S127 Cumulative frequency and box plots

Q1.

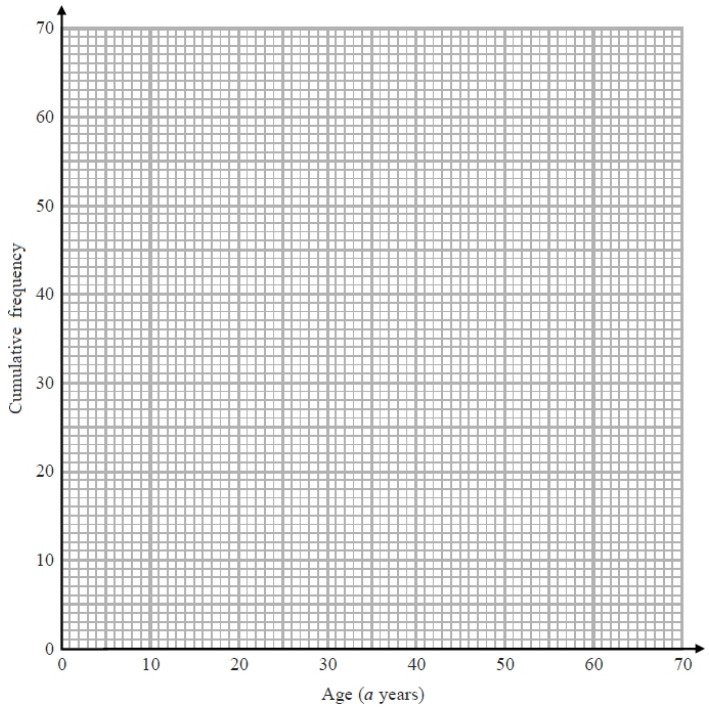
Francesco carried out a survey about the ages of the people in his office.

The table shows information about his results.

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

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

(2)



(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.

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(3)

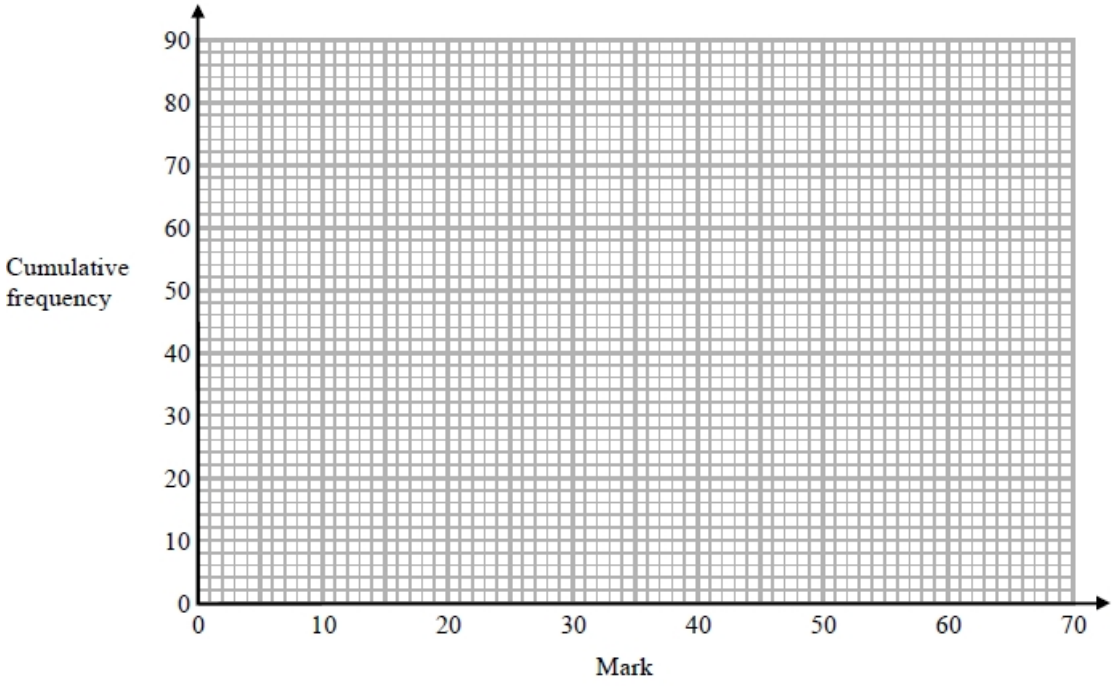
(Total for question = 6 marks)

Q2.

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

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

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



(2)

(b) Find the median mark.

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(1)

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.

(c) Find an estimate for the lowest possible pass mark.

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(3)

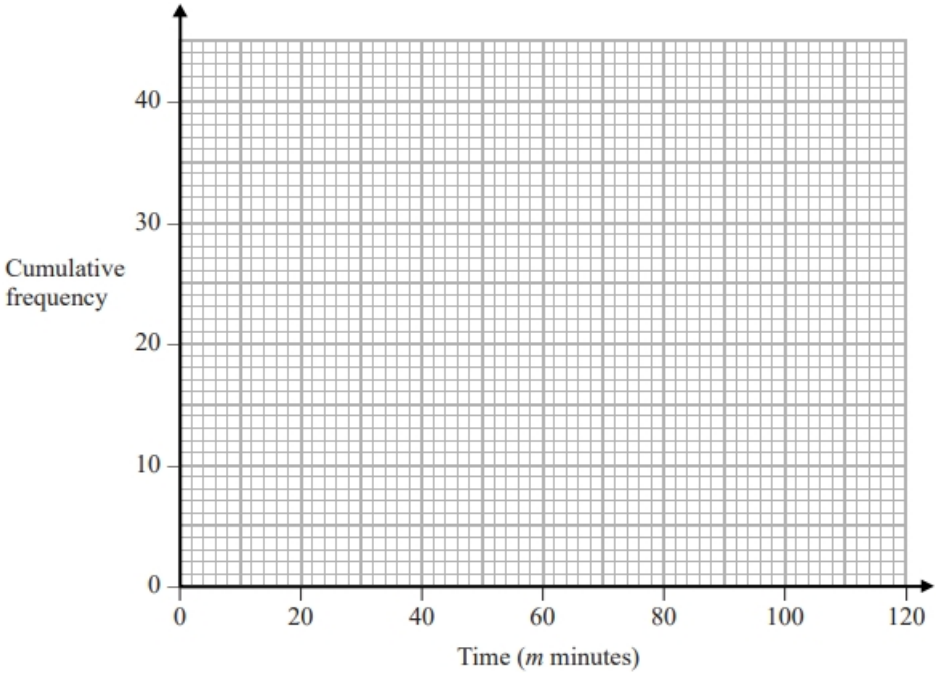
(Total for question = 6 marks)

Q3.

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

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

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



(2)

(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.

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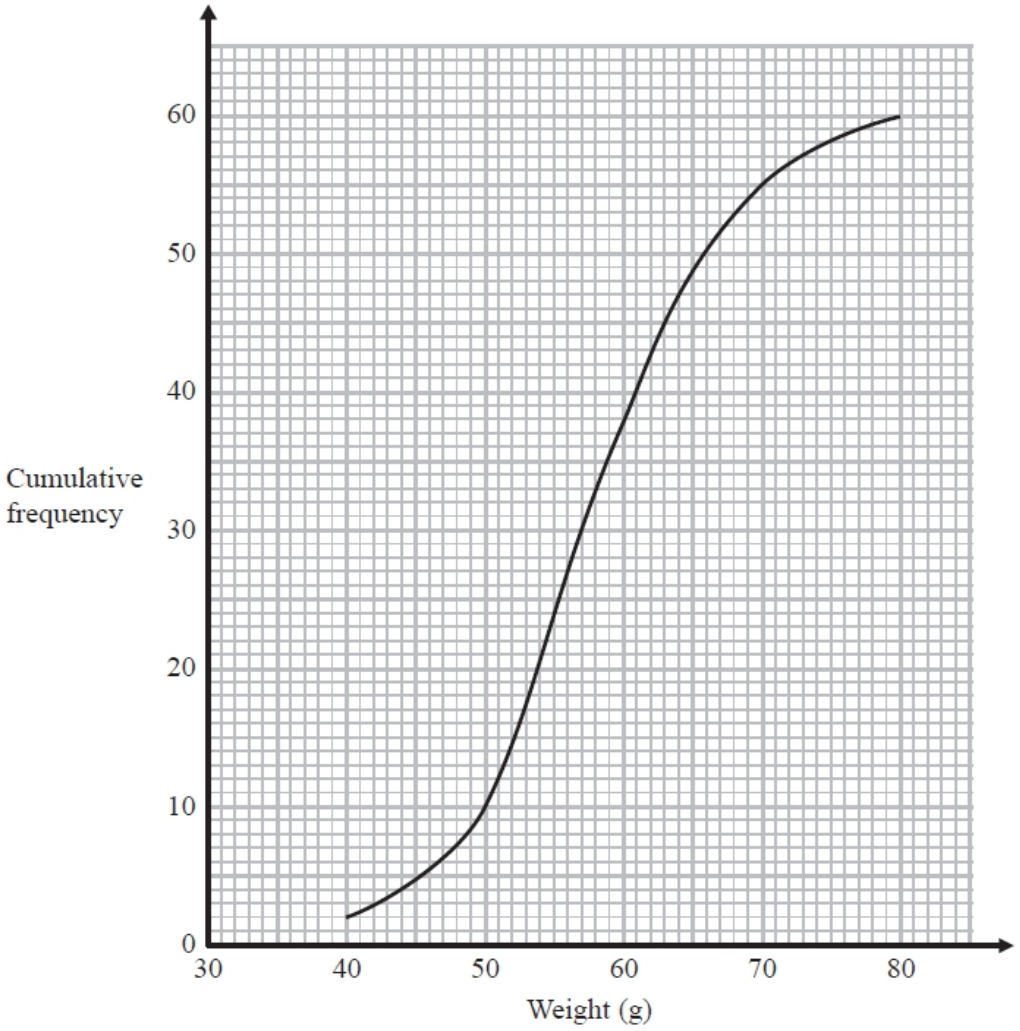
(2)

(Total for question = 6 marks)

Q4.

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.

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(1)

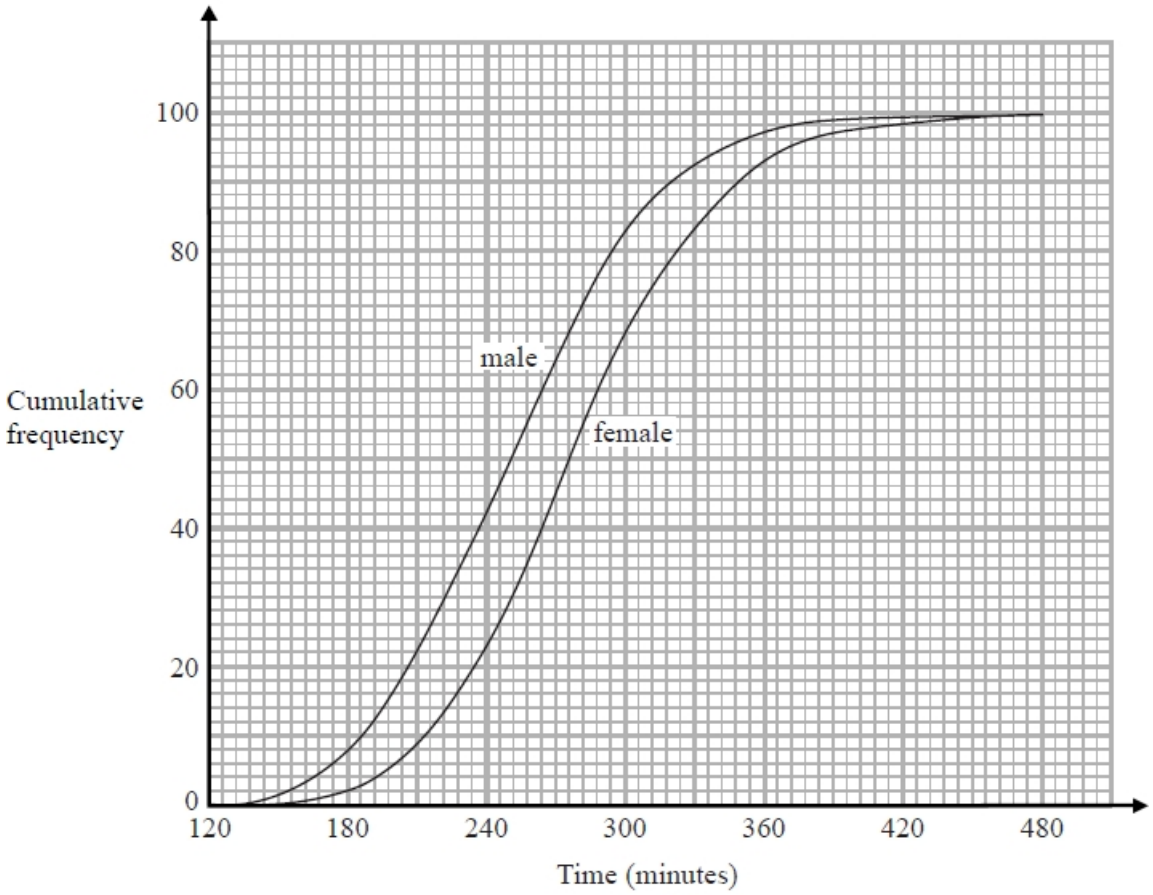
(c) Show that less than 25% of the potatoes have a weight greater than 65 g.

(2)

(Total for question = 4 marks)

Q5.

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.

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

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(2)

(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.

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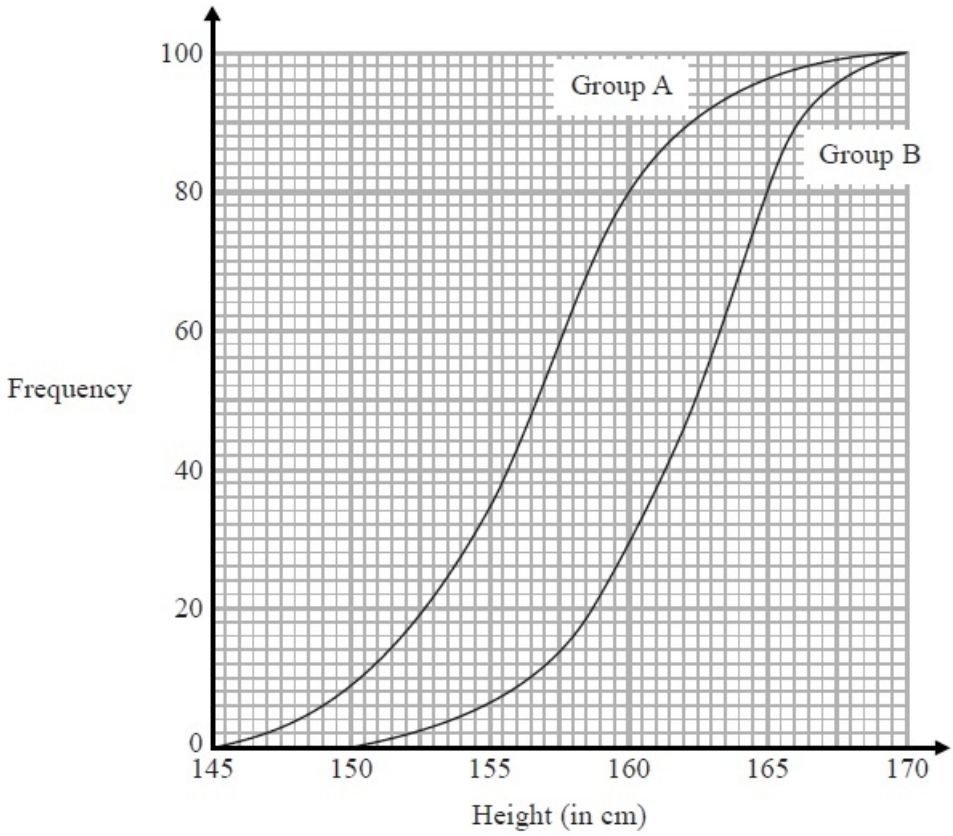
(4)

(Total for question = 6 marks)

Q6.

The cumulative frequency graphs give information about the heights of two groups of children, group A and group B.



Compare the heights of the children in group A and the heights of the children in group B.

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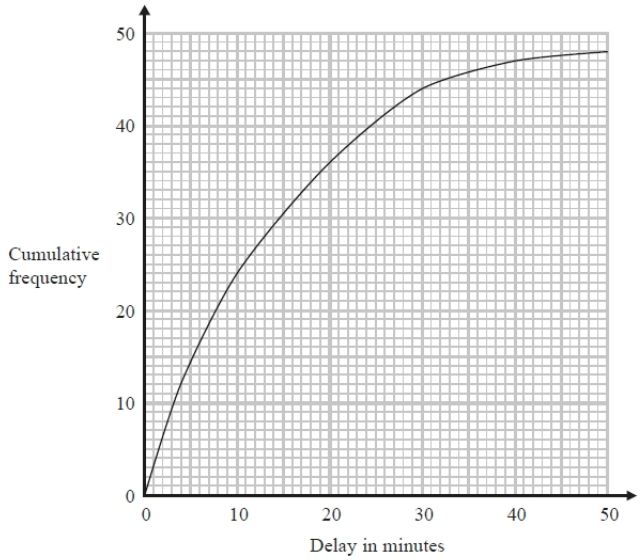
(Total for Question is 2 marks)

Q7.

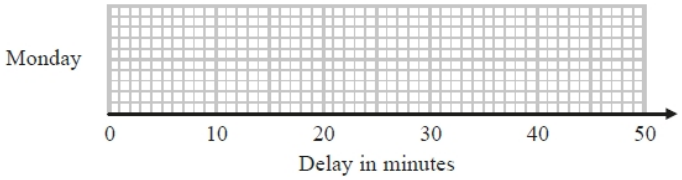
The times that 48 trains left a station on Monday were recorded.

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



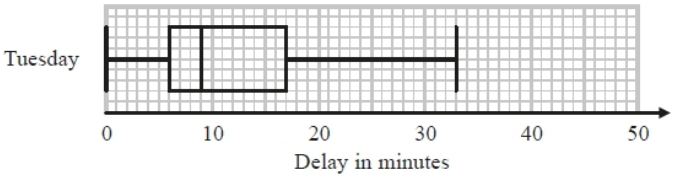
The shortest delay was 0 minutes. The longest delay was 42 minutes.

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



(3)

48 trains left the station on Tuesday.
The box plot below gives information about the delays on Tuesday.



(b) Compare the distribution of the delays on Monday with Tuesday.

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(2)

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."

(c) Is Mary right? You must give a reason for your answer.

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(1)

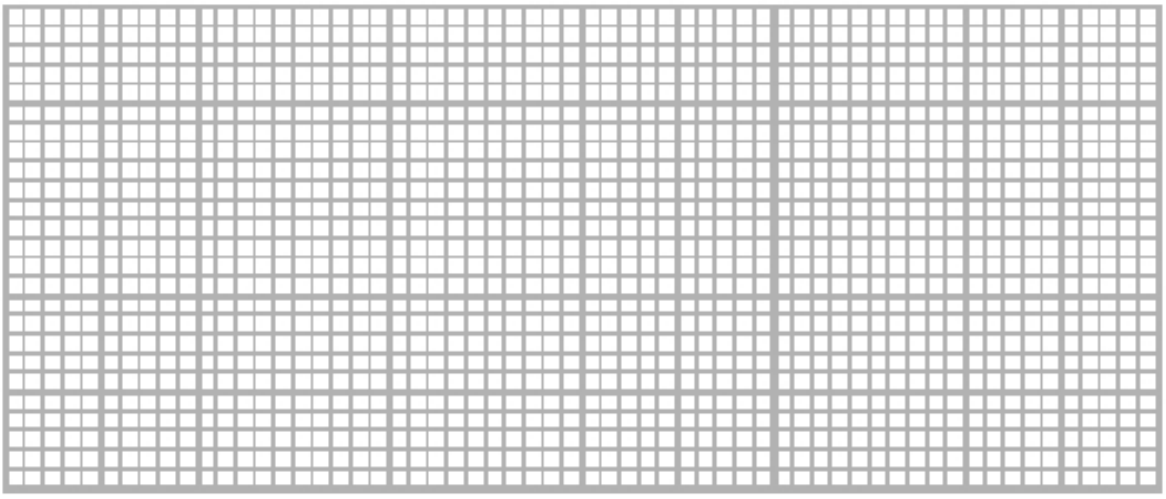
(Total for question = 6 marks)

Q8.

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

(a) Draw a box plot for this information.



(3)

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

(b) Who is more consistent at scoring points, Sam or Ben?
You must give a reason for your answer.

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(2)

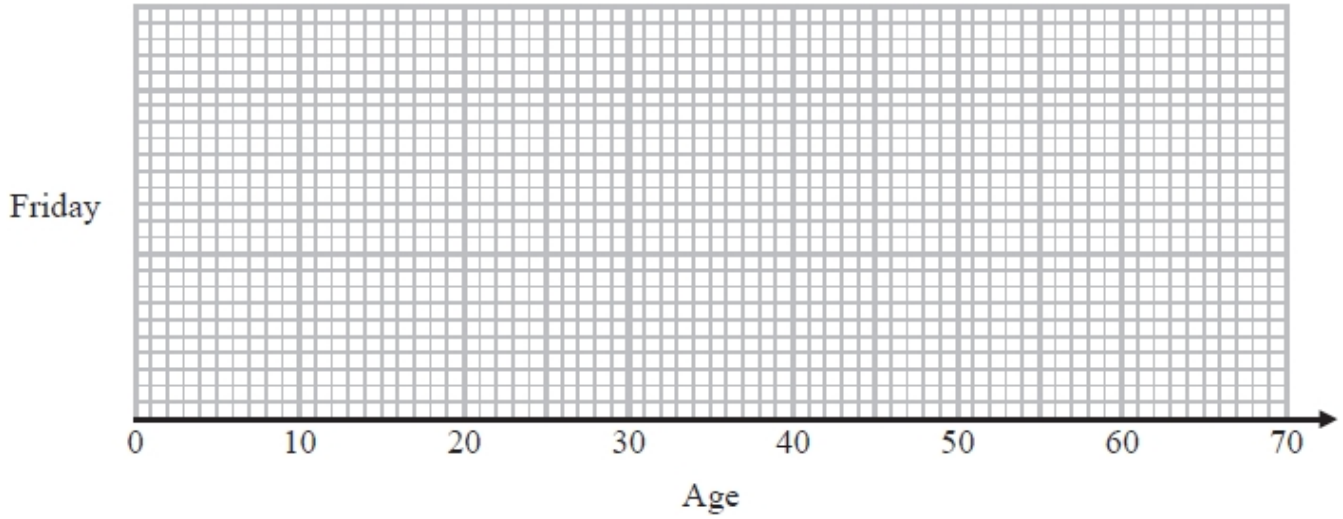
(Total for question = 5 marks)

Q9.

Here are the ages of 15 people at a party on Friday.

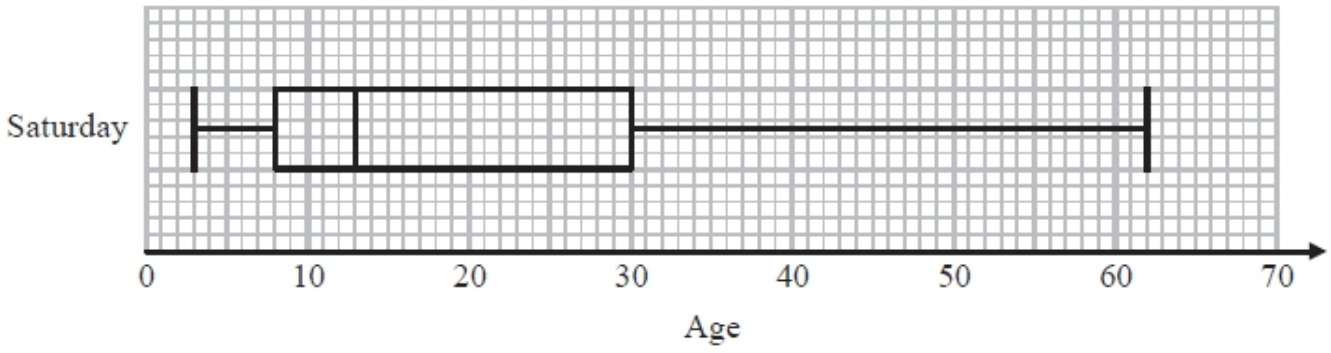
16 16 17 18 19 21 23 27 34 34 35 36 47 54 57

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



(3)

This box plot shows information about the ages of people at a party on Saturday.



*(b) Compare the distribution of the ages of the people at the party on Saturday with the distribution of the ages of the people at the party on Friday.

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(2)

(Total for question = 5 marks)

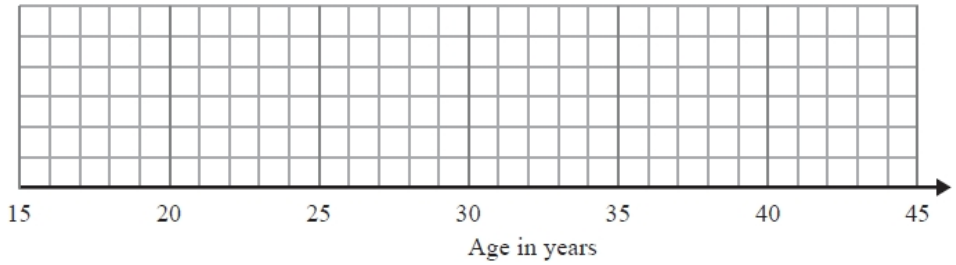
Q10.

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?

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(2)

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

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

Anne drew this cumulative frequency table for this information.

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

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

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

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(1)

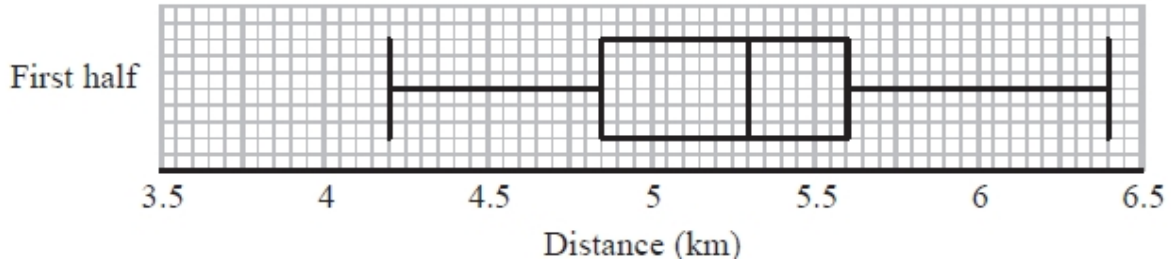
(Total for question = 6 marks)

Q11.

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.



(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.

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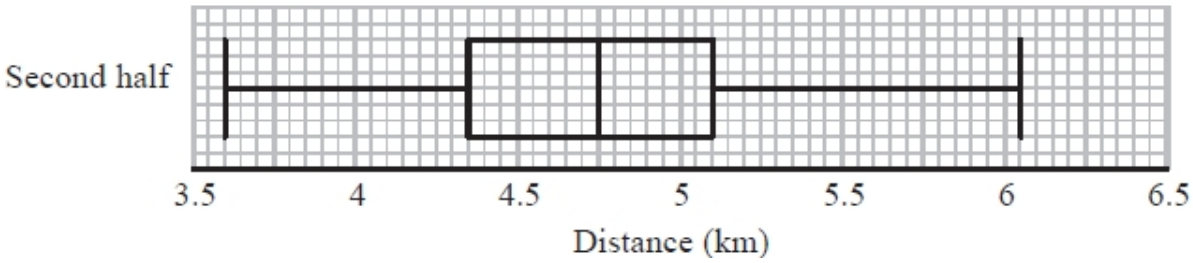
(2)

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.



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

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(2)

(Total for Question is 6 marks)

Q12.

The box plots give information about the wages of a group of 16 year old workers and a group of 18 year old workers.

*(a) 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)

There are 200 workers who are 16 years old.

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

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(2)

(Total for question = 5 marks)