Lite GCSE Maths

Cumulative Frequency

Name:

Class:

Solutions

Author:

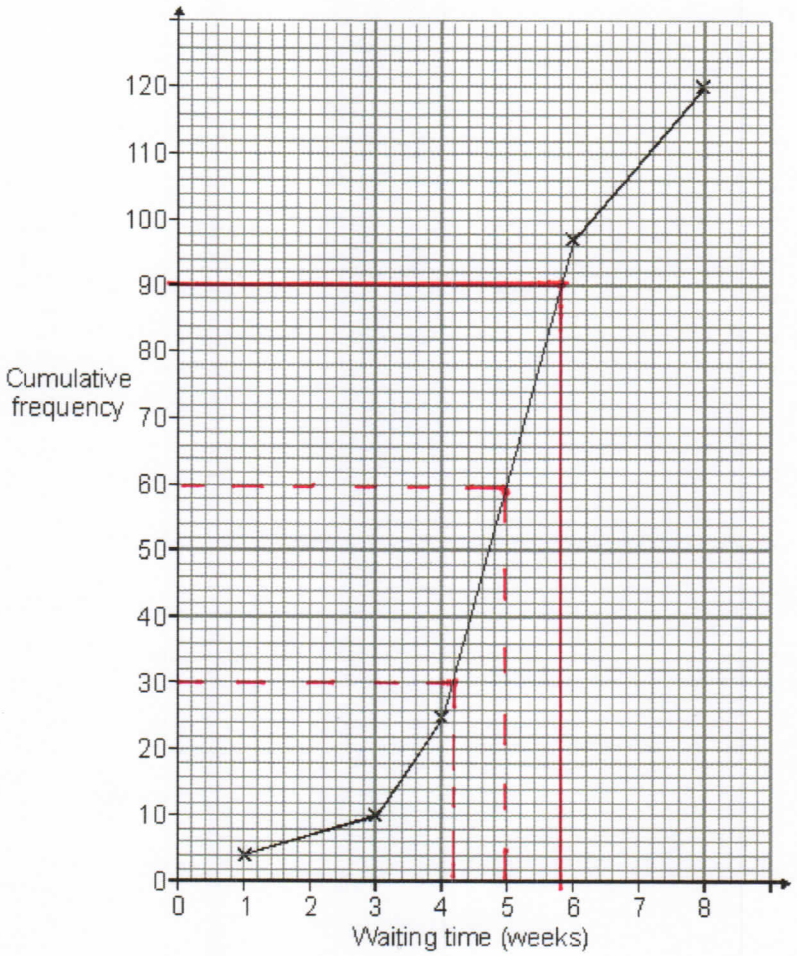
Date:

Time: 29

Marks: 27

Comments:

Q1. The cumulative frequency diagram shows the waiting times for 120 patients needing an operation at a hospital.



(a) The hospital claims that 75% of patients wait less than 40 days for the operation.

Comment on this claim.

75% is 90 patients

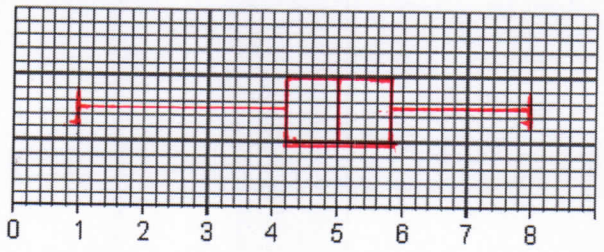
90 patients wait is upto just less than 6 weeks. So 40 day claim is reasonable

(3)

(b) The least waiting time was 1 week.

The range of waiting times was 7 weeks.

Use this information and the cumulative frequency diagram to draw a box plot for the waiting times



(3)

(c) At a different hospital 746 patients had the same operation.
This table shows the age and gender of the patients.

	Age		
	Under 18	**18 – 65**	**Over 65**
Male	84	342	50
Female	39	194	37

The hospital wants to take a stratified sample of 80 patients.
Complete the table below to show how many people from each group should be sampled.

	Age		
	Under 18	**18 – 65**	**Over 65**
Male	9	37	5
Female	4	21	4

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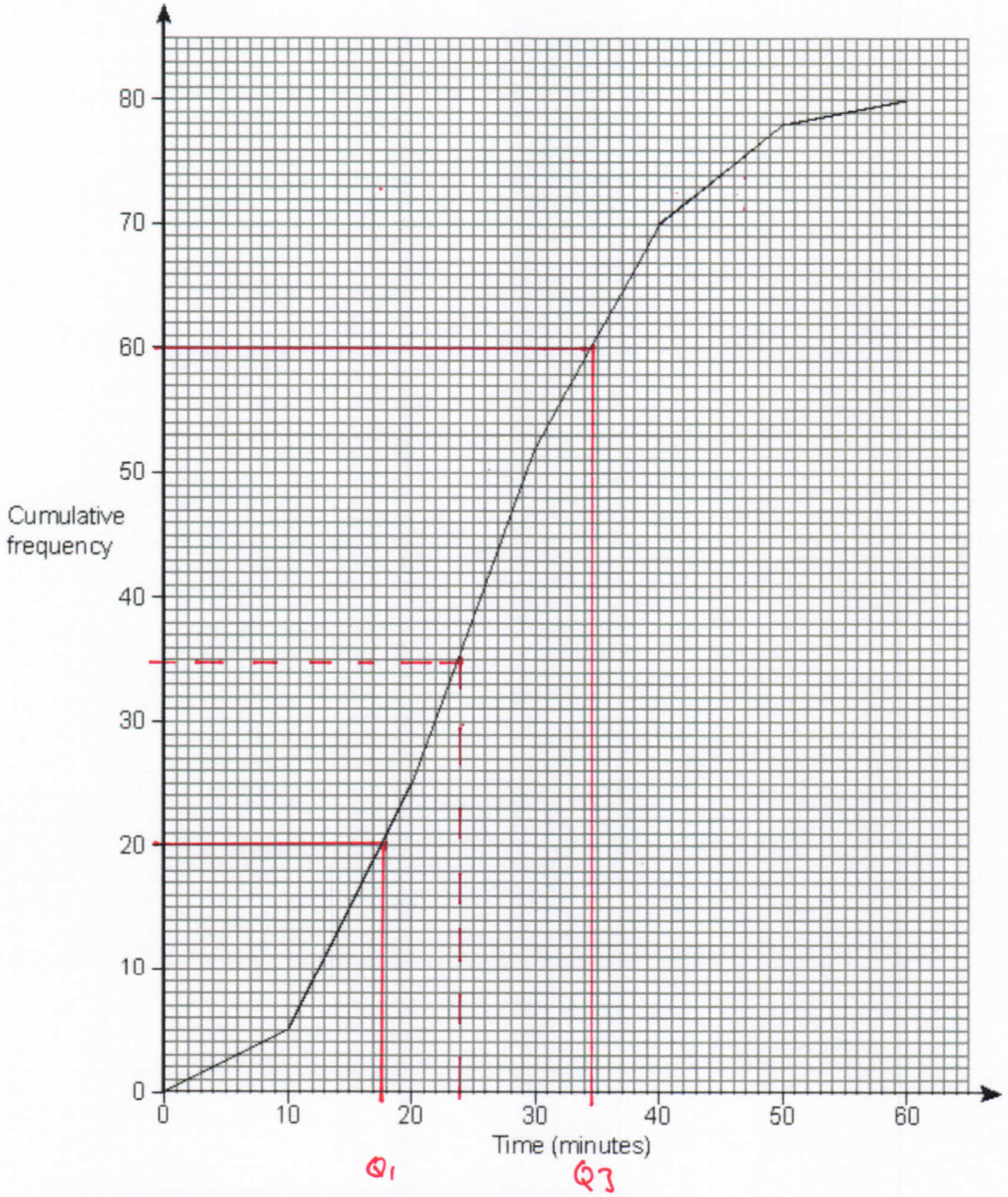
$\frac{84}{746} \times 80 = 9$ $\quad \frac{39}{746} \times 80 = 4$

$\frac{342}{746} \times 80 = 37$ $\quad \frac{194}{746} \times 80 = 21$

$\frac{50}{746} \times 80 = 5$ $\quad \frac{37}{746} \times 80 = 4$

(3)
(Total 9 marks)

Q2. The cumulative frequency diagram summarises the length of time taken for each of Bill's last
80 visits to the Internet.



(a) Estimate the inter-quartile range of the times.

IQR = Q3 − Q1

= 34.5 − 17.5 = 17

Answer 17 minutes

(2)

(b) Bill is charged 50p by his service provider for each visit to the Internet lasting more than 24 minutes.
Shorter sessions are free.

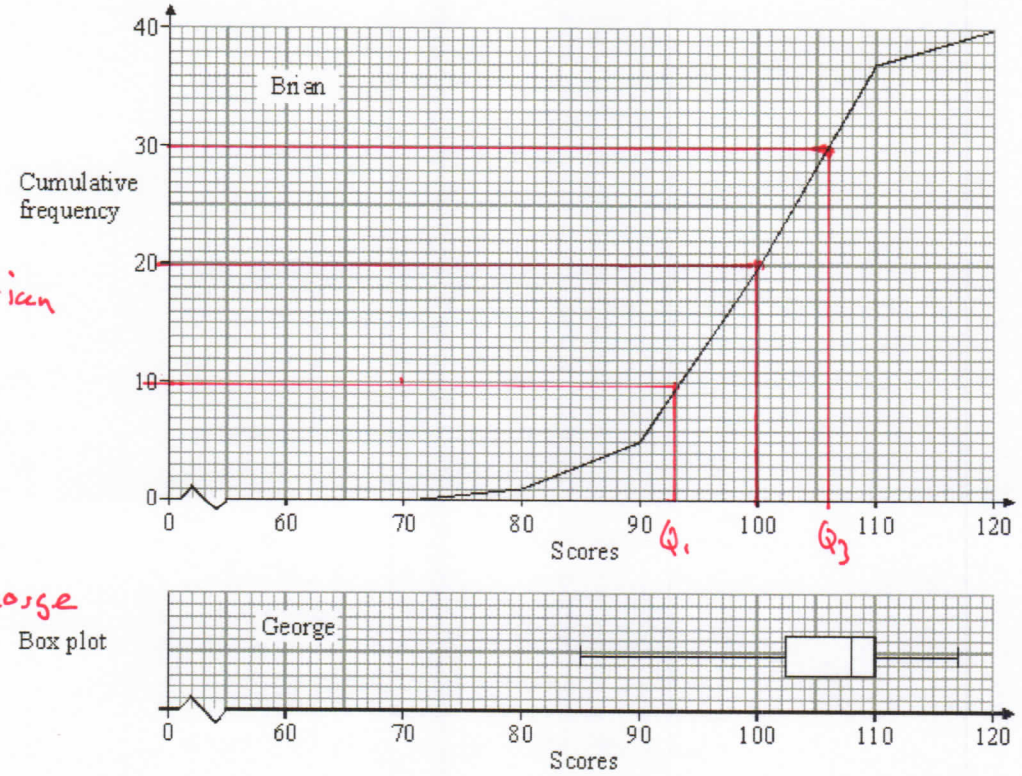
Estimate the total cost of these 80 visits to the Internet.

35 visits up to 24 mins so 80 − 35 = 45 visits longer than 24 min. Cost 45 x 50p

Answer £ 22.50

(2)
(Total 4 marks)

Q3. Brian and George played 40 games of golf.
The cumulative frequency diagram shows information about Brian's scores.
The box plot shows information about George's scores.



(a) Showing your method clearly, find

(i) Brian's median score

From graph reading cf = 20

Answer 100

(1)

(ii) Brian's inter-quartile range.

$Q_3 = 106$ $Q_1 = 93$

$IQR = Q_3 - Q_1 = 106 - 93 = 13$

Answer 13

(2)

(b) Use the cumulative frequency diagram and the box plot to answer the following.

(i) Which player is the more consistent in his scoring?
Give a reason for your choice.

George - his IQR is 110 − 102·5 = 7·5 whereas Brians is 13. Lower IQR means more consistent

(1)

(ii) The winner of a game of golf is the player who has the lowest score.
Who do you think is the better player?
Give a reason for your choice.

Brian better as he has lower median score 100 compared to George's 108

(1)
(Total 5 marks)

Q4. The table shows the distances travelled to school by 50 pupils living in a town.

Distance travelled, d (km)	Frequency	midpoint	Freq × midpoint
$0 < d \leq 2$	12	1	12
$2 < d \leq 4$	18	3	54
$4 < d \leq 6$	10	5	50
$6 < d \leq 8$	8	7	56
$8 < d \leq 10$	2	9	18
	50		190

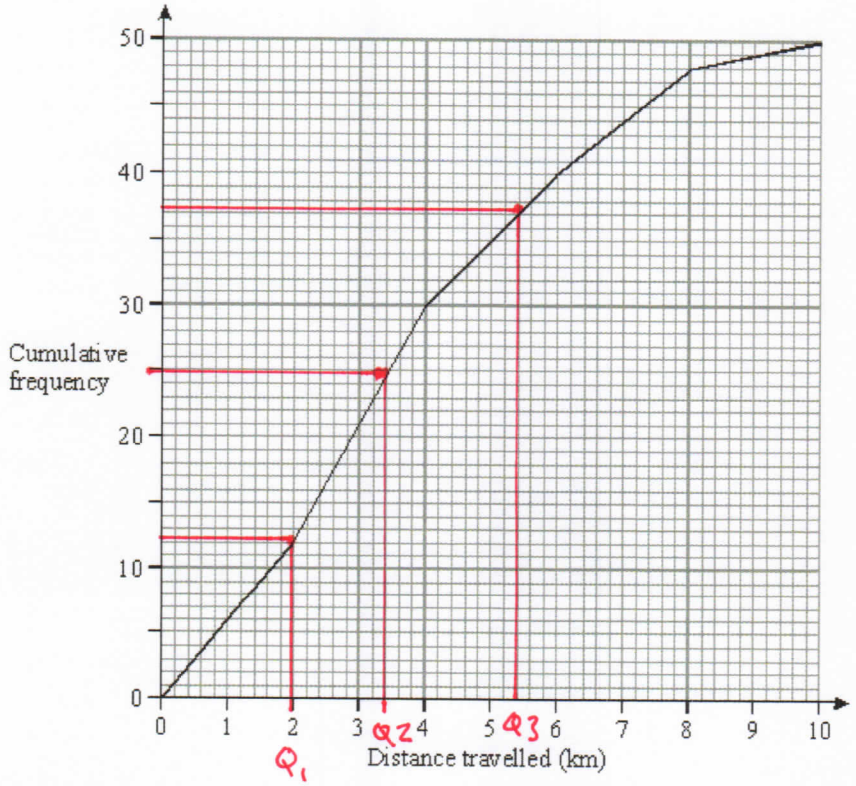
(a) Calculate an estimate of the mean distance travelled to school by these pupils.

Estimate for mean $= \frac{190}{50} = 3.8$

Answer 3.8 km

(4)

(b) The distances travelled are shown on the cumulative frequency diagram.



Use the cumulative frequency diagram to estimate

(i) the median,

Answer 3.4 km

(1)

(ii) the interquartile range

$Q_3 = 5.4$ $Q_1 = 2.0$

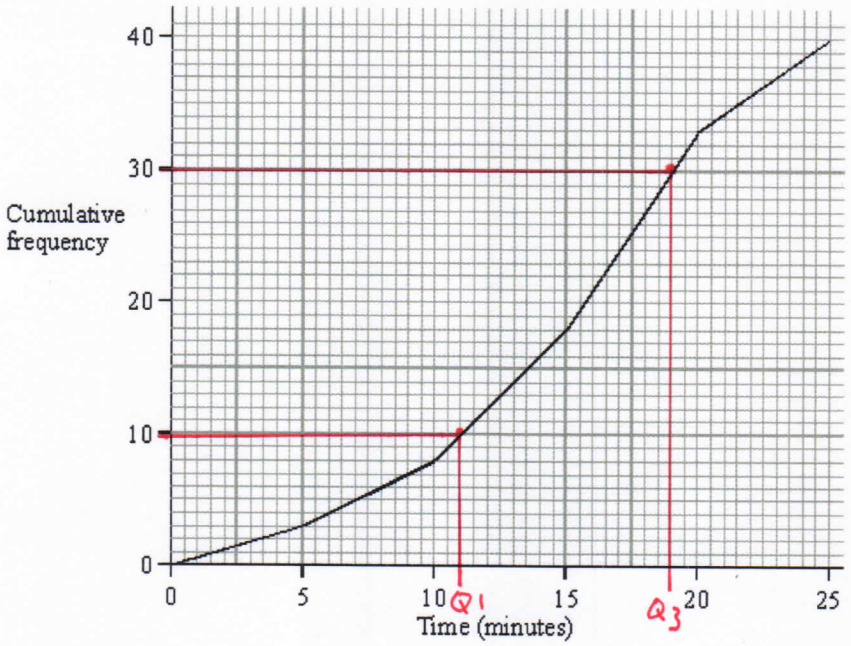
$IQR = Q_3 - Q_1 = 5.4 - 2.0 = 3.4$

Answer 3.4 km

(2)

(Total 7 marks)

Q5. The length of time, in minutes, of 40 telephone calls was recorded. A cumulative frequency diagram of this data is shown on the grid below.



Use the diagram to find the limits between which the middle 50% of the times lie.

Middle 50% between Q_1 and Q_3

between 11 and 19

Answer 11 minutes and 19 minutes

(Total 2 marks)