



## GCSE Foundation/Higher 23

*Handling Data*

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Questions



117 minutes



105 marks

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*Interpreting and discussing results*

- Q1.** Anna hits some old tennis balls.  
The speeds (mph) of the balls are shown.

46	55	64	48	51
57	65	60	53	72
61	59	52	53	49

- (a) Show the data in an ordered stem-and-leaf diagram.  
Remember to complete the key.

Key: ..... | ..... represents ..... mph

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(4)

- (b) Work out the median speed.

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Answer ..... mph

(1)

- (c) Anna hits some new tennis balls.  
The median speed of the new balls is 59 mph.

She says the speeds of the new balls are at least 5% faster than the old balls.

Is she correct?

You **must** show your working.

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(3)

(Total 8 marks)

- Q2.** A company pays people to visit shops and test customer service.  
Paul works for this company.

His fees in October are shown.

Fee (£)	Frequency
8	10
10	18
12	7
15	4
20	1

- (a) Calculate his mean fee.

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Answer £ .....

(3)

- (b) Paul says that his modal fee and his median fee are both £10.

Is he correct?  
Give reasons and working to show how you decide.

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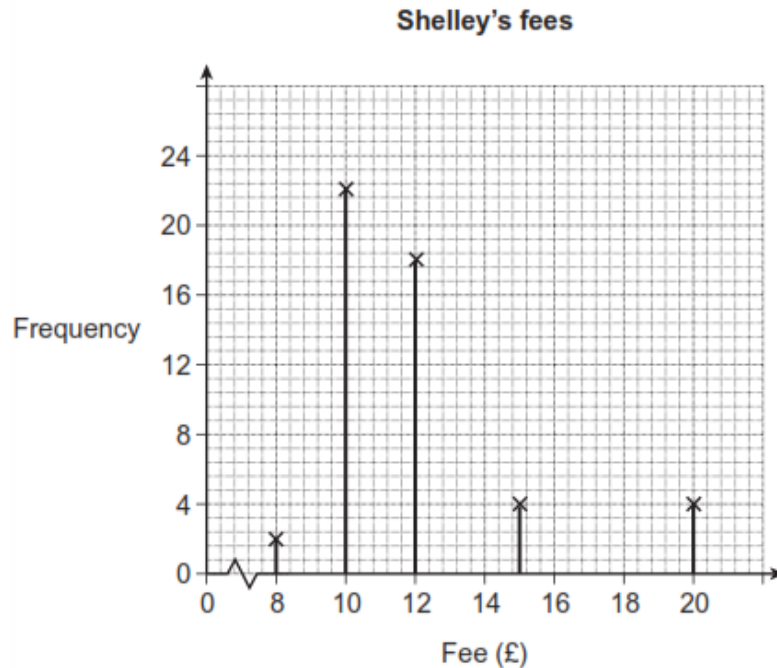
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(2)

- (c) Shelley also works for this company.  
Her fees in the same month are shown.



Give **one** similarity and **one** difference in the fees of Paul and Shelley.

Similarity .....

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Difference .....

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(2)  
(Total 7 marks)

- Q3.** Each day 147 trains leave Lea Road station.  
One day, most trains are on time (0 minutes late).  
19 trains are late.

- (a) What percentage of trains are late?  
Give your answer to 1 decimal place.

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Answer ..... %

(3)

- (b) The station manager records the number of minutes late for each of the 19 trains.

6	11	1	21	8	10	17	4	35	22
2	3	41	8	23	7	16	28	19	

- (i) Draw an ordered stem-and-leaf diagram to show the data for the late trains. Complete the key.

Key: ..... | ..... represents ..... minutes late

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(4)

- (ii) For the 19 late trains, write down the modal number of minutes late.

Answer ..... minutes

(1)

- (iii) Write down the modal number of minutes late for all 147 trains.

Answer ..... minutes

(1)

- (c) The station manager says,  
“The late times are all one minute less than I recorded.  
For example, the train I recorded as 6 minutes late was actually only 5 minutes late.”

Which modal number of minutes late changes?  
Tick a box.

☐

The 19 late trains

☐

All 147 trains

☐

Both

☐

Neither

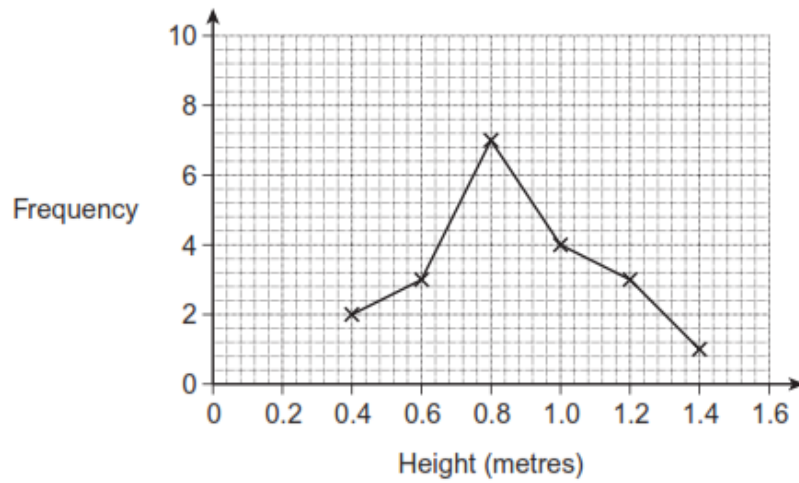
Give a reason for your answer.

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(2)  
(Total 11 marks)

- Q4.** (a) Amir drops different balls from the same height onto a wood floor. He measures the height, to the nearest 0.2 metres, of their first bounce. The frequency polygon shows his results.



Calculate an estimate of the mean bounce height.

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Answer ..... m

(3)

- (b) Amir wants to test this hypothesis.

Balls bounce higher on concrete than on wood.

Use the Data Handling Cycle to write a plan for Amir.

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(3)  
(Total 6 marks)

- Q5.** Olivia usually drives home from work.  
Some of her journey times are shown.

**Week 1**

	<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thu</b>	<b>Fri</b>
Leaves work (pm)	5.13	5.24	5.30	5.28	5.02
Arrives home (pm)	5.55	6.03	6.15	6.06	5.32
Time taken (minutes)	42	39	45	38	30



### Week 2

	Mon	Tue	Wed	Thu	Fri
Leaves work (pm)	5.15	5.18	5.20	5.07	5.10
Arrives home (pm)	5.49	5.50	5.57	5.40	
Time taken (minutes)		32	37	33	121

- (a) How long did it take Olivia to drive home on Monday of week 2?

Answer ..... minutes

(1)

- (b) On Friday of week 2 Olivia walked home.

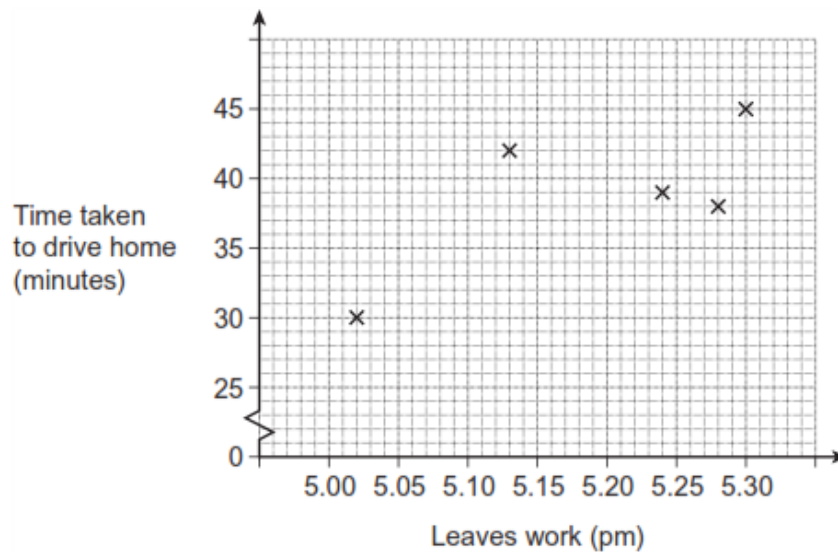
What time did she arrive home?

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Answer ..... pm

(2)

- (c) Complete the scatter diagram for the **four** days she drives home in week 2.



(2)

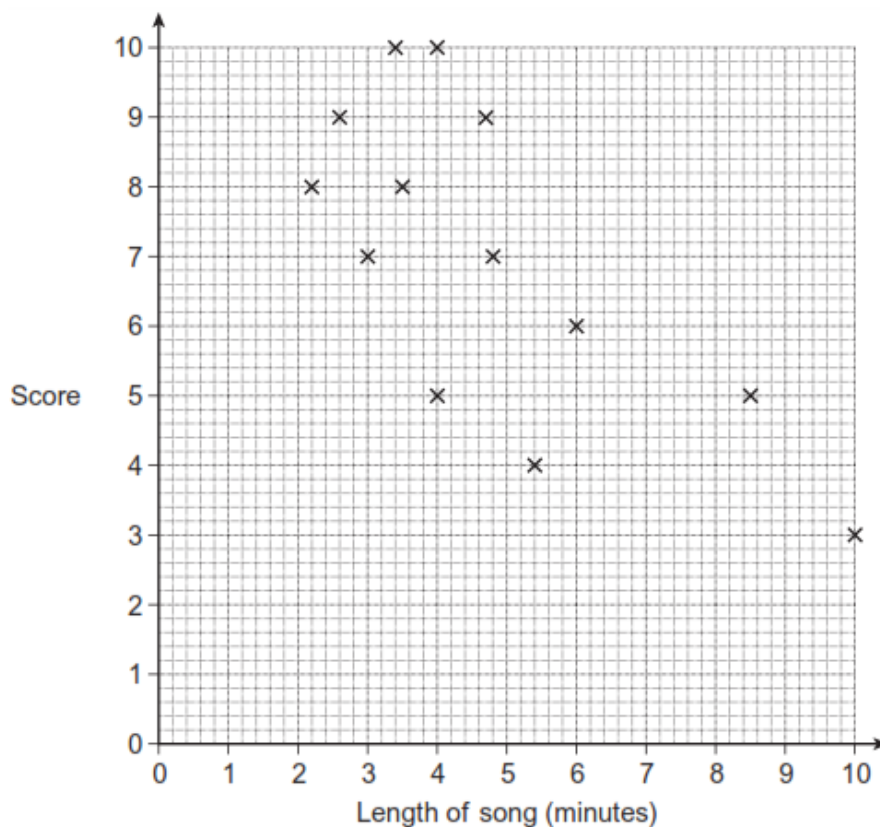
- (d) Estimate the time Olivia would have arrived home on Friday of week 2 if she had driven.  
Use your scatter diagram to show how you decide.

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Answer ..... pm

(3)  
(Total 8 marks)

- Q6.** Freddie and Priya both like music.  
Freddie gives some songs a score out of 10.  
The scatter diagram shows his results.



- (a) What fraction of the songs is given full marks?

Answer .....

(1)

- (b) How long is the song that is given a score of 4?  
Give your answer in minutes and seconds.

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Answer ..... minutes .....seconds

(2)

- (c) Freddie has this hypothesis.  
He says, "The shorter the song the more I like it."

Comment on his hypothesis.

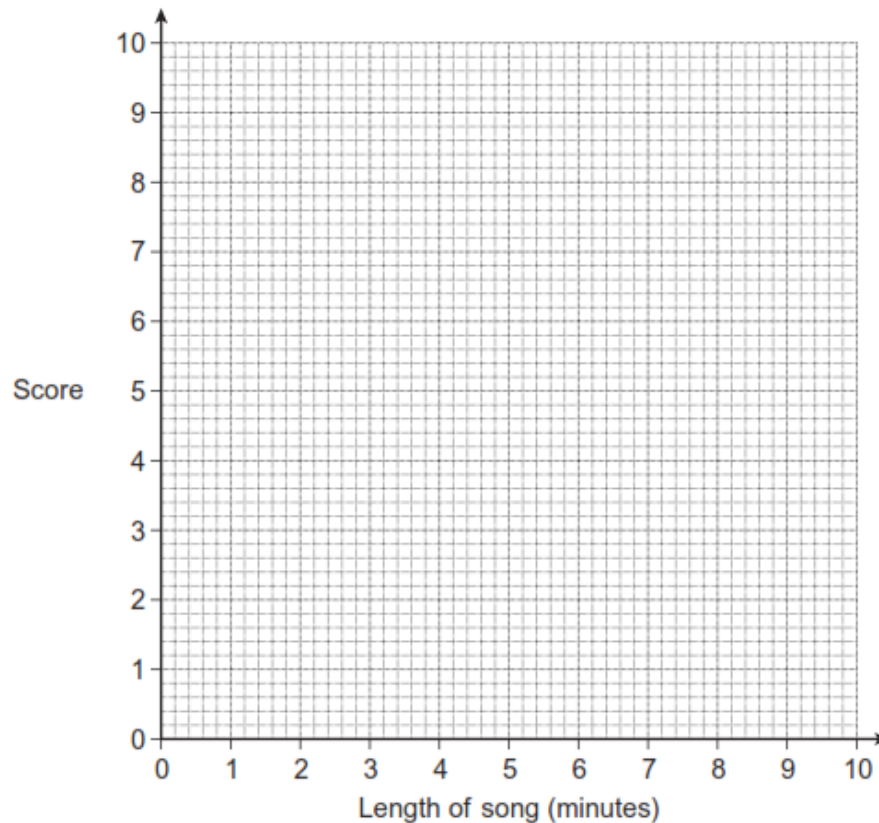
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(1)

- (d) Priya also gives some songs a score out of 10.  
She has a different hypothesis.  
She says, "The longer the song the more I like it."  
Her hypothesis is strongly supported by the data she collects.

Plot points on the grid to show how her scatter diagram may look.



(1)

(Total 5 marks)

**Q7.** 10 boys and 10 girls are each given 20 mental arithmetic questions.

Here are the number of correct answers for each boy.

12    18    12    19    9    20    11    9    18    12

The range of the girls' scores is 12.

The mean of the girls' scores is 14.5

Use the data to investigate the hypothesis

‘Boys are better at mental arithmetic than girls’

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(Total 5 marks)

- Q8.** (a) The National Curriculum levels in Mathematics for 30 students in year 9 were recorded.

Level	Number of students	
3	0	
4	4	
5	4	
6	9	
7	8	
8	5	

Calculate the mean level.

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Answer .....

(3)

- (b) The 30 students study both French and Spanish.

Their National Curriculum levels in these subjects are shown in the table.

		Level of Spanish						
		1	2	3	4	5	6	Total
Level of French	1	0	0	0	0	0	0	0
	2	1	0	0	0	0	0	1
	3	2	1	1	0	0	0	4
	4	0	3	4	1	0	0	8
	5	0	1	2	3	2	0	8
	6	0	0	3	3	2	1	9
	Total	3	5	10	7	4	1	30

- (i) What is the median level for French?

Show clearly how you obtain your answer.

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Answer .....

(2)

- (ii) The teacher claims that the students are better at French than at Spanish.

How can you tell from the table that this is true?

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(1)

(Total 6 marks)

**Q9.** Jenny sends out party invitations.

The number of replies she receives each day, for the next seven days, is given below.

9      7      4      6      2      2      3

(a) (i) Write down the mode.

Answer .....

(1)

(ii) Work out the median.

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Answer .....

(2)

(iii) After seven days Jenny has replies from half of the people invited.

How many people has she invited?

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Answer .....

(3)

(b) After **eight** days the mean number of replies is 4.5 per day.

Work out the number of replies she receives on the **eighth** day.

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Answer .....

(3)

(Total 9 marks)

**Q10.** Seb investigates whether members of an athletics club perform better than non-members in a 10 kilometre race.

The table summarises the finishing times of the members.

Finishing time, $t$ (minutes)	Frequency		
$30 \leq t < 40$	10		
$40 \leq t < 50$	12		
$50 \leq t < 60$	6		
$60 \leq t < 70$	2		

- (a) (i) Calculate an estimate of the mean finishing time of the members.

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Answer ..... minutes

(4)

- (ii) What fraction of the members finish in less than 50 minutes?

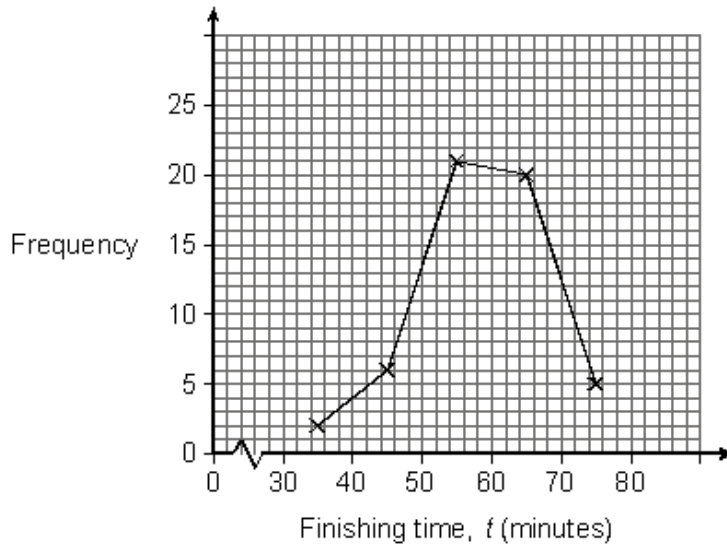
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Answer .....

(2)

- (b) The frequency polygon for the finishing times of non-members is shown below.



- (i) On the same axes draw the frequency polygon for the finishing times of the members.
- (ii) Seb claims that on average non-members are slower and have more varied finishing times than members.

(2)

How can you tell that **both** of Seb's claims are correct?

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(2)

- (c) Brendan finished 11<sup>th</sup> in the race.

Which of the following could be his finishing time?  
Circle your answer.

39 minutes      42 minutes      48 minutes      52 minutes

Explain your choice of answer.

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(2)  
(Total 12 marks)



- Q11.** On her way to work Janice passes through four sets of traffic lights. She records the number of times she stops at traffic lights each day. The table shows her results for ten weeks.

Number of stops each day	Frequency (number of days)
0	1
1	6
2	12
3	15
4	16

- (a) Calculate the mean number of stops each day.

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Answer .....

(3)

- (b) Janice says that she stops at every set of traffic lights on most days. She is wrong.

Explain why she is wrong.

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(1)

- (c) On average, how many days per week does Janice work?

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Answer .....

(1)

(Total 5 marks)

**Q12.** The table shows the heights of 30 students in a class.

Height, $h$ , (cm)	Number of students
$140 < h \leq 144$	4
$144 < h \leq 148$	5
$148 < h \leq 152$	8
$152 < h \leq 156$	7
$156 < h \leq 160$	5
$160 < h \leq 164$	1

By using the midpoints of each group, calculate an estimate for the mean height of the students.

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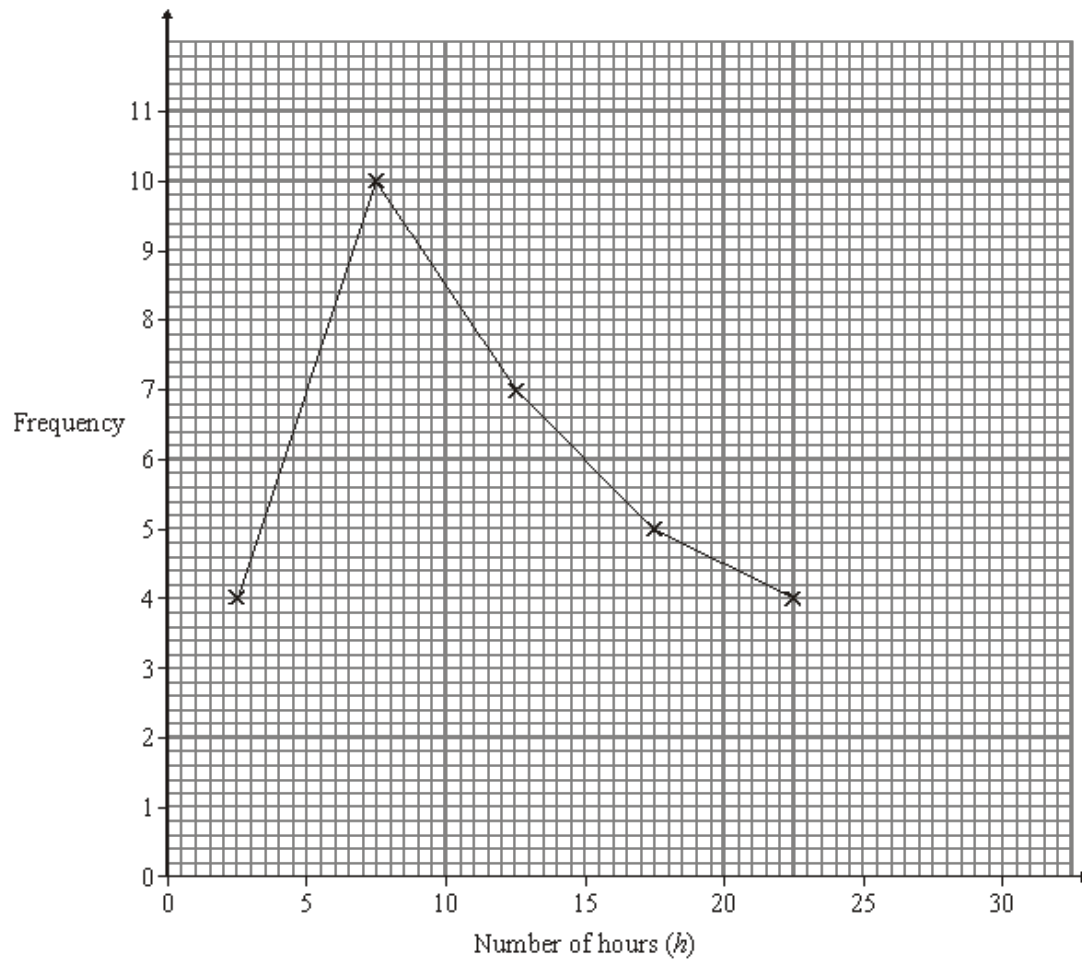
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Answer ..... cm

**(Total 3 marks)**

- Q13.** The frequency polygon shows the number of hours of television watched each week by 30 teachers.



- (a) One of the teachers is picked at random.  
What is the probability that this teacher watches more than 15 hours of television each week?

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Answer .....

(2)

- (b) The number of hours of television watched each week by 30 students is shown below.

Number of hours ( $h$ )	Frequency
$0 < h \leq 5$	1
$5 < h \leq 10$	2
$10 < h \leq 15$	7
$15 < h \leq 20$	9
$20 < h \leq 25$	7
$25 < h \leq 30$	4

On the same grid draw a frequency polygon to show this information.

(2)

- (c) Give **two** comparisons between the number of hours of television watched by these teachers and students.

Comparison 1

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 .....

Comparison 2

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(2)

(Total 6 marks)

- Q14.** A form teacher records the number of times her students were late during a term. She shows the data for those who were late in a stem and leaf diagram.

Key     |     2     |     7     represents late 26 times

0	1	1	2	6
1	2	4	4	
2	3	6		
3	2			
4	0	9		
5	0			

17 students were never late.

Calculate the mean number of times students were late for the whole form.

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Answer .....

(Total 4 marks)

- Q15.** The ordered stem and leaf diagram shows the number of cameras sold each day, over a period of 20 days.

Key    | 1 | 2    represents 12 cameras

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

The next day 28 cameras are sold.

Does the median increase, decrease or stay the same?

You **must** show your working.

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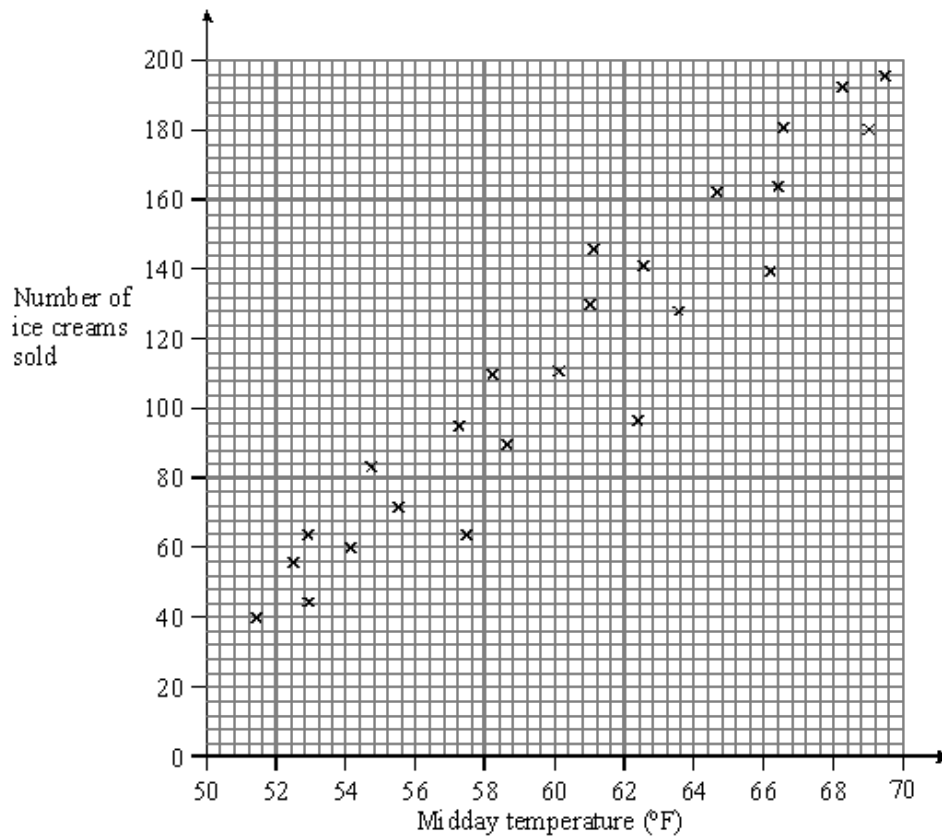
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(Total 3 marks)

- Q16.** The scatter graph shows the number of ice creams sold plotted against the midday temperature.



- (a) Draw a line of best fit on the scatter graph.

(1)

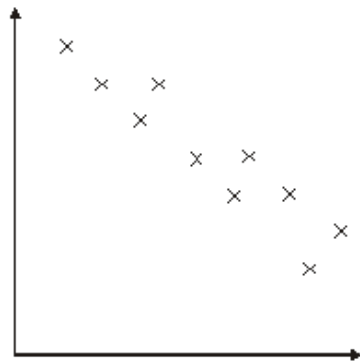
- (b) Describe the relationship between the number of ice creams sold and the midday temperature.

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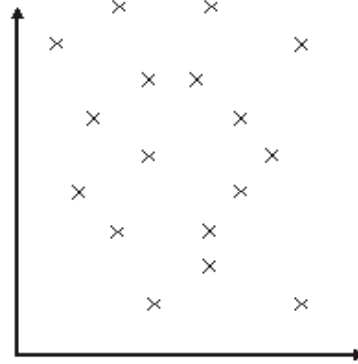
(1)

(Total 2 marks)

- Q17.** (a) Write down the type of correlation shown in each of the scatter graphs, A and B, below.



Scatter graph A

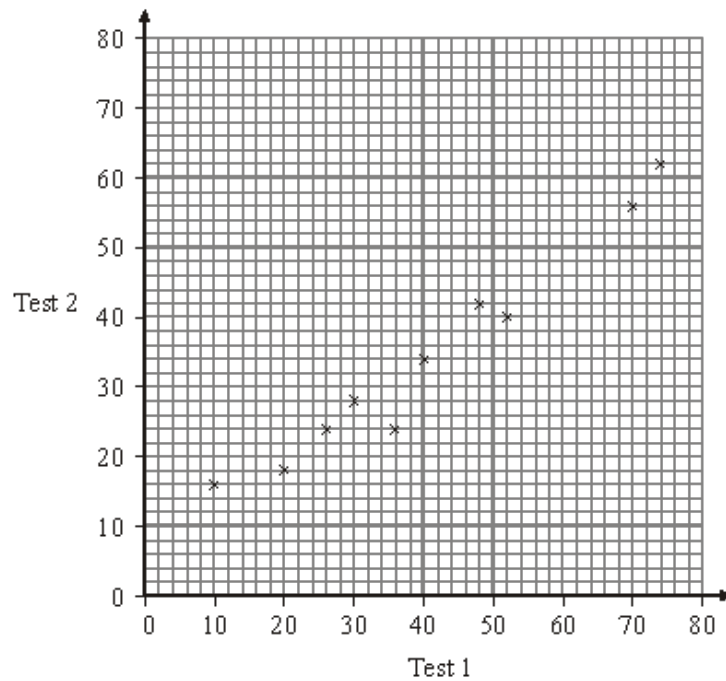


Scatter graph B

Answer A ..... Answer B .....

(2)

- (b) The marks for a group of pupils who sat two tests are shown in the scatter graph below.



- (i) Draw a line of best fit on this scatter graph.

(1)

- (ii) Use your line of best fit to estimate the Test 1 mark for a pupil who scored 50 in Test 2.

Answer .....

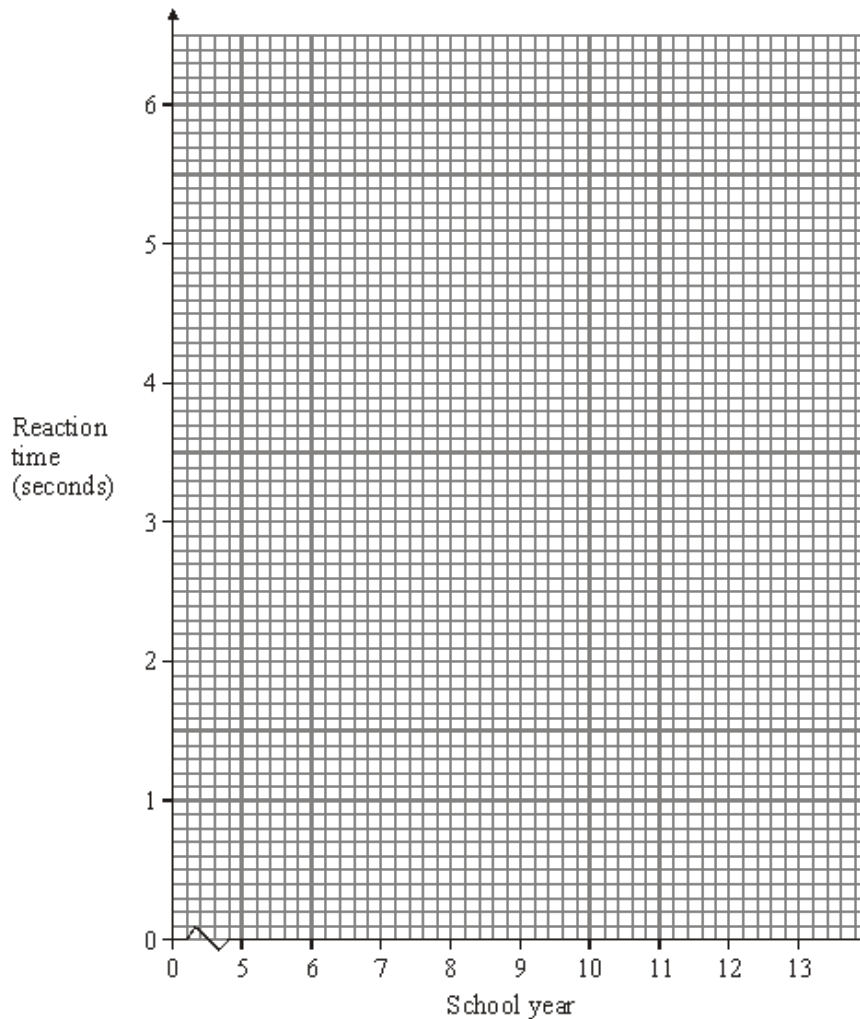
(1)

(Total 4 marks)

- Q18.** The table shows the school year and the reaction time of eight people who took part in the same test.

<b>School year</b>	5	7	8	9	10	11	12	13
<b>Reaction time (seconds)</b>	6	5	4.8	4.5	4	4.2	3.5	3

- (a) Draw a scatter graph of these data.



(2)

- (b) Draw a line of best fit on your scatter graph.

(1)

- (c) Describe the relationship shown by your scatter graph.

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(1)

**(Total 4 marks)**



