Write your name here

Surname	Other names

Pearson
Edexcel Award

Centre Number	Candidate Number

Statistical Methods
Level 2
Calculator allowed

Monday 18 January 2016 – Morning	**Paper Reference**
Time: 1 hour 30 minutes	**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 ▶

PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1   Steve sells TVs and washing machines.

On Saturday he sold 7 TVs and 5 washing machines.
On Sunday he sold 10 TVs and 4 washing machines.

Show this information in a two-way table.
You should include totals.
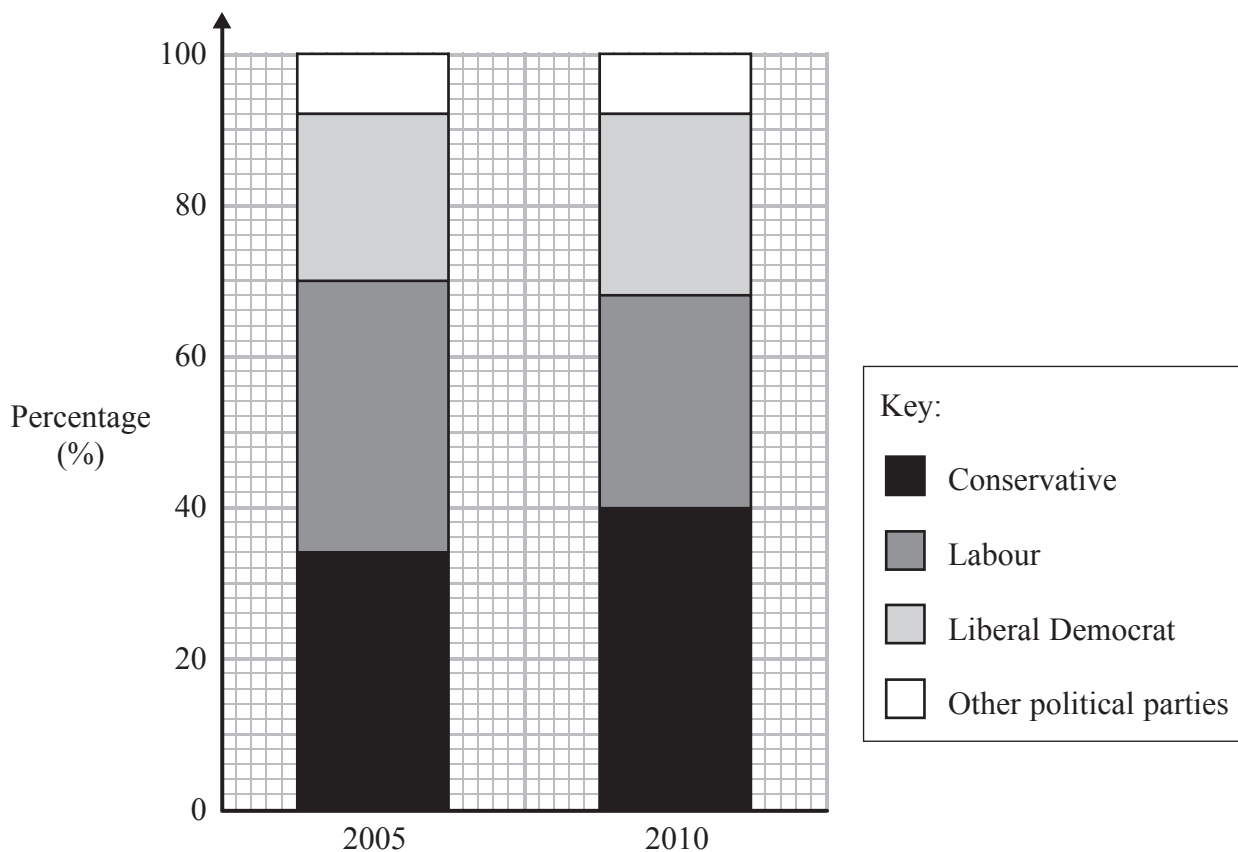
(Total for Question 1 is 3 marks)

2 The composite bar chart gives information about the percentages of people who voted for each political party in the UK general elections of 2005 and 2010.

(a) Write down the percentage of people who voted Conservative in 2010.

.... %

(1)

(b) Which political party did the greatest percentage of people vote for in 2005?

....

(1)

(c) Work out the percentage of people who voted Liberal Democrat in 2005.

.... %

(2)

(Total for Question 2 is 4 marks)

3 (a) The weight of a piece of cheese is an example of which type of numerical data?

....

(1)

Here are the weights, in grams, of 30 pieces of cheese.

927	998	1010	978	940
1005	1100	932	1058	1033
955	960	1005	1042	995
993	1025	1038	937	980
1060	1125	1076	1132	1045
948	1082	1140	985	1086

(b) Complete the grouped frequency table to summarise the data.

Weight (w grams)	Tally	Frequency
$900 < w \leqslant 950$		
$950 < w \leqslant 1000$		
$1000 < w \leqslant 1050$		
$1050 < w \leqslant 1100$		
$1100 < w \leqslant 1150$		

(2)

(c) On the grid, draw a frequency polygon for the information in your table.

0
900

(4)
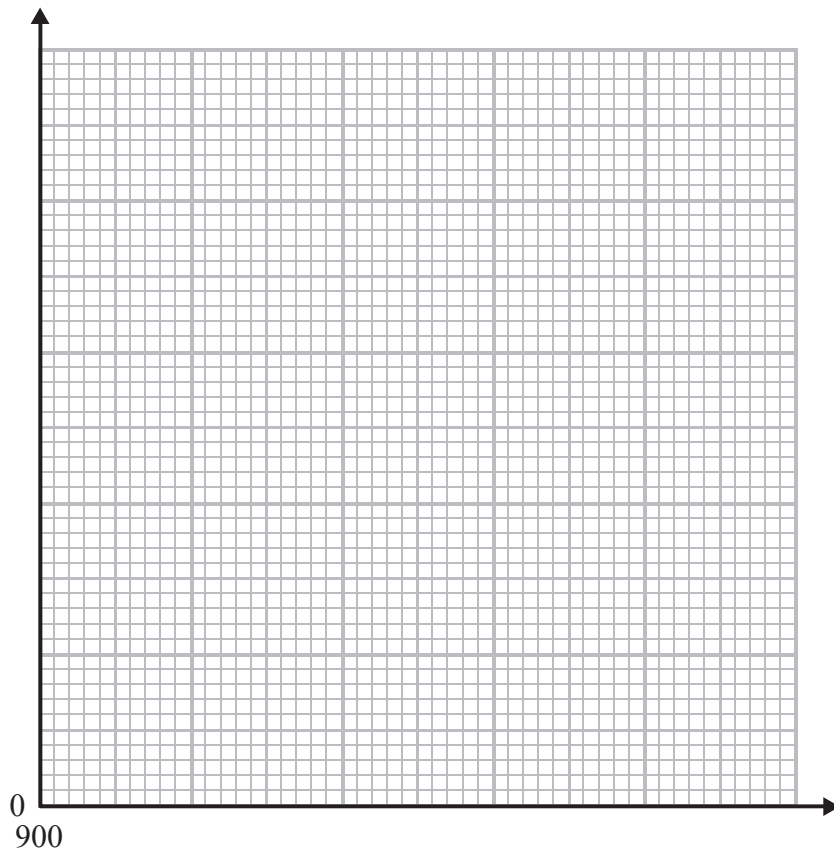
(Total for Question 3 is 7 marks)

4 The scatter diagram gives information about the body length, x cm, and the wingspan, y cm, of each of 10 butterflies.
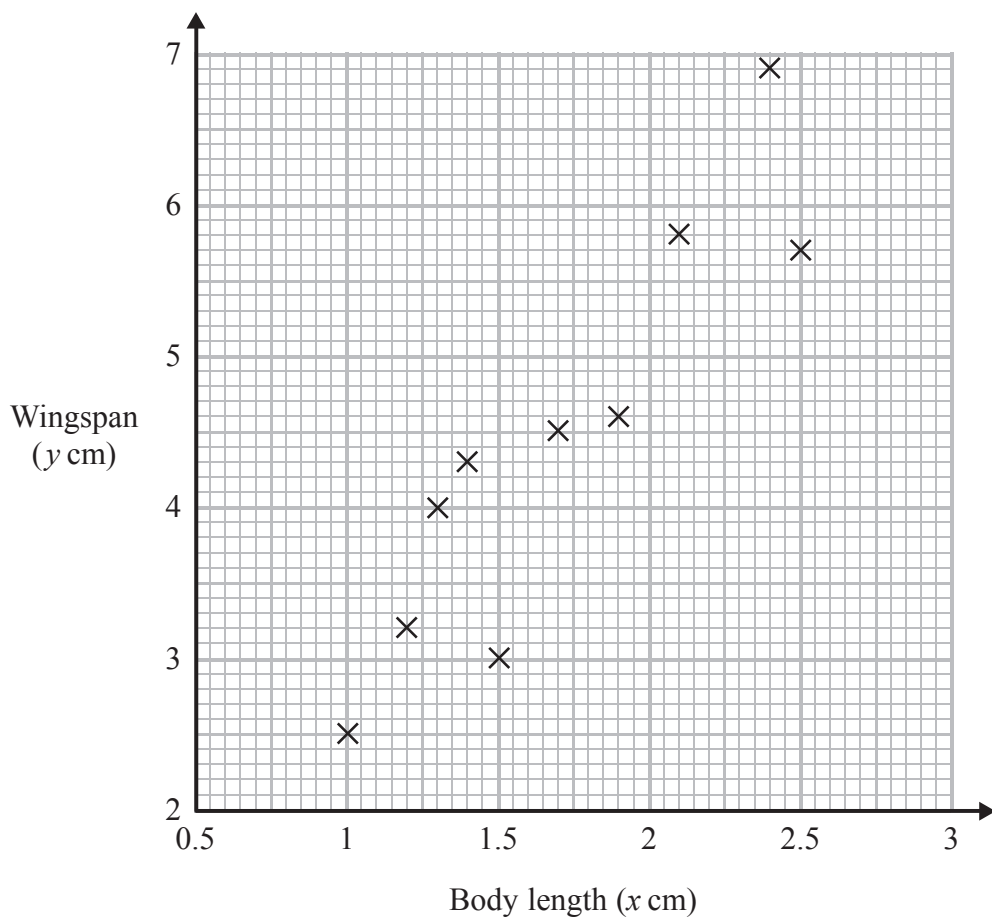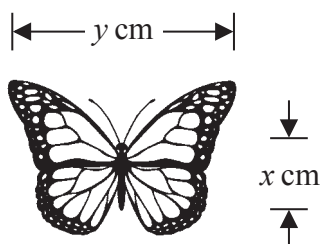

(a) Describe the relationship between the body lengths and the wingspans of these butterflies.

....

(1)

(b) (i) Work out the mean point of the data.

You may use $\sum x = 17.0$ and $\sum y = 44.5$

(................................... , ...)

(ii) On the grid, plot the mean point.

(2)

A butterfly has a body length of 2.2 cm.

(c) Predict the wingspan of this butterfly.

.... cm

(2)

(Total for Question 4 is 5 marks)

5 Jim spins a coin 100 times.

The table shows information about his results.

	Heads	Tails
Frequency	30	70

(a) Is Jim's coin biased?
Give a reason for your answer.

....

....

....

(1)

Jim draws this diagram to show his results.
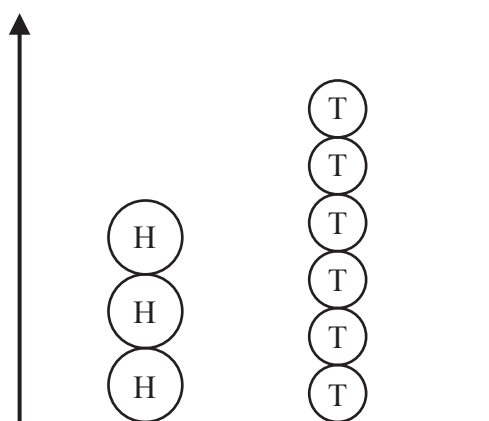
(b) Write down three things that could be misleading or are wrong in Jim's diagram.

1...

2...

3...

(3)

(Total for Question 5 is 4 marks)

6 Tina has a fair 4-sided dice.

She is going to roll the dice twice.

The sample space diagram shows all the possible outcomes.

Second roll

First roll		**1**	**2**	**3**	**4**
	1	(1, 1)	(1, 2)	(1, 3)	(1, 4)
	2	(2, 1)	(2, 2)	(2, 3)	(2, 4)
	3	(3, 1)	(3, 2)	(3, 3)	(3, 4)
	4	(4, 1)	(4, 2)	(4, 3)	(4, 4)

(i) Find the probability that Tina gets the same number on each roll of the dice.

....

(ii) Find the probability that the number she gets on the first roll of the dice is greater than the number she gets on the second roll of the dice.

....

(Total for Question 6 is 3 marks)

7 Amie recorded the number of books borrowed from a library for each of 15 days in June.

Here are her results.

68	62	53	75	38
49	55	40	49	64
54	73	67	169	54

One of these results may be an outlier.

(a) Which result?

....

(1)

Amie also recorded the number of books borrowed from the library for each of 15 days in December.

The stem and leaf diagram gives information about her results.

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

Key: 4 │ 9 represents 49 books

(b) Use the information in the stem and leaf diagram to complete the table.

Lowest value	49
Lower quartile	
Median	
Upper quartile	
Highest value	83

(3)

(c) On the grid, draw a box plot for the information in your table.

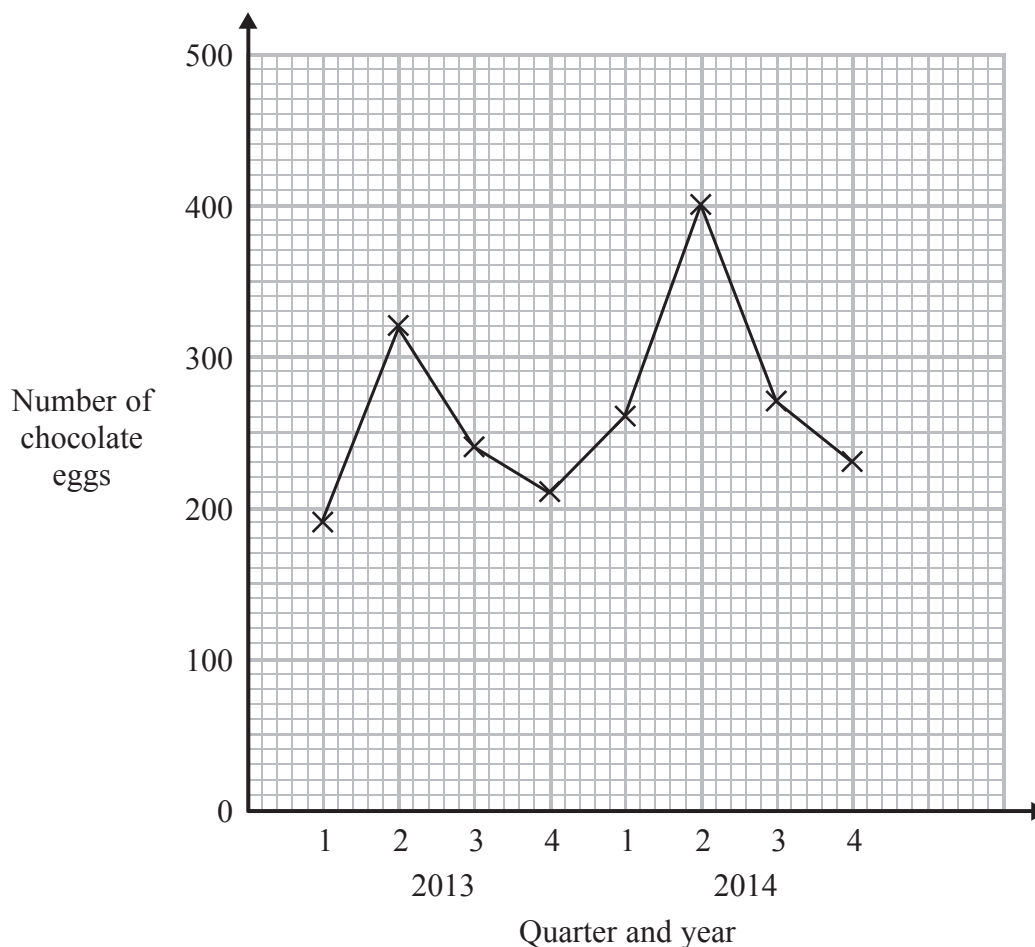40   50   60   70   80   90

Number of books

(3)
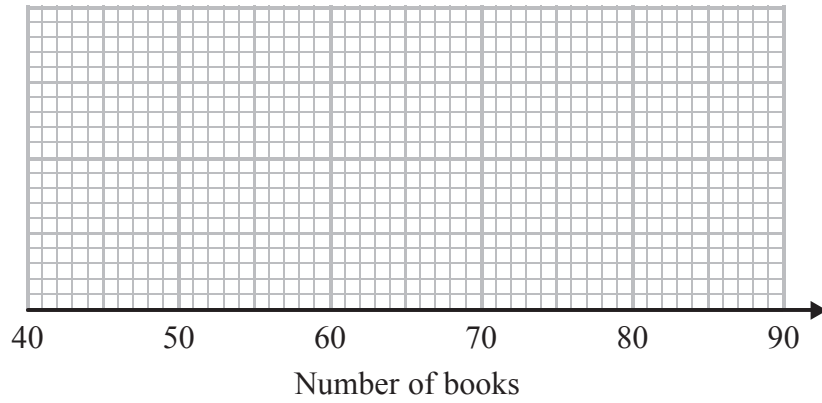
(Total for Question 7 is 7 marks)

Turn over ▶

8 The time-series graph gives information about the number of chocolate eggs sold in a shop each quarter in 2013 and in 2014.

(a) Calculate the 4-point moving averages for the information in the graph.

You must show your working.
The first three have been done for you.

240, 257.5, 277.5, ... , ...

(3)

(b) Describe what the moving averages show about the trend in the number of chocolate eggs sold in the shop during this period.

....

(1)

(Total for Question 8 is 4 marks)

9 Feisal buys some Christmas crackers.

There is one of a whistle or a balloon or a toy in each cracker.

The probability that there will be a whistle in a cracker is 0.15
The probability that there will be a balloon in a cracker is 0.45

Feisal takes at random one of his crackers.

(a) Work out the probability that there will be

   (i) a toy in the cracker,

   ....

   (ii) a balloon or a toy in the cracker.

   ....
   (4)

Feisal buys 60 of these crackers.

(b) Work out an estimate for the number of crackers that will have a whistle in them.

   ....
   (2)

(Total for Question 9 is 6 marks)

10 The grouped frequency table gives information about the heights, in metres, of 29 mountains.

Height (h metres)	Frequency (f)
$6500 < h \leqslant 7000$	4
$7000 < h \leqslant 7500$	3
$7500 < h \leqslant 8000$	8
$8000 < h \leqslant 8500$	10
$8500 < h \leqslant 9000$	4

(a) Write down the modal class interval.

....
(1)

(b) Find the class interval that contains the median.

....
(1)

(c) Work out an estimate for the mean height.
Give your answer correct to the nearest metre.

.... metres
(4)

(Total for Question 10 is 6 marks)

11 The cumulative frequency diagrams give information about the times taken by each of 50 boys and each of 50 girls to do a Sudoku puzzle.
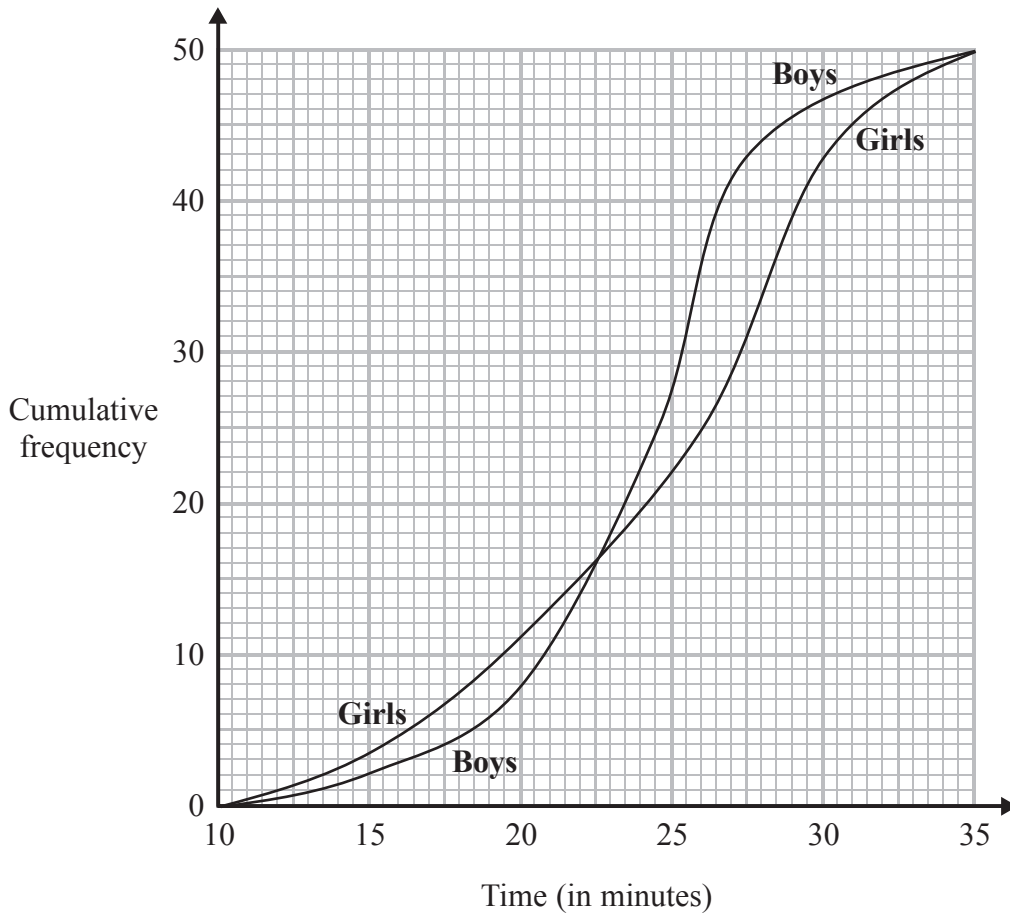
(a) Work out an estimate for the difference between the median time taken by the boys and the median time taken by the girls.

.... minutes

(2)

(b) Work out an estimate for the interquartile range of the times taken by the boys.

.... minutes

(2)

(c) Compare the interquartile ranges of the times taken by the boys and of the times taken by the girls.

....

(1)

(Total for Question 11 is 5 marks)

Turn over ▶

12 Shaun wants to find out the number of games of snooker played by each person in his snooker club.
He is going to use a questionnaire.

(a) Design a suitable question for Shaun to use on his questionnaire.

(2)

The table gives information about the ages of the people in Shaun's snooker club.

Age (in years)	20–29	30–39	40–49	50 and over
Number of people	34	53	69	72

Shaun is going to take a sample of 30 of these people, stratified by age.

(b) Work out the number of people aged 30–39 years in the sample.

....

(2)

(Total for Question 12 is 4 marks)

13 Veena wants to find information about the numbers of people travelling in cars in her town.

She is going to take a sample of the cars passing her house.

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

....

Veena's sample may be biased.

(ii) Explain why.

....

....

(2)

Veena records the number of people in each of 10 cars.

Here are her results.

  1   1   1   2   2   2   3   3   4   5

(b) Find the standard deviation of her results.
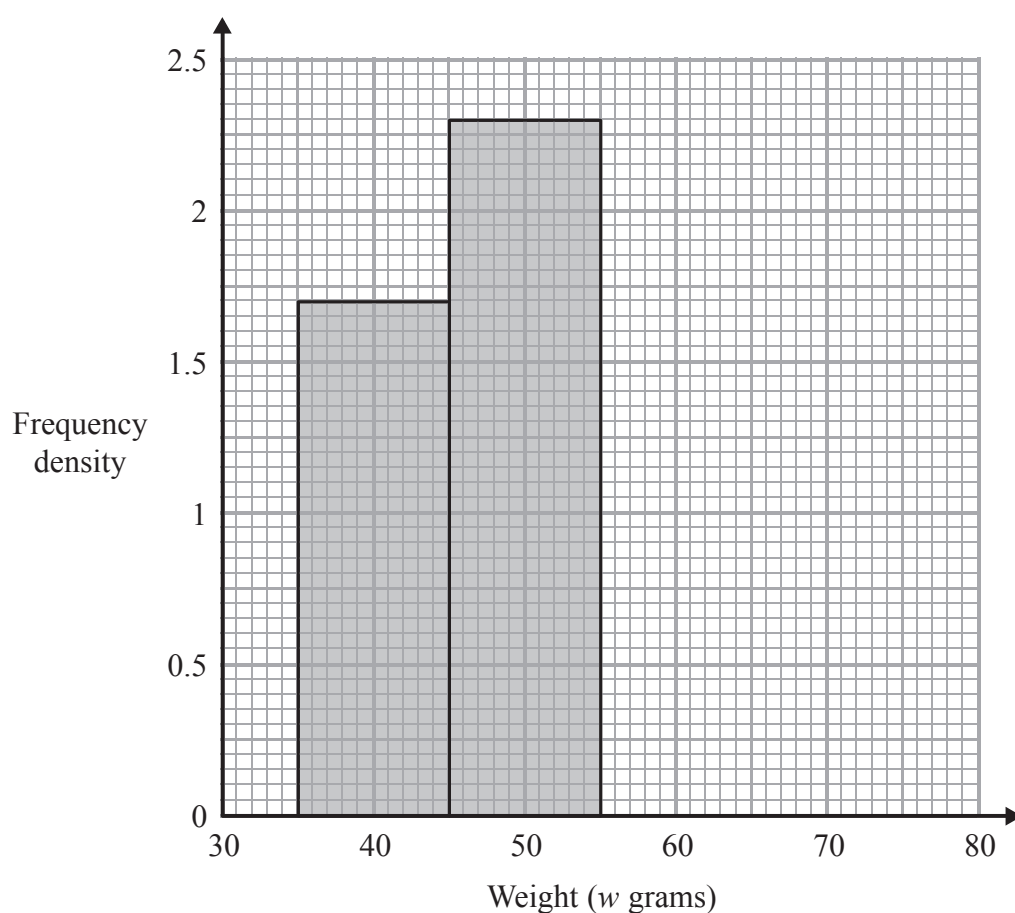Give your answer correct to 2 decimal places.

....

(3)

(Total for Question 13 is 5 marks)

Turn over ▶

14 The incomplete table and histogram give some information about the weights of some onions.

Weight (*w* grams)	Frequency
$35 < w \leqslant 45$	17
$45 < w \leqslant 55$	
$55 < w \leqslant 65$	14
$65 < w \leqslant 75$	6

(a) Use the information in the histogram to complete the table.

(1)

(b) Use the information in the table to complete the histogram.

(2)

(c) Describe the skew of the distribution of the weights of these onions.

....
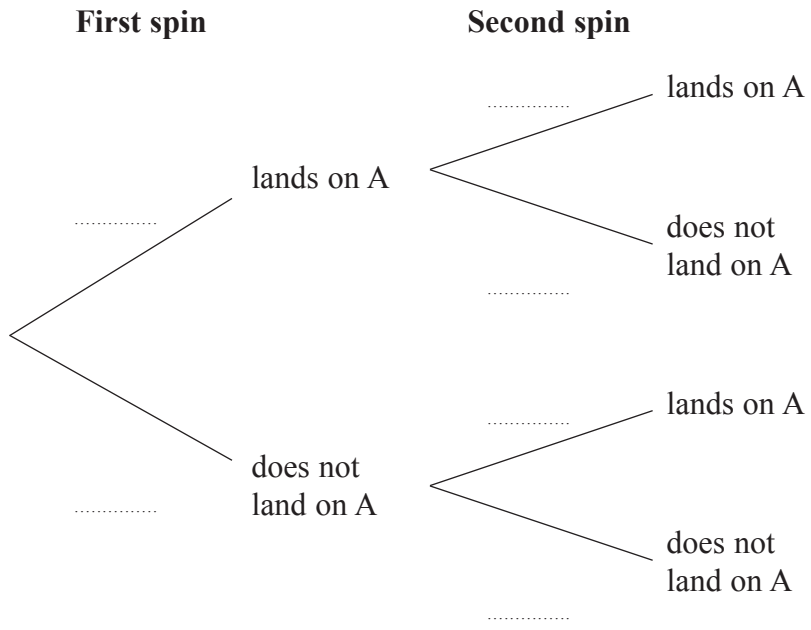
(1)

(Total for Question 14 is 4 marks)

15 The diagram shows a fair 5-sided spinner.
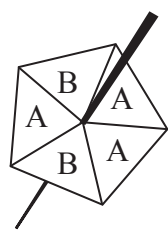
Charley is going to spin the spinner twice.

(a) Complete the probability tree diagram.

First spin   **Second spin**

.... lands on A

lands on A

....

.... does not
land on A

.... lands on A

does not
land on A

....

.... does not
land on A

....

(3)

(b) Work out the probability that the spinner lands on A on the first spin and does not
land on A on the second spin.

....

(2)

(Total for Question 15 is 5 marks)

16 47 boys and 28 girls ran in a cross country race.

The total time taken by the 47 boys was 1275.75 minutes.
The total time taken by the 28 girls was 907.5 minutes.

(a) Compare the mean time taken by the boys and the mean time taken by the girls.
You must show your working.

....

(3)

(b) Work out the combined mean time for all 75 runners.

.... minutes

(2)

(Total for Question 16 is 5 marks)

17 In 2000, Shakta paid £945 council tax.
In 2005, he paid £1078 council tax.

(a) Using 2000 as the base year, work out the index number for the amount of council
tax Shakta paid in 2005.
Give your answer correct to 1 decimal place.

....

(2)

Jenny also pays council tax.

Using 2000 as the base year, the table gives the index numbers for the amounts of council
tax she paid in 2000, in 2005 and in 2010.

Year	2000	2005	2010
Index number	100	103.0	108.0

Jenny says that the amount she paid in council tax in 2010 is 5% more than the amount
she paid in 2005.

She is **wrong**.

(b) Explain why.

....

....

....

(1)

(Total for Question 17 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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