

Write your name here

Surname

Other names

Pearson
Edexcel Award

Centre Number

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Candidate Number

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Statistical Methods

Level 2

Calculator allowed

Thursday 12 May 2016 – Morning
Time: 1 hour 30 minutes

Paper Reference

AST20/01

You must have:

Pen, HB pencil, eraser, calculator, ruler, protractor.

Total Marks



Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

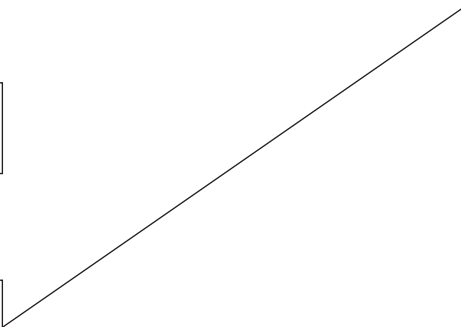
You must write down all stages in your working.

1 Here are some examples of data.

Draw a line from each example to the word that best describes the type of data.

One has been done for you.

The number of people in an office		Categorical
The length of a fence		Discrete
The colour of a sofa		Continuous
The number of birds in a cage		



(Total for Question 1 is 2 marks)

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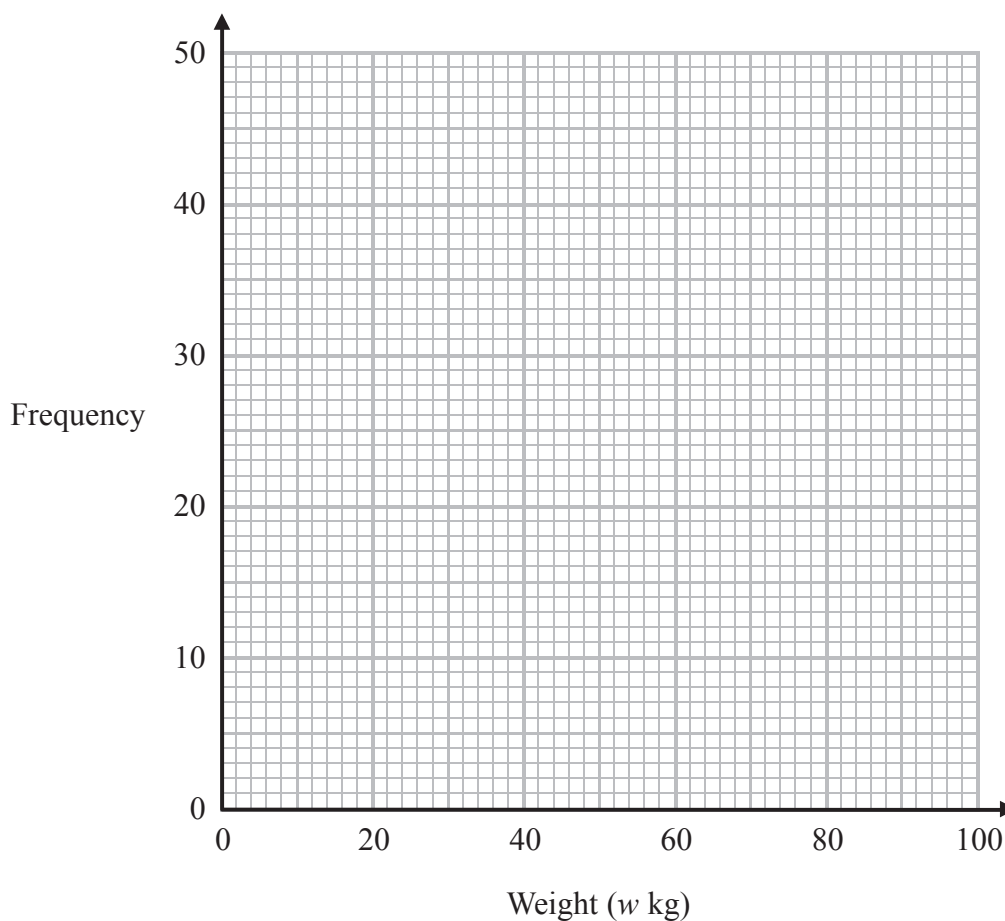
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2 The grouped frequency table gives information about the weights, in kg, of some pigs on a farm.

Weight (w kg)	Frequency
$0 < w \leq 20$	16
$20 < w \leq 40$	24
$40 < w \leq 60$	33
$60 < w \leq 80$	29
$80 < w \leq 100$	18

(a) On the grid, draw a frequency polygon for this information.



(2)

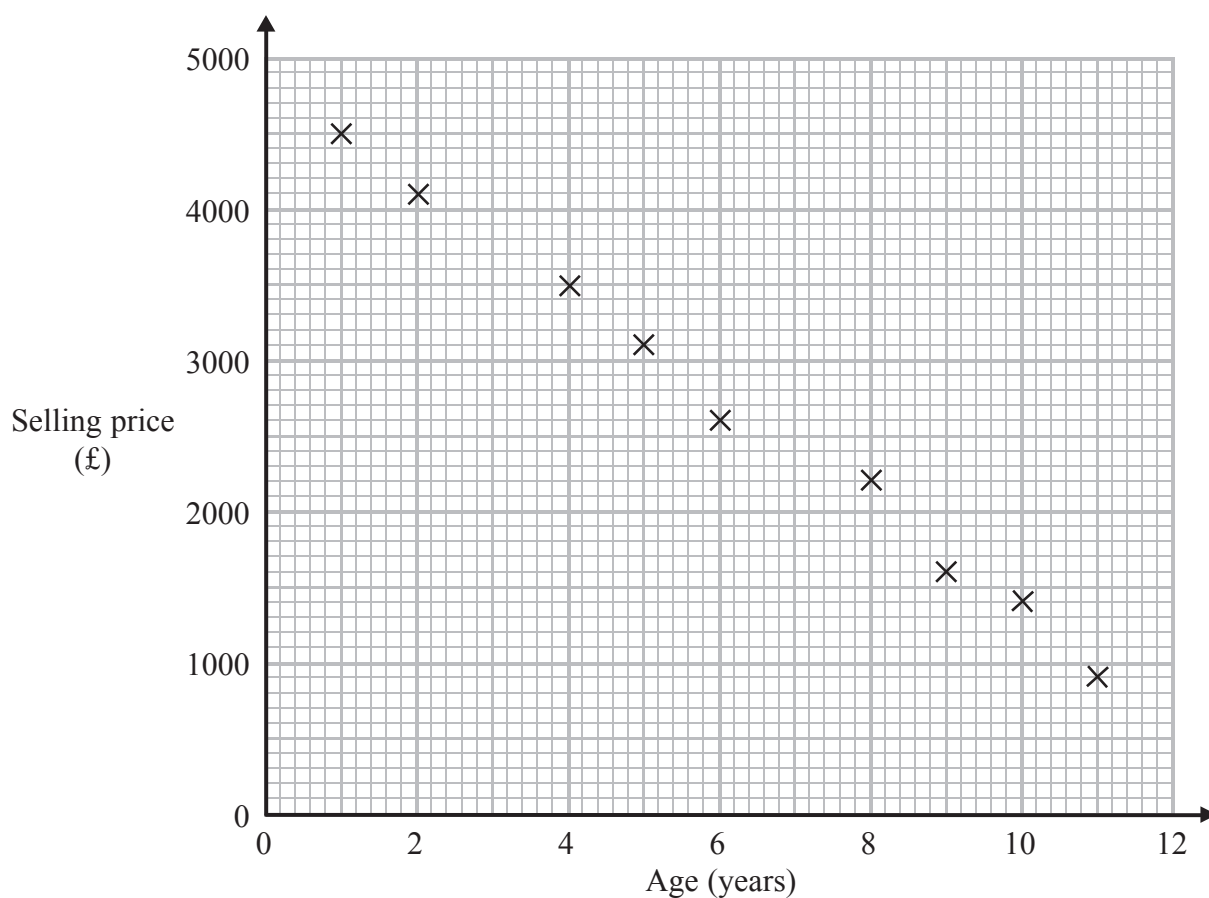
(b) Write down the modal class interval.

.....
(1)

(Total for Question 2 is 3 marks)



3 Lewis wants to buy a van.
He finds out the age and the selling price of each of nine vans of the same type.
The scatter graph shows this information.



(a) Draw a line of best fit on the scatter graph. (1)

(b) What type of correlation does the scatter graph show? (1)

(c) Describe the relationship between the selling price of a van and its age. (1)



Lewis sees another van of this type for sale.
The van is 10 years old and the selling price is £4500

The point (10, 4500) does not fit the pattern of the other points on the scatter graph.

(d) (i) What statistical name is given to the point (10, 4500)?

.....

Lewis is thinking of buying this van.

(ii) What advice would you give Lewis to help him decide whether or not to buy this van?
Your answer should use the information given in the scatter graph.

.....

.....

.....

(3)

(Total for Question 3 is 6 marks)



4 Sandeep rolls a biased 6-sided dice.

The table shows the probabilities that the dice will land on 1 or on 2 or on 3 or on 4 or on 5

Number	1	2	3	4	5	6
Probability	0.14	0.18	0.27	0.21	0.09	

(a) Work out the probability that the dice will land on 6

.....
(2)

(b) Work out the probability that the dice will land on 2 or 3 or 4

.....
(2)

Sandeep now rolls the dice 350 times.

(c) Work out an estimate for the number of times the dice will land on 2

.....
(2)

The next day, Sandeep rolls the dice 100 times.

He thinks it will land on 5 **exactly** 9 times.

He may be wrong.

(d) Explain why.

.....
.....
(1)

(Total for Question 4 is 7 marks)



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5 Jane wants to know how many times people visit their local arts centre. She is going to use a questionnaire.

(a) Design a suitable question for Jane to use in her questionnaire. You must include some response boxes.

(2)

Jane plans to give her questionnaire to the first 10 people in the queue at the arts centre.

(b) (i) Write down one advantage of taking a sample.

(ii) Write down one reason why Jane's plan may not give a good sample.

(2)

(Total for Question 5 is 4 marks)



- 6 A mobile police unit records the speeds of motorbikes on a road.

The table gives information about the speeds of 120 motorbikes on this road.

Speed (s mph)	Frequency
$30 < s \leq 40$	2
$40 < s \leq 50$	10
$50 < s \leq 60$	16
$60 < s \leq 70$	47
$70 < s \leq 80$	39
$80 < s \leq 90$	6

- (a) Complete the cumulative frequency table.

Speed (s mph)	Cumulative frequency
$30 < s \leq 40$	2
$30 < s \leq 50$	
$30 < s \leq 60$	
$30 < s \leq 70$	
$30 < s \leq 80$	
$30 < s \leq 90$	

(1)

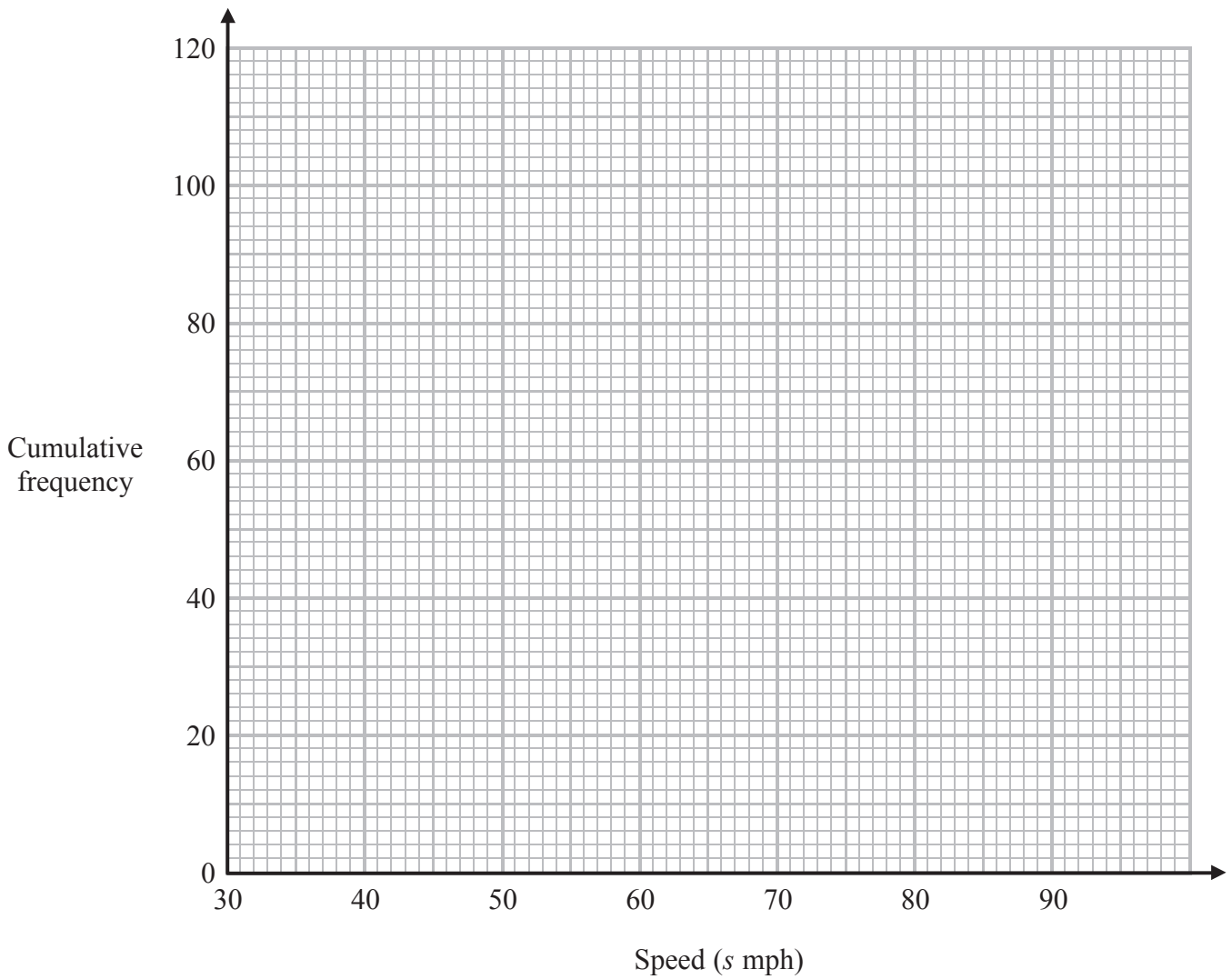


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(b) On the grid, draw a cumulative frequency diagram for your table.



(2)

(c) Use your cumulative frequency diagram to find an estimate for the interquartile range of the speeds.

..... mph

(2)

(d) Use your cumulative frequency diagram to find an estimate for the number of these 120 motorbikes with recorded speeds between 45 mph and 65 mph.

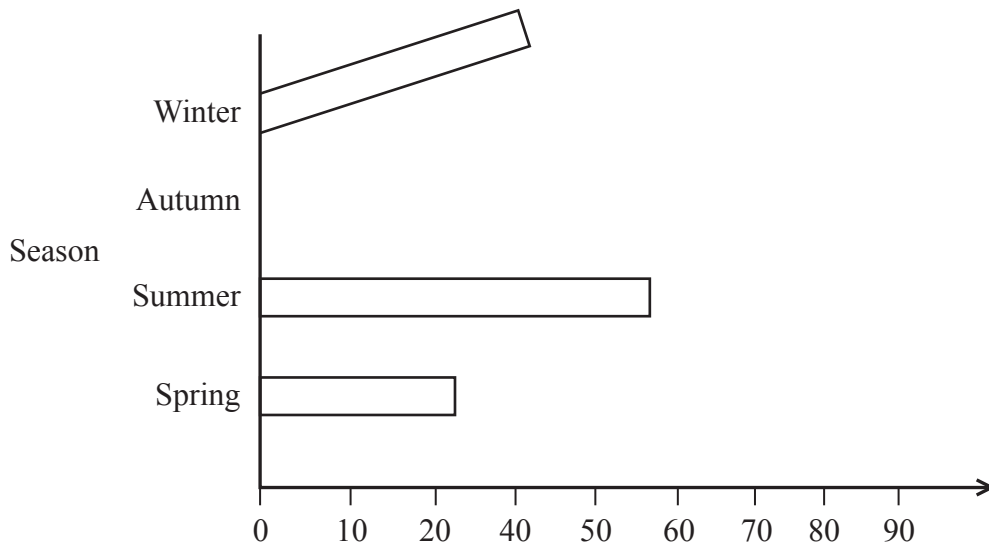
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(2)

(Total for Question 6 is 7 marks)



7 The owner of a shop recorded the number of fans he sold each season of the year. He drew this bar chart.



Write down two things that are wrong or could be misleading about the bar chart.

- 1
- 2

(Total for Question 7 is 2 marks)

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8 The table gives information about the number of people who were in each of 45 taxis one evening.

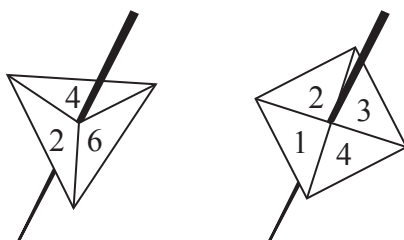
Number of people	Frequency	
1	15	
2	11	
3	6	
4	9	
5	4	

Calculate the mean number of people per taxi.

.....
(Total for Question 8 is 3 marks)



- 9 Ravina has two fair spinners.
 One is a 3-sided spinner, which can land on 2 or on 4 or on 6
 The other is a 4-sided spinner, which can land on 1 or on 2 or on 3 or on 4



Ravina is going to spin the two spinners at the same time.
 Her score is the difference between the two numbers she gets.

The sample space diagram shows some of the possible scores.

		4-sided spinner			
		1	2	3	4
3-sided spinner	2	1	0	1	
	4	3	2		
	6				

- (a) Complete the sample space diagram to show all the possible scores.

(2)

- (b) (i) Find the probability that the score is 5

- (ii) Find the probability that the score is less than 3

(3)

(Total for Question 9 is 5 marks)



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10 Anjali is the secretary of her rambling club.
She recorded the number of miles walked by each rambler in one month.

Here are her results.

16	29	22	31	49	47	33	13
14	27	28	37	44	34	36	

(a) Draw an ordered stem and leaf diagram for this information.

(3)

(b) Find the median.

..... miles

(1)

(c) Find the interquartile range.

..... miles

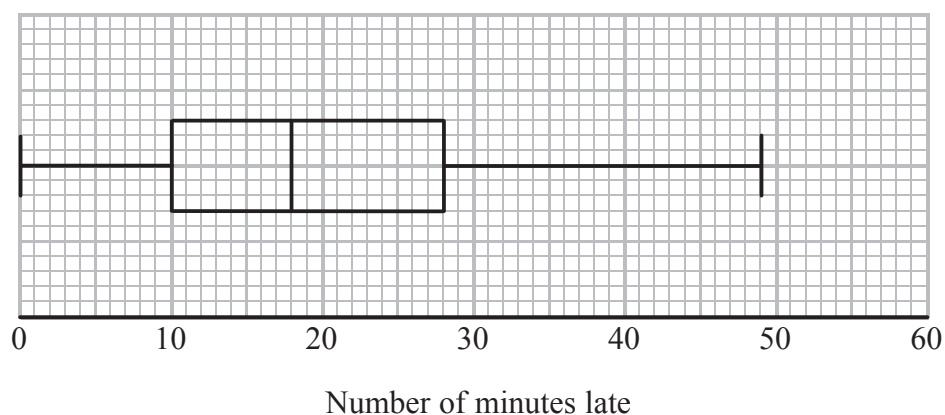
(2)

(Total for Question 10 is 6 marks)



- 11 Dylan was at a railway station on Monday.
He recorded the number of minutes that each train was late.

The box plot summarises his results.



- (a) Describe the skew of the distribution of the number of minutes late.

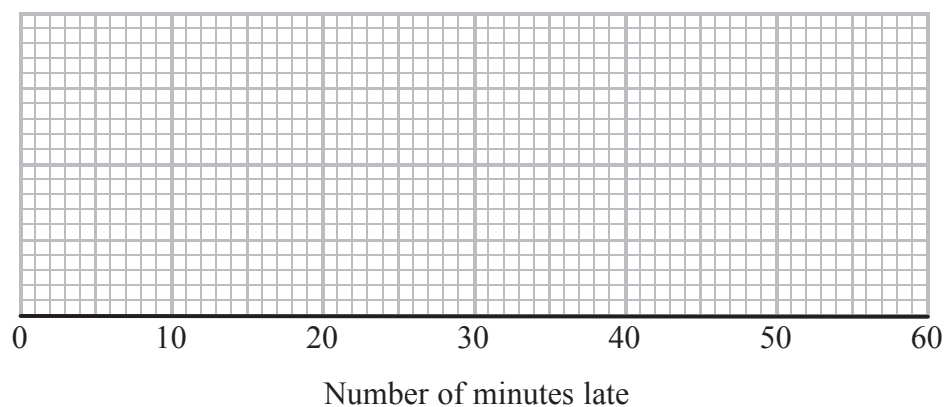
(1)

Dylan was also at the railway station on Tuesday.
He recorded the number of minutes that each train was late.

Here is some information about his results.

Lowest value	0
Lower quartile	12
Median	25
Upper quartile	33
Highest value	56

- (b) On the grid, draw a box plot for the information in the table.



(2)



(c) Compare the two distributions.
Write down two comparisons.

1

2

(2)

(Total for Question 11 is 5 marks)

- 12 70 children were asked if they watch cartoons every day.
42 of the children were girls.
21 boys watch cartoons every day.
19 girls do not watch cartoons every day.

Complete this two-way table.

	Watch cartoons	Do not watch cartoons	Total
Boys			
Girls			
Total			

(Total for Question 12 is 3 marks)



- 13 David recorded the time, in minutes, he took to deal with each complaint at a call centre. He used this information to complete the following frequency table.

Time taken (t minutes)	Frequency
$0 < t \leq 4$	6
$4 < t \leq 8$	9
$8 < t \leq 12$	13
$12 < t \leq 16$	18
$16 < t \leq 20$	10
$20 < t \leq 24$	4

- (a) Find the class interval that contains the median.

.....
(1)

- (b) Calculate an estimate for the mean time taken.

..... minutes
(4)

(Total for Question 13 is 5 marks)



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14 A swimming club has 250 members.

Each member specialises in only one swimming stroke.

The table gives information about the number of members who specialise in each of the swimming strokes.

Swimming stroke	Frequency
freestyle	79
back	42
breast	87
butterfly	42

Simon takes a sample of 65 of these members stratified by swimming stroke.

Find the number of members in his sample who specialise in the butterfly stroke.

.....
(Total for Question 14 is 2 marks)



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- 15 The table below gives information about the number of bicycles sold by a shop in each quarter in 2014 and 2015.

Year	2014				2015			
Quarter	1	2	3	4	1	2	3	4
Number of bicycles	280	295	304	268	310	324	346	302

- (a) Calculate the 4-point moving averages for this information.
The first four have been done for you.

286.75 294.25 301.5 312

(2)

- (b) Describe what the moving averages show about the trend in the numbers of bicycles sold in the shop over these two years.

.....
(1)

The following table shows the number of bicycles sold in the shop in 2014 and in 2015.

Year	Number sold
2014	1147
2015	1282

- (c) Using 2014 as the base year, work out the index number for the number of bicycles sold in 2015.

Give your answer correct to 1 decimal place.

.....
(2)

- (d) Interpret the index number worked out in part (c).

.....
(1)

(Total for Question 15 is 6 marks)



17 75 athletes are members of an athletics club.

The 40 male athletes have a mean weight of 71.2 kg.

The 35 female athletes have a mean weight of 63.4 kg.

Calculate the mean weight of all 75 athletes.

..... kg

(Total for Question 17 is 3 marks)

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18 The weights of 25 packets of crisps are measured and these weights, x grams, are recorded.
The mean weight of these packets of crisps is 24 grams.

(a) Calculate the value of $\sum x$

..... g
(2)

Given that $\sum x^2 = 14\,560$

(b) work out the standard deviation of the weights.

..... g
(3)

(Total for Question 18 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS



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