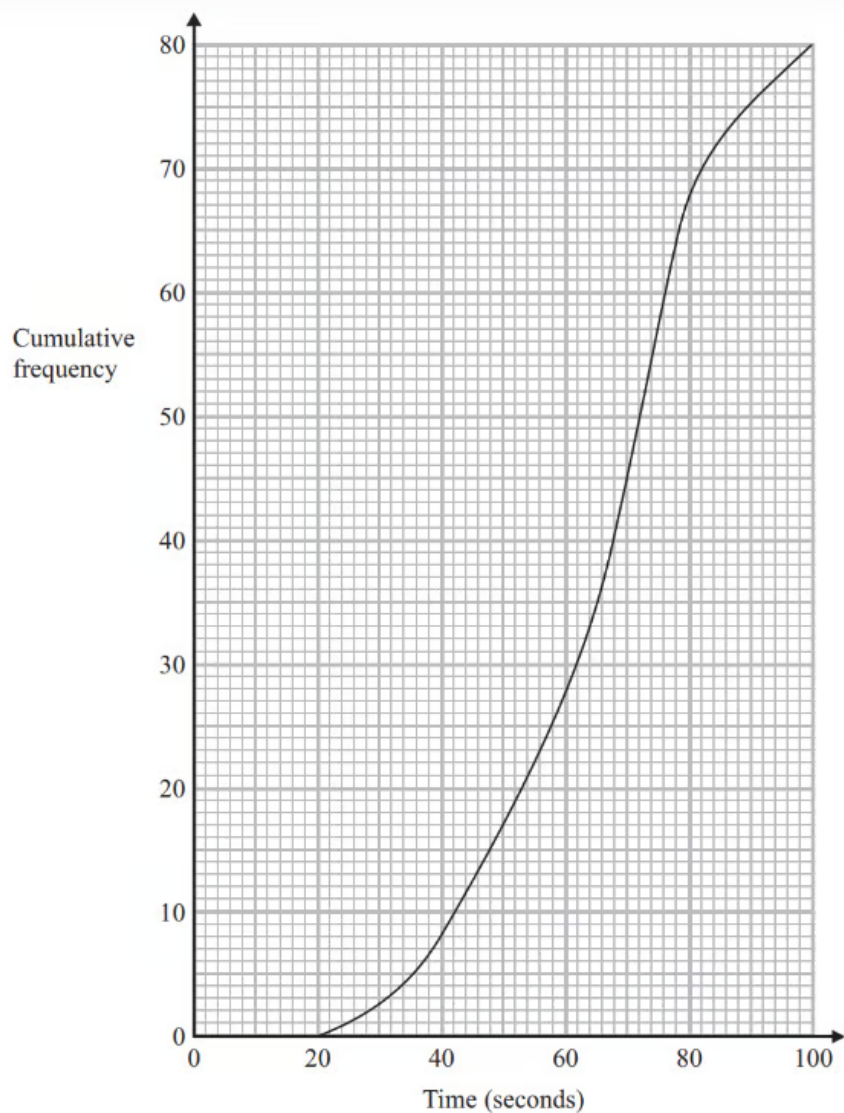
Harry weighed 60 tomatoes from group B.
He drew this box plot for his results.



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 marks)

- 5 (a)** The cumulative frequency graph shows information about the times 80 swimmers take to swim 50 metres.



Use the graph to find an estimate for the median time.

(1 mark)

- (b)** 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."

Is the team captain right?

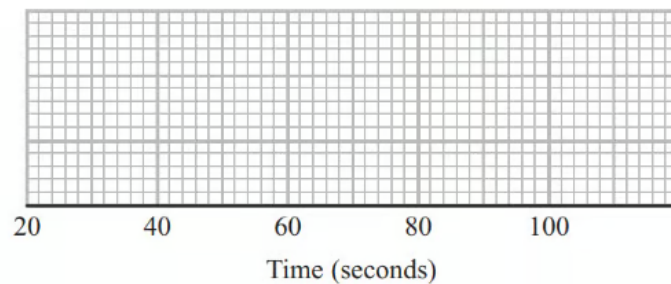
You must show how you got your answer.

(3 marks)

- (c)** For these 80 swimmers

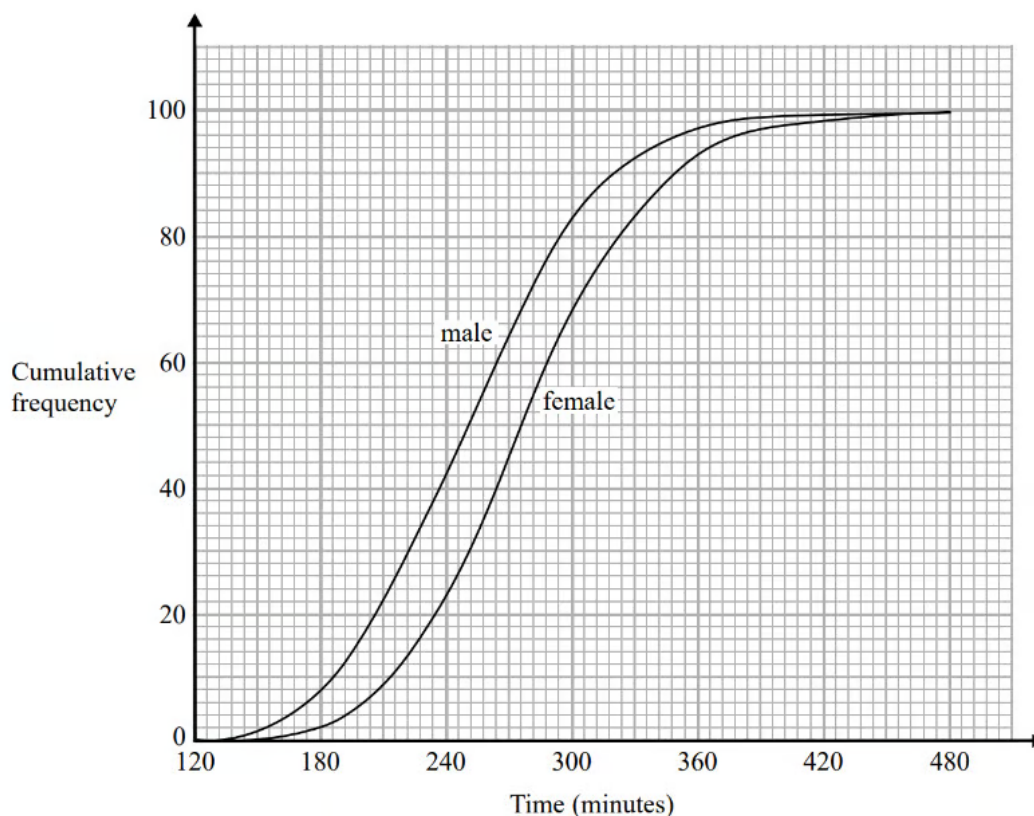
the least time taken was 28 seconds
and the greatest time taken was 96 seconds.

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



(3 marks)

- 6 (a)** The cumulative frequency graphs show information about the times taken by 100 male runners and by 100 female runners to finish the London marathon.



A male runner is chosen at random.

Find an estimate for the probability that this runner took less than 4 hours to finish the London marathon.

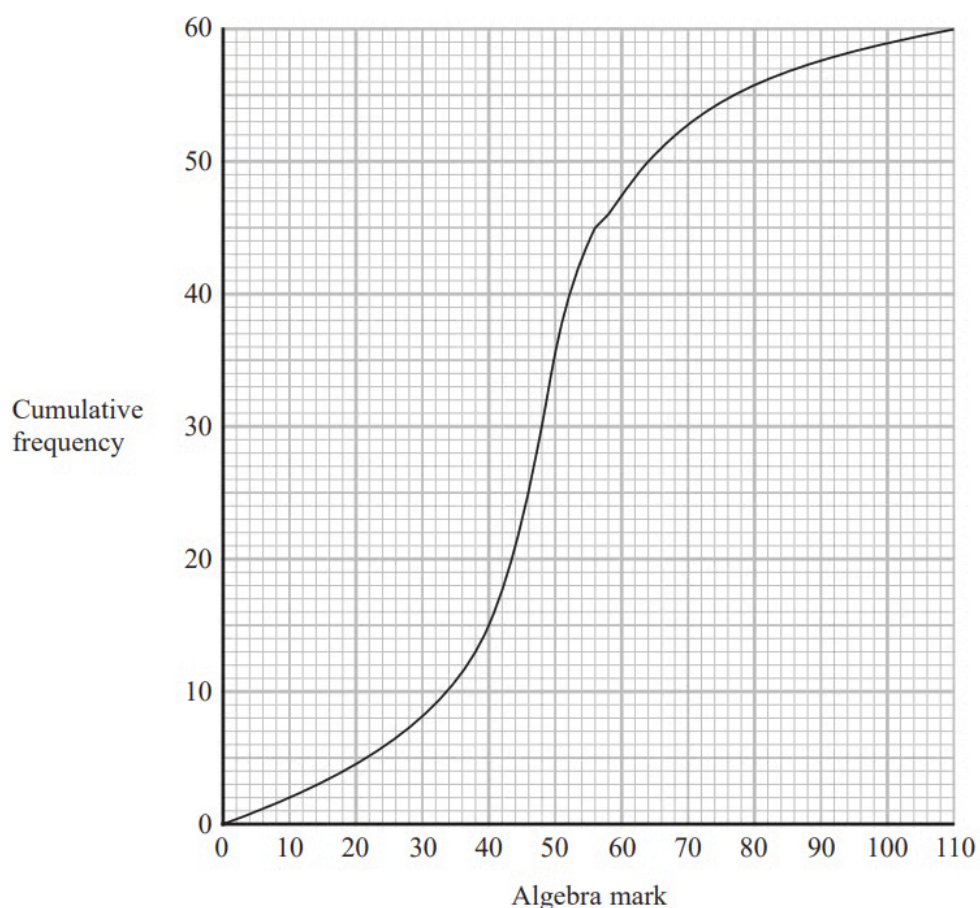
(2 marks)

- (b)** Use medians and interquartile ranges to compare the distribution of the times taken by the male runners with the distribution of the times taken by the female runners.

(4 marks)

- 7 A group of 60 students each sat an algebra test and a geometry test. Each test was marked out of 110

The cumulative frequency graph gives information about the marks gained by the 60 students in the algebra test.



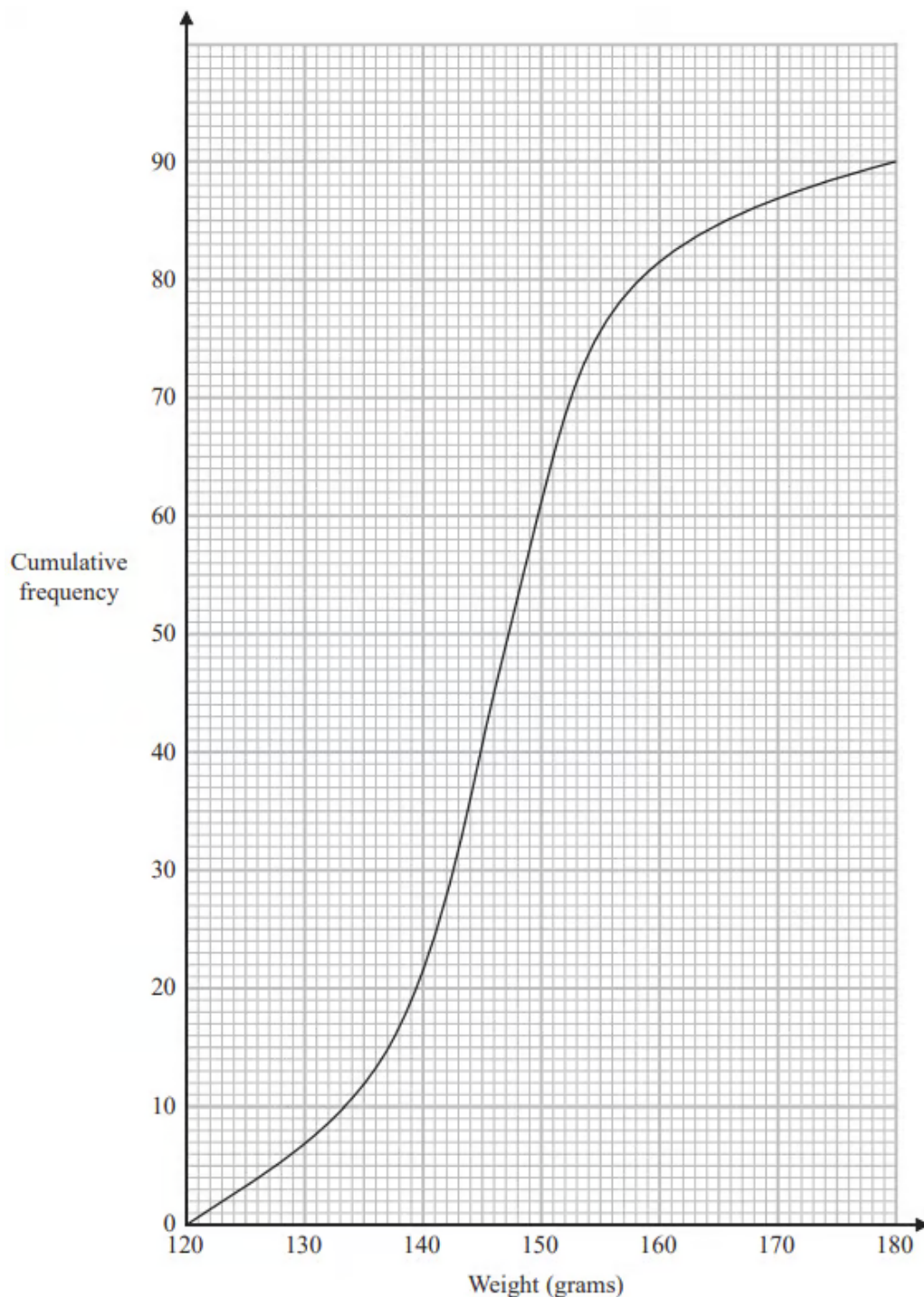
To be awarded a grade A in the algebra test, a student had to gain a mark greater than 64

Two students are to be selected at random from the 60 students in the group.

Use the graph to find an estimate for the probability that both of these students were awarded a grade A in the algebra test.

(3 marks)

- 8 The cumulative frequency graph gives information about the weights, in grams, of 90 bags of sweets.



Roberto sells the bags of sweets to raise money for charity.

Bags with a weight greater than grams are labelled large bags and sold for 3.75 euros

each bag.

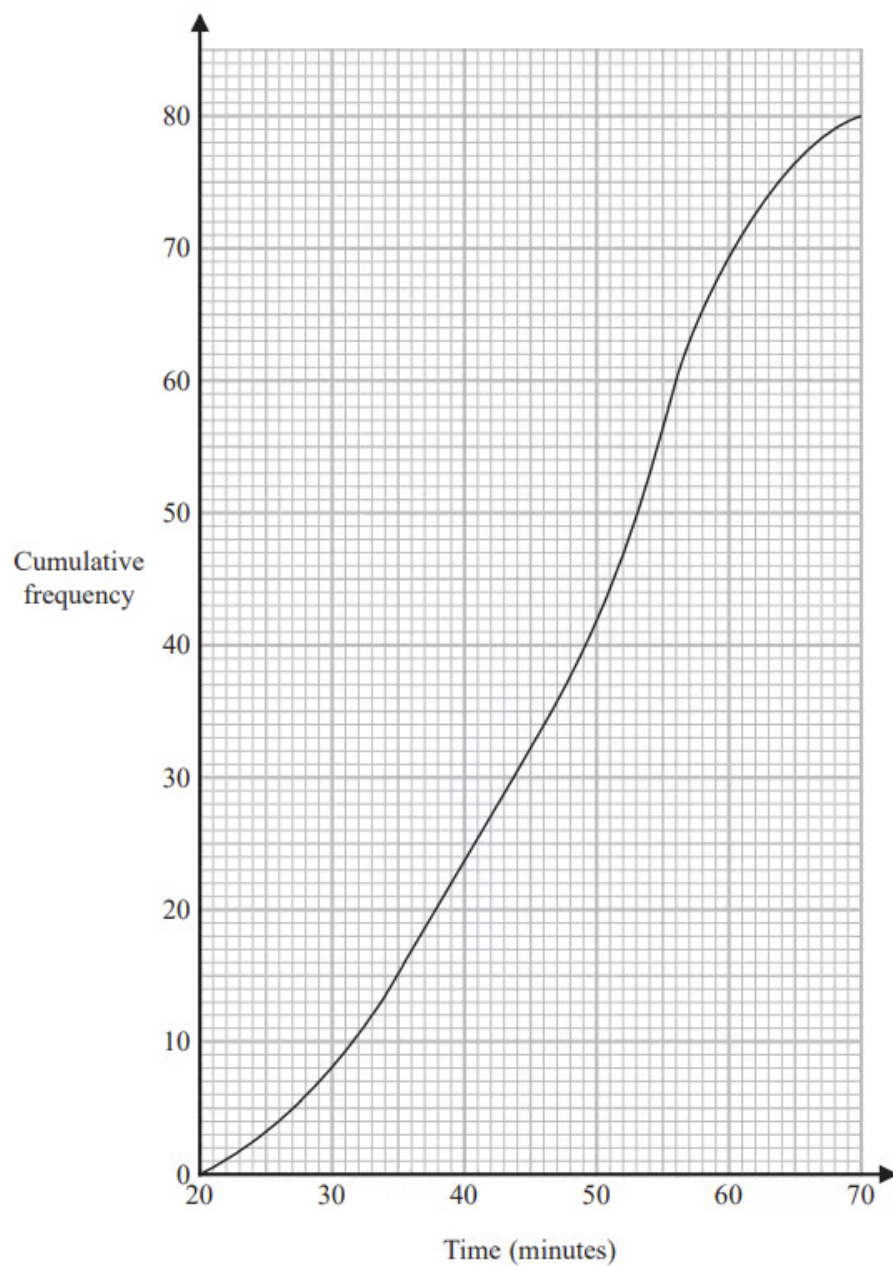
The total amount of money he receives by selling all the large bags is 93.75 euros.

Find the value of d .

(3 marks)

- 9** A total of 80 national and international runners took part in a race.
The cumulative frequency graph gives information about the times, in minutes, they took

for the race.

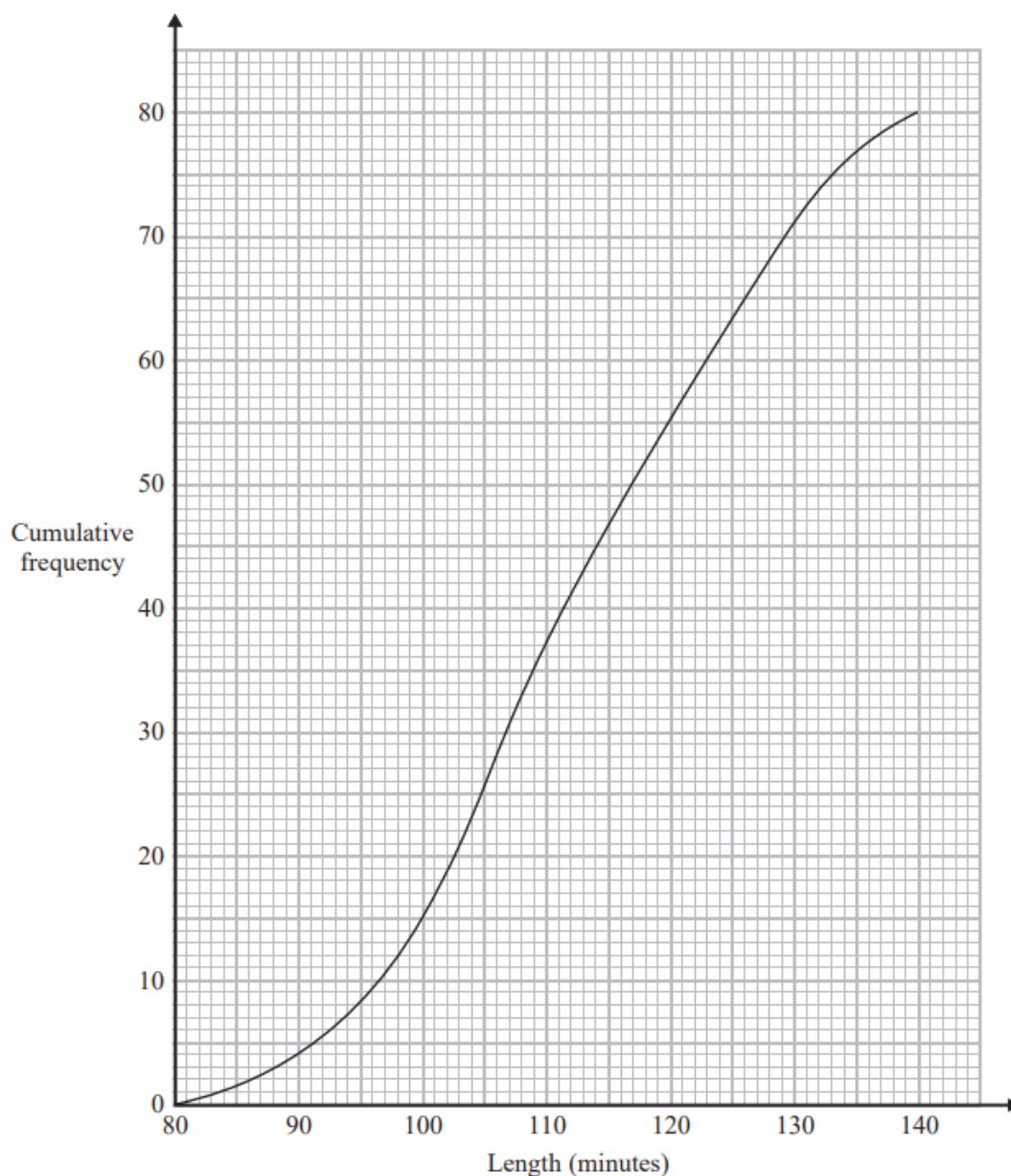


60% of the national runners took 50 minutes or less for the race. No international runner took 50 minutes or less for the race.

Work out an estimate for the number of national runners who took part in the race.

(3 marks)

- 10 The cumulative frequency graph shows information about the length, in minutes, of each of 80 films.



Clare says,

"More than 35% of these films are over 120 minutes long."

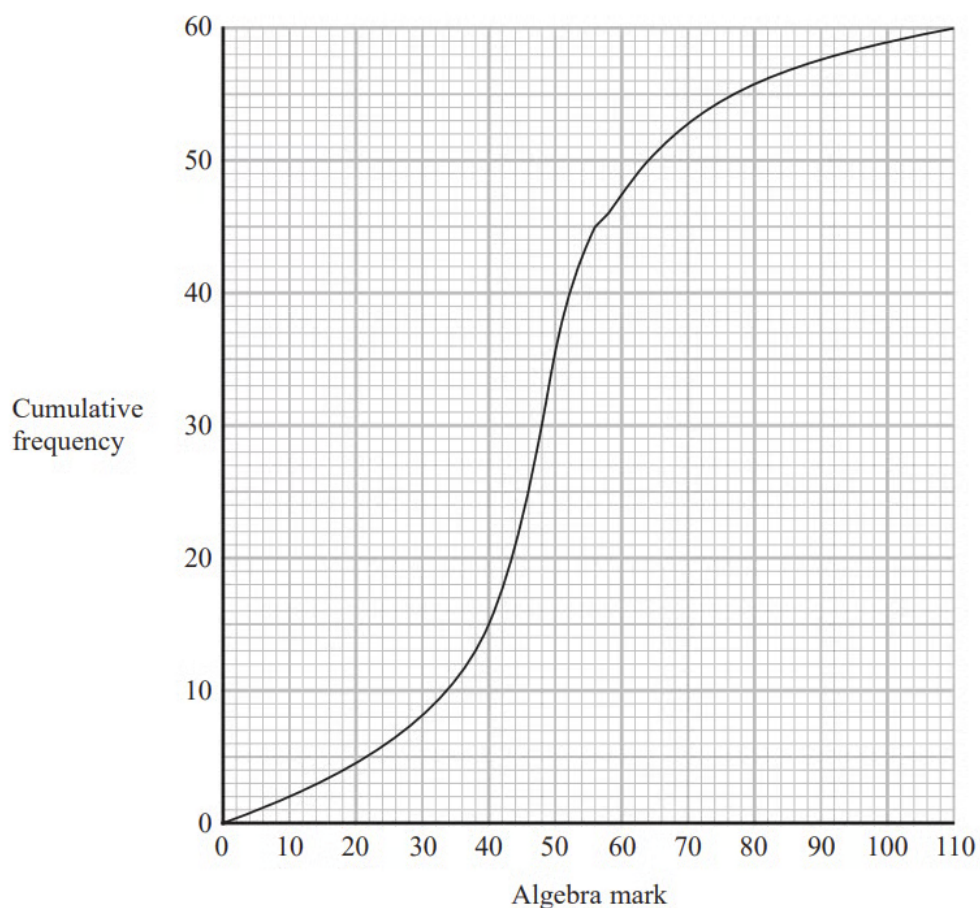
Is Clare correct?

Give a reason for your answer.

(3 marks)

- 11 (a)** A group of 60 students each sat an algebra test and a geometry test.
Each test was marked out of 110.

The cumulative frequency graph gives information about the marks gained by the 60 students in the algebra test.



Use the graph to find an estimate for the median mark in the algebra test.

(1 mark)

- (b)** Use the graph to find an estimate for the number of students who gained 58 marks or less in the algebra test.

(1 mark)

- (c) Use the graph to find an estimate for the interquartile range of the marks gained in the algebra test.

(2 marks)

- (d) The interquartile range of the marks gained in the geometry test is 9.

Luis says

"The students' marks are more spread out in the algebra test than in the geometry test."

Is Luis correct?

Give a reason for your answer.

(1 mark)

- (e) To be awarded a grade A in the algebra test, a student had to gain a mark greater than 64.

Two students are to be selected at random from the 60 students in the group.

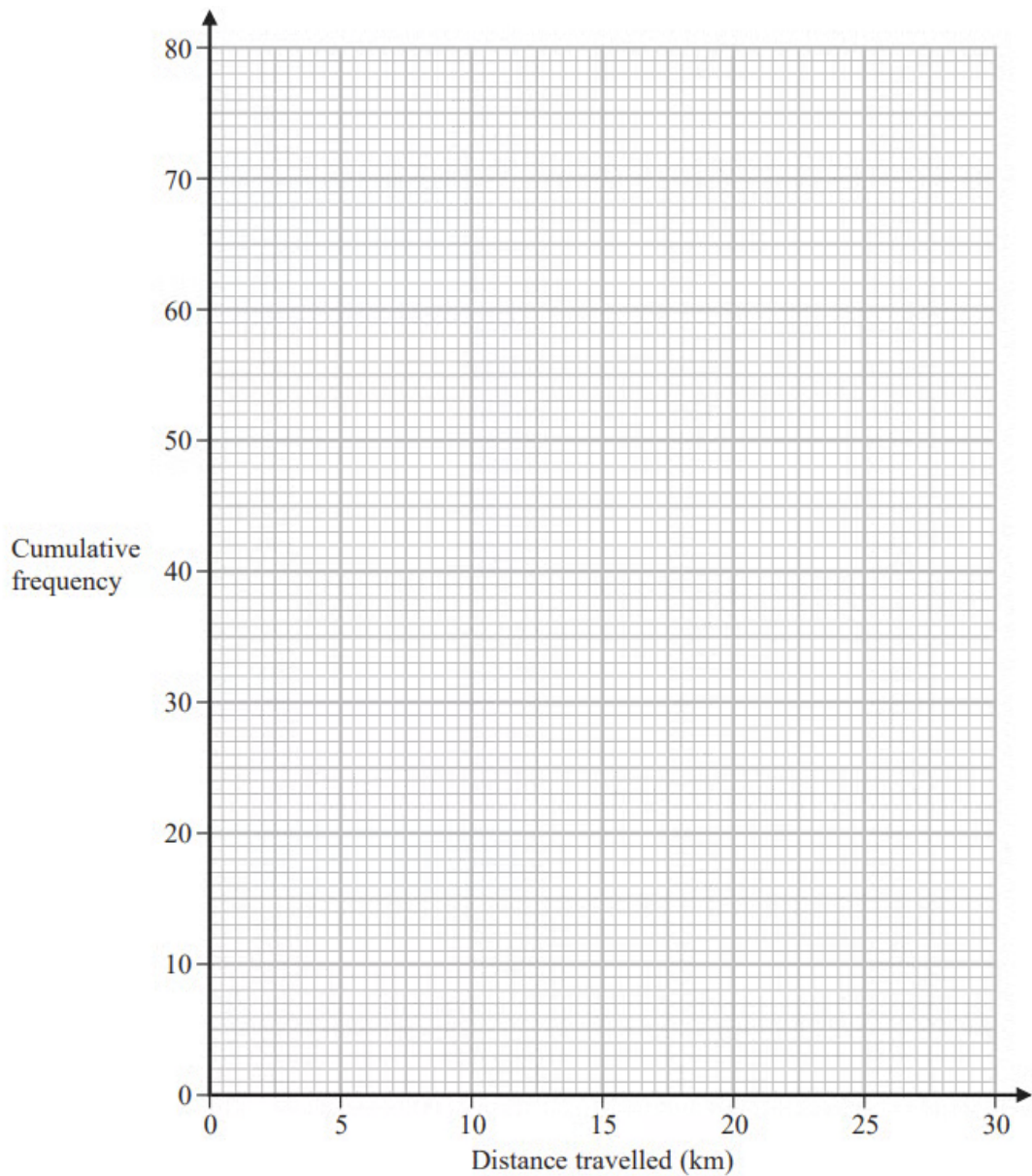
Use the graph to find an estimate for the probability that both of these students were awarded a grade A in the algebra test.

(3 marks)

- 12 (a)** The cumulative frequency table gives information about the distance, in kilometres, that each of 80 workers travel from home to work at Office *A*.

Distance travelled (d km)	Cumulative frequency
$0 < d \leq 5$	17
$0 < d \leq 10$	32
$0 < d \leq 15$	57
$0 < d \leq 20$	70
$0 < d \leq 25$	76
$0 < d \leq 30$	80

On the grid below, draw a cumulative frequency graph for the information in the table.



(2 marks)

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

..... km

(1 mark)

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

..... km

(2 marks)

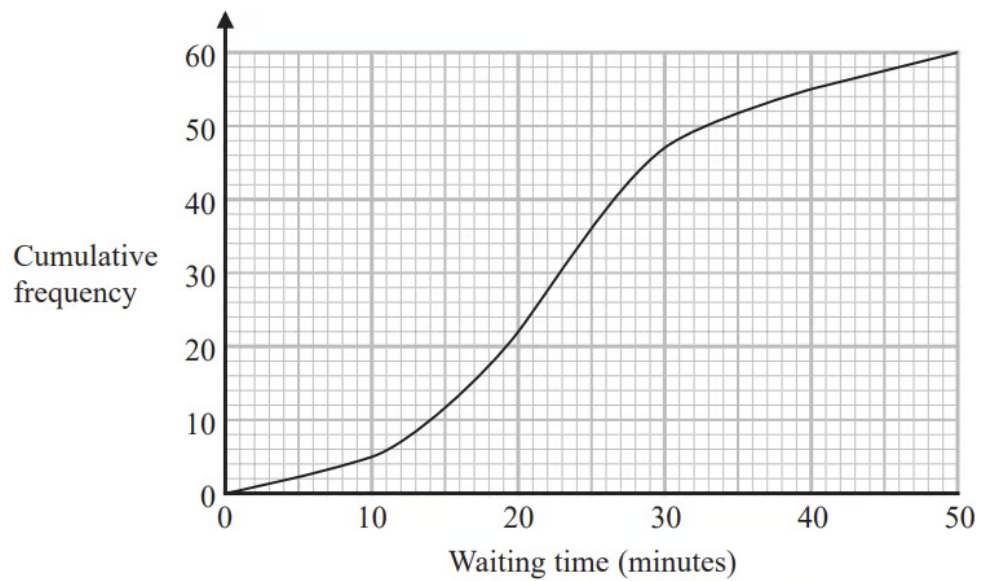
(d) For Office *B*, the median distance workers travel from home to work is 15 km and the interquartile range is 5 km.

Use the information above to compare the distances that workers at Office *A* and workers at Office *B* travel from home to work.

Write down **two** comparisons.

(2 marks)

- 13 (a)** The cumulative frequency graph gives information about the waiting times, in minutes, of people with appointments at Hospital A.



Use the graph to find an estimate of the median waiting time at Hospital A.

.....minutes
(1 mark)

- (b)** Use the graph to find an estimate of the interquartile range of the waiting times at Hospital A.

..... minutes

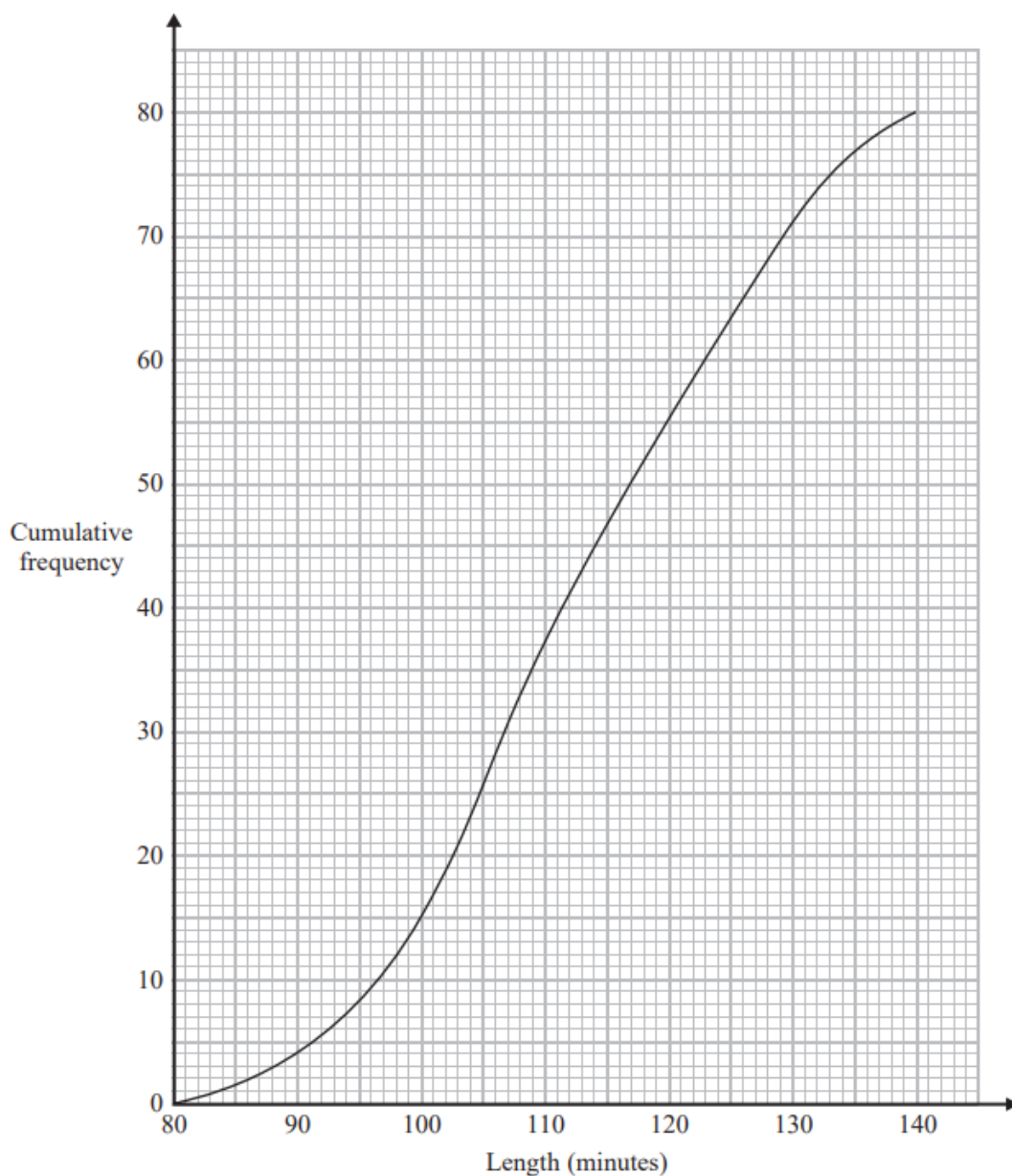
(2 marks)

- (c)** At a different hospital, Hospital B, the median waiting time is 28 minutes and the interquartile range of the waiting times is 19 minutes.

Compare the waiting times at Hospital A with the waiting times at Hospital B.

(2 marks)

- 14 (a)** The cumulative frequency graph shows information about the length, in minutes, of each of 80 films.



Use the graph to find an estimate for the interquartile range.

..... minutes

(2 marks)

(b) Clare says,

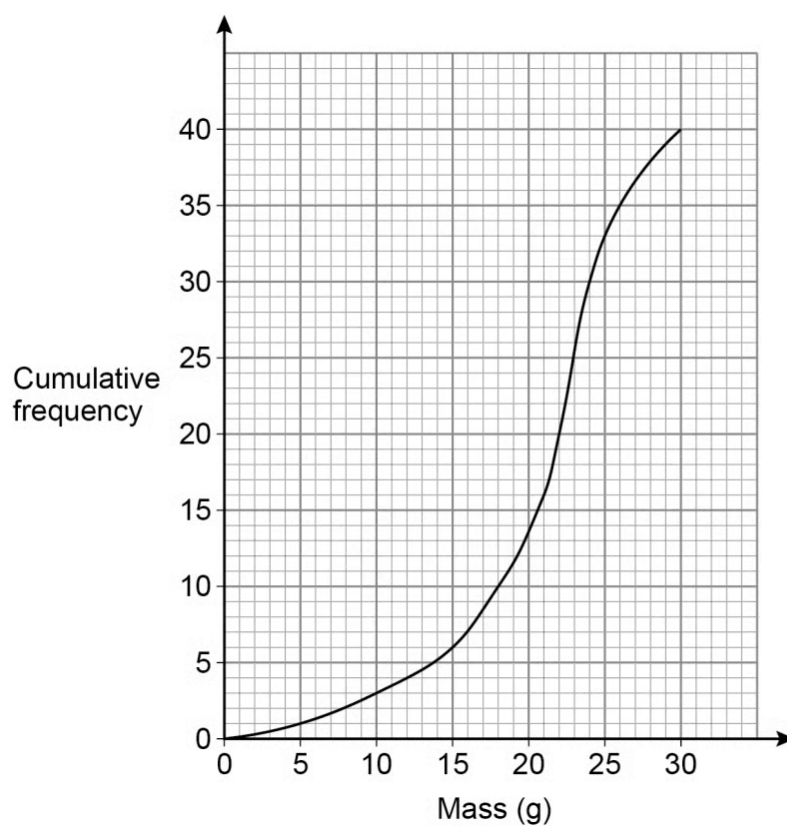
"More than 35% of these films are over 120 minutes long."

Is Clare correct?

Give a reason for your answer.

(3 marks)

15 (a) The cumulative frequency graph represents the masses of 40 necklaces.



A jeweller buys every necklace with mass **greater than** 21 grams.

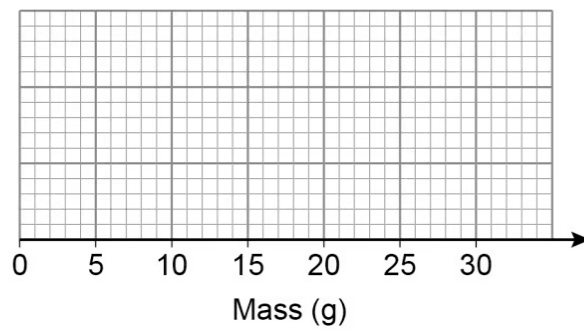
Use the graph to estimate how many she buys.

(2 marks)

(b) The lowest mass was 3 grams.

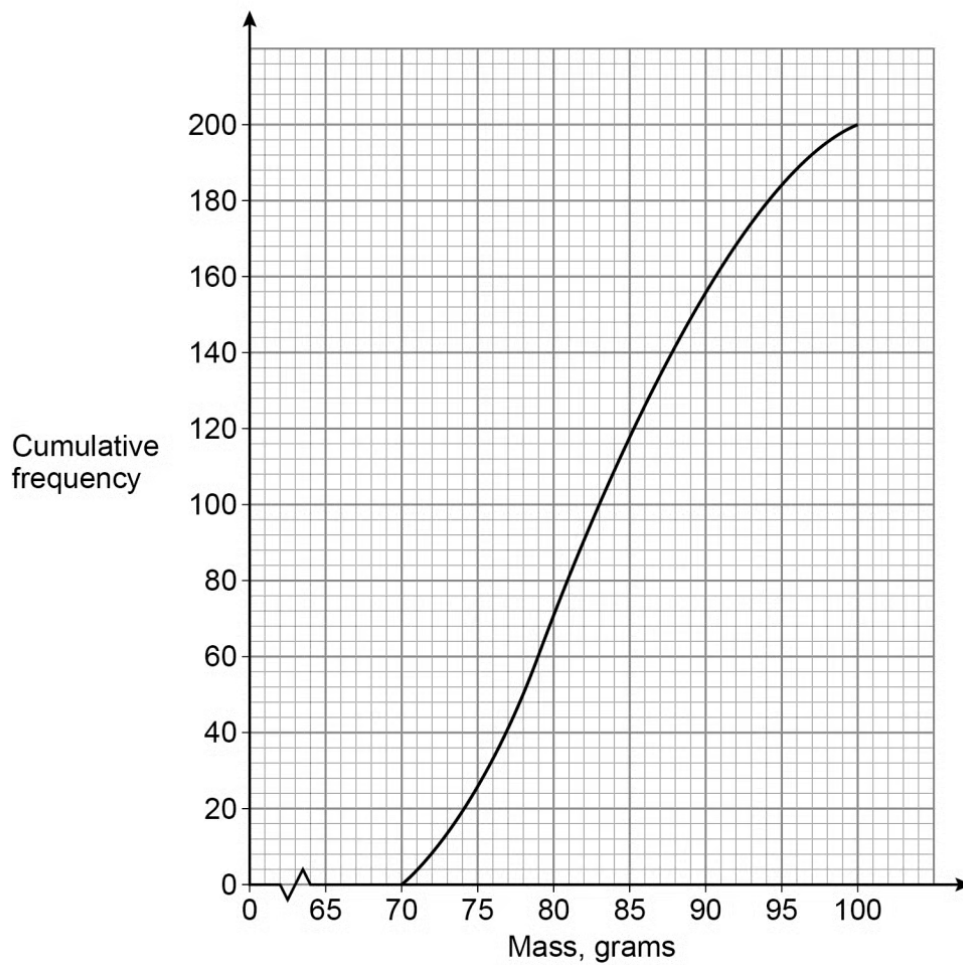
The highest mass was 28 grams.

Draw a box plot to represent the data.



(3 marks)

16 (a) The cumulative frequency graph shows information about the masses of 200 apples.



Estimate the median mass.

.....grams

(1 mark)

(b) Apples with mass 90 grams or less cost 32p each.

Apples with mass more than 90 grams cost 39p each.

Estimate the **total** cost of the 200 apples.

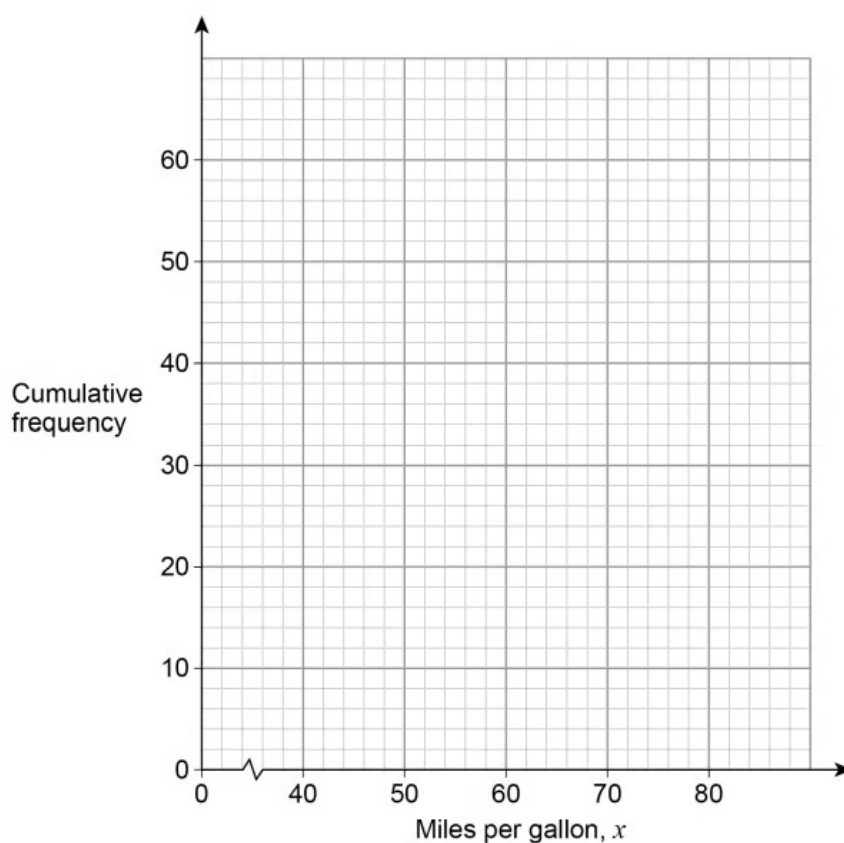
£.....

(3 marks)

17 (a) Here is some information about the miles per gallon of 60 cars.

Miles per gallon, x	Frequency
$40 < x \leq 50$	6
$50 < x \leq 60$	16
$60 < x \leq 70$	28
$70 < x \leq 80$	10

Draw a cumulative frequency graph.



(3 marks)

(b) Use the graph to work out the interquartile range.

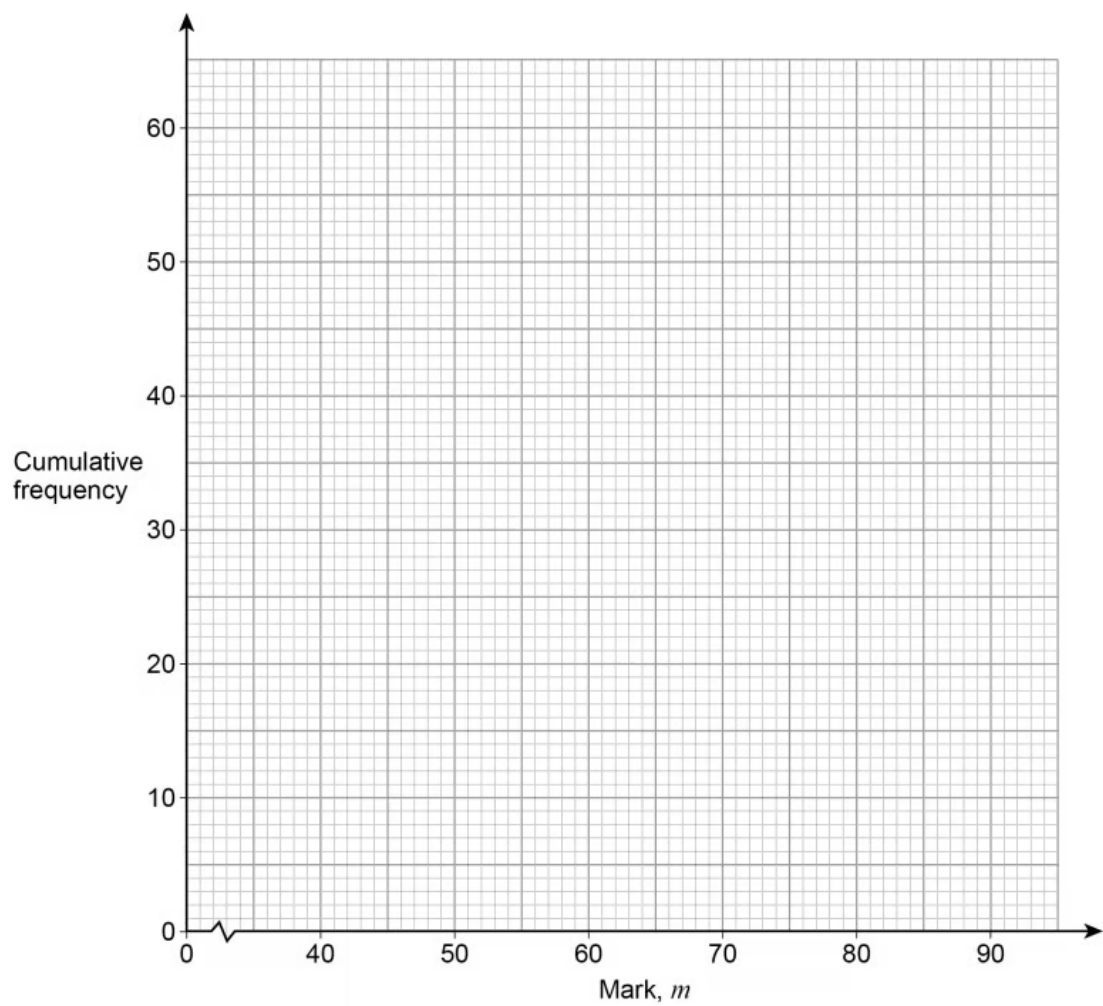
.....miles per gallon

(2 marks)

18 (a) Here is some information about the marks of 60 students in a test.

Mark,	Frequency
$40 < m < 50$	9
$50 < m \leq 60$	16
$60 < m \leq 70$	20
$70 < m \leq 80$	8
$80 < m \leq 90$	7

On the grid, draw a cumulative frequency graph.

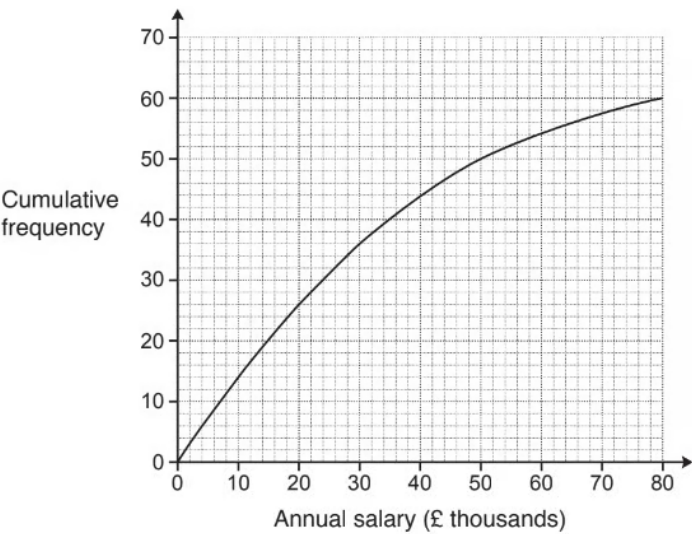


(3 marks)

(b) Use your graph to estimate the lowest mark of the top 20% of students.

(2 marks)

- 19 (a)** The cumulative frequency graph summarises the annual salary, p (£ thousands), of the 60 workers in a factory.



Use the graph to estimate the median annual salary.

£ thousands

(1 mark)

- (b)** Complete this cumulative frequency table.

Annual salary, p (£ thousands)	Cumulative frequency
$p \leq 10$	
$p \leq 20$	
$p \leq 30$	
$p \leq 50$	
$p \leq 80$	

(2 marks)

- (c)** Use the information in the cumulative frequency table to calculate an estimate of the mean annual salary.

£ thousands

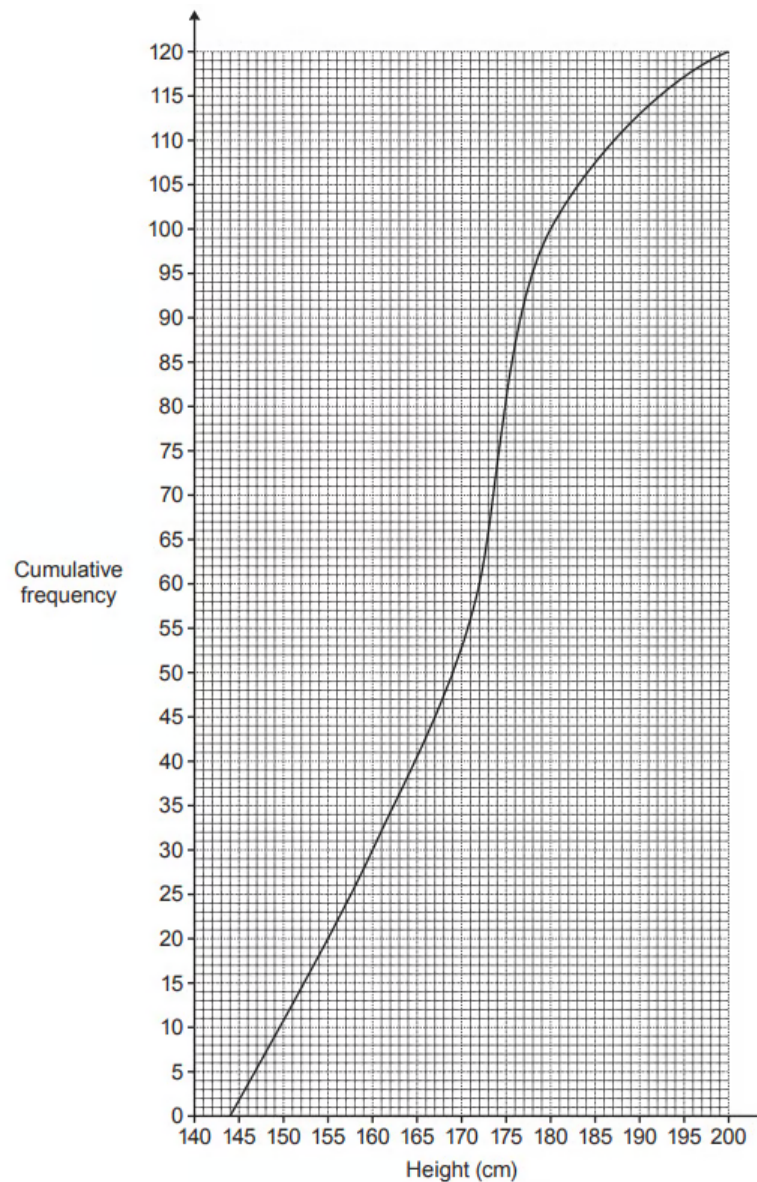
(5 marks)

- (d)** Explain why your estimate of the median is more reliable than your estimate of the mean.

(1 mark)

- 20** The cumulative frequency graph shows the distribution of the heights of members of a

rowing club.

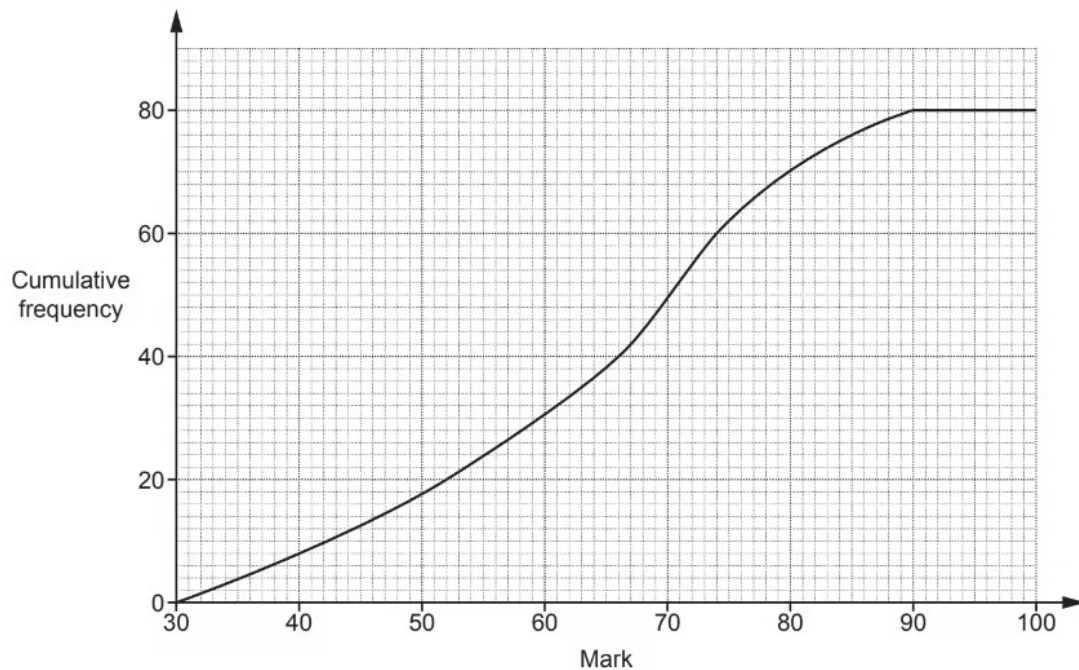


Calculate the percentage of the members who are at least 180 cm tall.

(3 marks)

21 The cumulative frequency graph shows information about the marks scored by a group

of 80 students in a test.

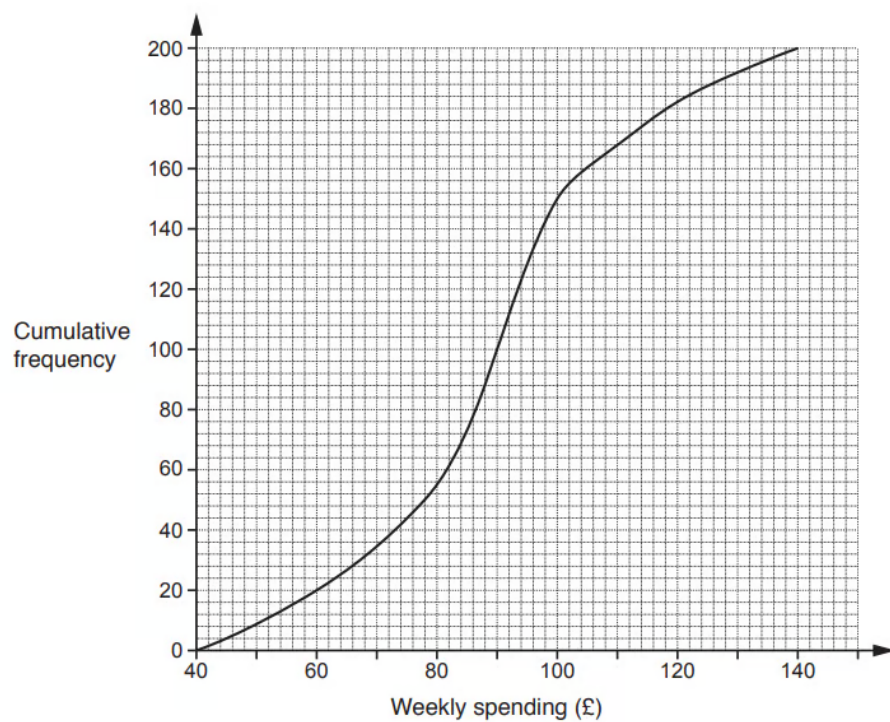


The ratio of the number of students passing the test compared to failing the test is 4 : 1.
Find the minimum mark needed to pass the test.

(3 marks)

- 22 (a)** Iqrah carries out a survey of 200 families in the **north** of England on their weekly spending on food.

The cumulative frequency diagram summarises the results.



Find

i) the median,

£ [1]

ii) the interquartile range.

£ [2]

(3 marks)

(b) Iqrah says

15% of these families spent over £120.

Is her statement correct?

State the evidence you have used in making your decision.

(2 marks)

(c) In a survey of 200 families in the **south** of England, the median weekly amount spent on food was £84 and the interquartile range was £28.

Make two comparisons between the weekly amounts spent on food in the north of England and the south of England.

State the evidence you have used in making your comparisons.

1 [2]

2 [2]

(4 marks)