Write your name here

Surname	Other names

Pearson Edexcel Award

Centre Number	Candidate Number

Statistical Methods

Level 2
Calculator allowed

Wednesday 10 May 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference
AST20/01

You must have:
Pen, HB pencil, eraser, calculator, ruler.

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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P 4 8 3 5 3 A 0 1 2 0

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here are two sets of numbers, Set A and Set B.

Set A 2, 4, 7, 8

Set B 1, 3, 5, 7, 9

Kim is going to take at random a number from Set A and a number from Set B.

(a) Complete the sample space diagram to show all the possible outcomes.
One outcome has been done for you.

		Set B				
		1	**3**	**5**	**7**	**9**
Set A	**2**	(2, 1)				
	4					
	7					
	8					

(2)

(b) Work out the probability that the number from Set A and the number from Set B will have

(i) a total of 3

.....

(ii) a total greater than 11

.....

(3)

(Total for Question 1 is 5 marks)

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2 Fatima recorded the number of books sold in a shop for each of 27 days.

Here are her results.

15 20 31 24 32 28 36 37 25

31 35 33 41 18 46 34 39 47

21 19 28 51 53 43 49 26 48

(a) Draw an ordered stem and leaf diagram for this information.
You must include a key.

1	
2	
3	
4	
5	

Key:

(3)

(b) Find the median number of books.

.....

(1)

(c) Work out the interquartile range.

.....

(2)

(Total for Question 2 is 6 marks)

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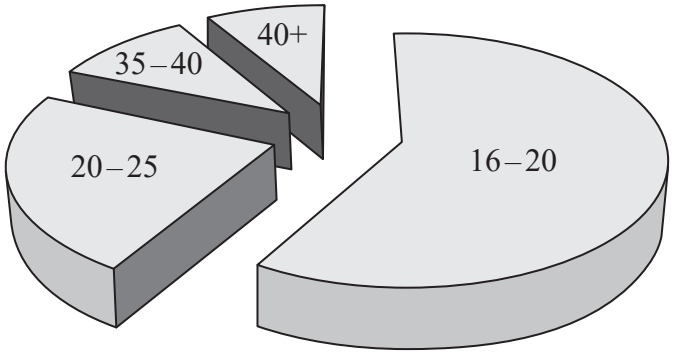
3 The 3-D pie chart shows information about the ages of the people at a concert.



Write down three things that are wrong or could be misleading about this pie chart.

1 .....

.....

2 .....

.....

3 .....

.....

(Total for Question 3 is 3 marks)

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4 The manager of a petrol station recorded the amount of money spent on fuel by each of 24 customers.

Here are her results.

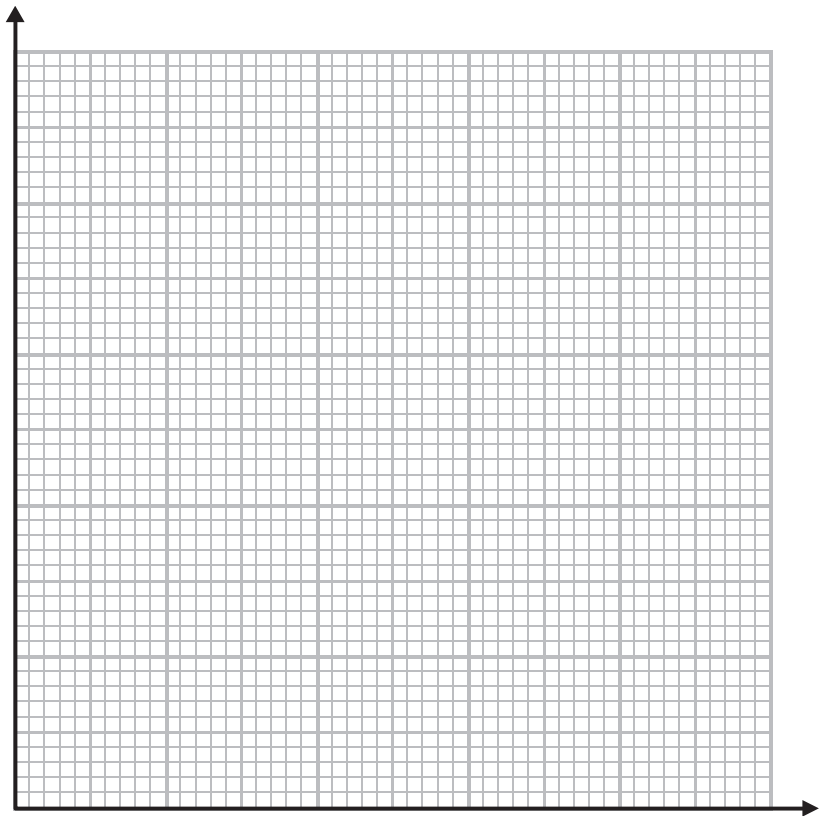
£42.53	£52.00	£54.00	£57.00	£51.93	£44.01	£57.71	£48.00
£46.87	£54.05	£49.17	£41.67	£46.90	£43.97	£51.87	£50.50
£47.66	£43.08	£54.00	£58.00	£48.24	£54.88	£46.01	£53.90

(a) Summarise the data in the grouped frequency table below.

Amount spent (£a)	Tally	Frequency
$40 < a \leqslant 45$		
$45 < a \leqslant 50$		
$50 < a \leqslant 55$		
$55 < a \leqslant 60$		

(2)

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



(3)

(Total for Question 4 is 5 marks)

5 Vikki wants to find out how much tea people drink.
She is going to use a questionnaire.

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

(2)

Vikki is going to give the questionnaire to a sample of the people in her family.

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

.....

This may **not** be a good sample.

(ii) Give one reason why.

.....

.....

(2)

(Total for Question 5 is 4 marks)

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6 Kirin recorded the weights, in grams, of some bats.

The table gives information about his results.

Weight (w grams)	Frequency
$2 < w \leqslant 4$	8
$4 < w \leqslant 6$	16
$6 < w \leqslant 8$	18
$8 < w \leqslant 10$	5

Weight is an example of numeric data.

(a) Which type of numeric data?

.....

(1)

(b) Find the class interval which contains the median weight.

.....

(1)

(c) Work out an estimate for the mean weight.
Give your answer correct to 1 decimal place.

..... grams

(4)

(Total for Question 6 is 6 marks)

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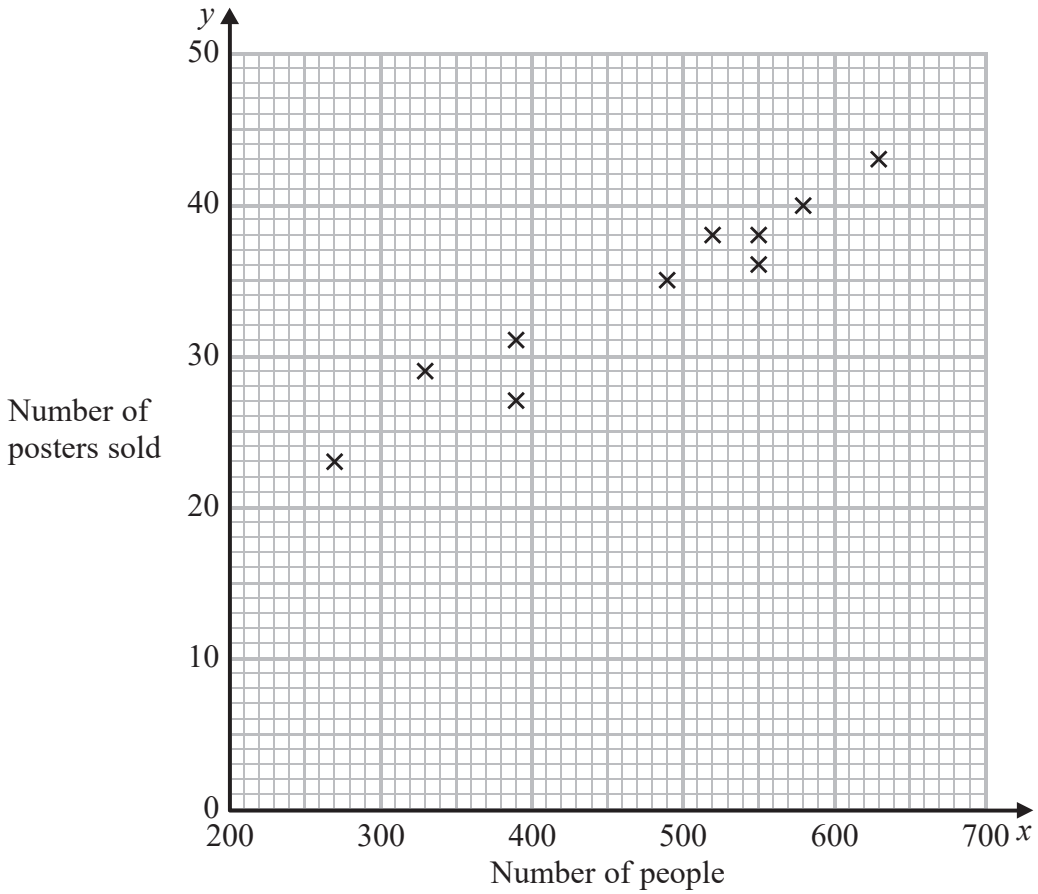
7 The scatter graph shows information about the number of people visiting a gallery (x) and the number of posters sold in the gallery shop (y) on each of 10 days.



330 people visited the gallery on one of these days.

(a) How many posters were sold on that day?

.....

(1)

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

.....

(ii) Describe the relationship between the number of people visiting the gallery and the number of posters sold.

.....

.....

(2)

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(c) Work out the mean point of the data.
You may use $\sum x = 4700$ and $\sum y = 340$

(..... , ...)

(2)

(d) On the grid,

(i) plot the mean point,

(ii) draw a line of best fit for the data.

(2)

On the eleventh day, 450 people visited the gallery.

(e) Find an estimate for the number of posters sold on this day.

.....

(1)

(Total for Question 7 is 8 marks)

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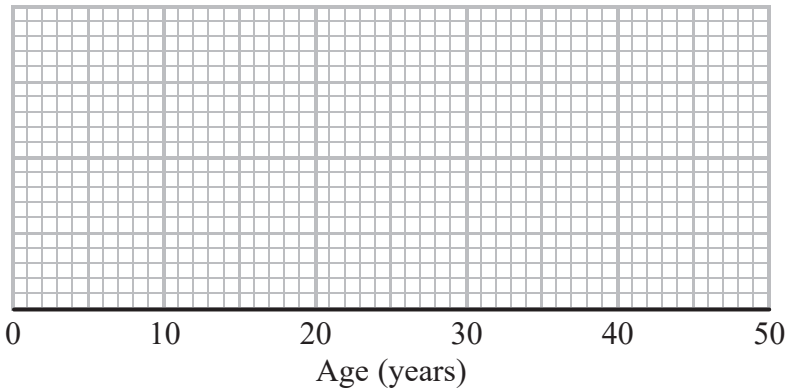
8 John recorded the ages, in years, of 15 donkeys.
Here are his results.

12 16 25 28 29 35 36 36 37 38 38 38 39 41 47

(a) On the grid, draw a box plot for John's results.



(4)

(b) Describe the skew of the distribution shown in your box plot.

.....

(1)

(Total for Question 8 is 5 marks)

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9 Yoko asks each of 50 teachers which of the plays Othello or Hamlet or Macbeth they like the best.

Here is some information about her results.

10 males like Othello the best.
8 males and 9 females like Hamlet the best.
7 males and 4 females like Macbeth the best.

(a) Use this information to complete the two-way table.

	Othello	Hamlet	Macbeth	Total
Male				
Female				
Total				

(4)

Cameron asks each of 138 students which of the plays Othello or Hamlet or Macbeth they like the best.

The table below shows some information about his results.

	Othello	Hamlet	Macbeth	Total
Number of students	28	61	49	138

Cameron is going to take a sample of 25 of these students stratified by play.

(b) Work out the number of students in his sample who like Hamlet the best.

.....

(2)

(Total for Question 9 is 6 marks)

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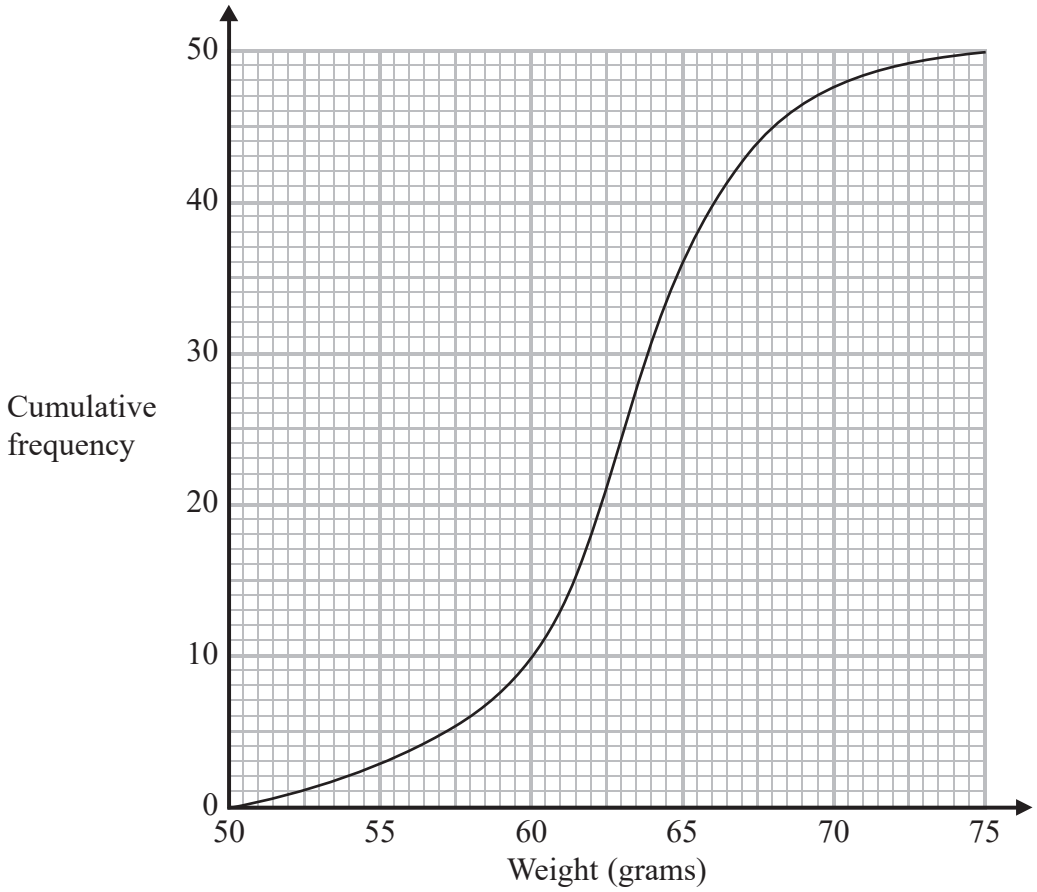
10 The cumulative frequency diagram gives information about the weights of 50 eggs.



(a) Find an estimate for the median weight.

..... grams

(1)

(b) Find an estimate for the number of eggs with a weight greater than 65 grams.

.....

(2)

(Total for Question 10 is 3 marks)

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11 A box contains blue pens, black pens and red pens.

Zach is going to take at random a pen from the box.

The probability that the pen will be blue is 0.35
The probability that the pen will be black is 0.45
The probability that the pen will be red is 0.2

(a) Work out the probability that the pen will be blue or black.

.....

(2)

(b) Work out the probability that the pen will **not** be blue.

.....

(2)

Zach says that the **only** pens in the box are blue pens, black pens and red pens.
He is **right**.

(c) Explain why.

.....

.....

(1)

(Total for Question 11 is 5 marks)

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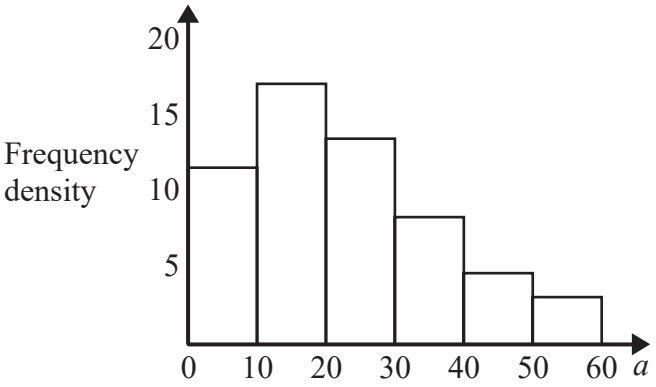
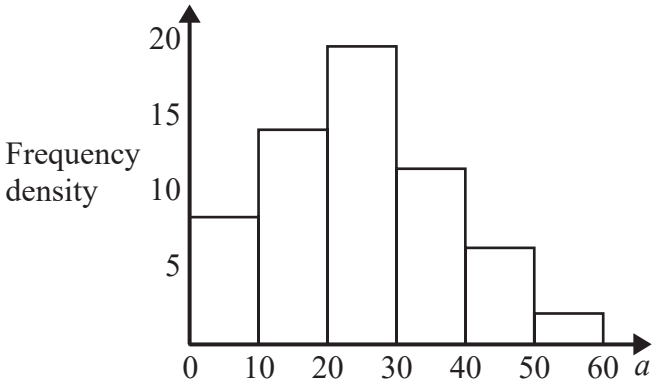
12 The diagram shows two histograms, Histogram A and Histogram B.

Histogram A



Histogram B



Here is a list of the class intervals for Histogram A.

$0 < a \leqslant 10$ $10 < a \leqslant 20$ $20 < a \leqslant 30$ $30 < a \leqslant 40$ $40 < a \leqslant 50$ $50 < a \leqslant 60$

(a) Which class interval from the list is the modal class interval for Histogram A?

.....

(1)

Both histograms show a positive skew.

(b) Which histogram shows the greater positive skew, Histogram A or Histogram B? Give a reason for your answer.

.....

.....

(2)

(Total for Question 12 is 3 marks)

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13 The table shows the number of chocolate eggs sold in a shop for each of six months.

Month	**March**	**April**	**May**	**June**	**July**	**August**
Number of chocolate eggs	215	47	56	32	38	35

The number of chocolate eggs sold in March is an outlier for the number of eggs sold in the six months.

(a) Using the information in the table, explain why.

.....

(1)

Ignoring the number of eggs sold in March,

(b) work out the 3-point moving averages for the months April to August.
The first one has been done for you.

45, ... , ...

(2)

(c) Describe what the moving averages show about the trend in the number of chocolate eggs sold in the shop during these months.

.....

(1)

(Total for Question 13 is 4 marks)

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14 Paul is going to roll a fair 6-sided dice 90 times.

(a) Work out an estimate for the number of times the dice will land on 5

.....

(2)

Clive has a coin.
He spins the coin 50 times.
The coin lands Heads a total of 10 times.

The coin may be biased.

(b) Explain why.

.....

.....

(1)

(Total for Question 14 is 3 marks)

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15 A shop sells lawnmowers.
In 2013, the average price of the lawnmowers in the shop was £88.32
In 2014, the average price of the lawnmowers in the shop was £90.87

(a) Using 2013 as the base year, work out the index number for the average price of the lawnmowers in the shop in 2014.
Give your answer correct to 1 decimal place.

.....

(2)

The shop also sells wheelbarrows.
Using 2013 as the base year, the index number for the average price of the wheelbarrows in the shop in 2014 is 98.5

(b) Interpret this index number.

.....

.....

(2)

(Total for Question 15 is 4 marks)

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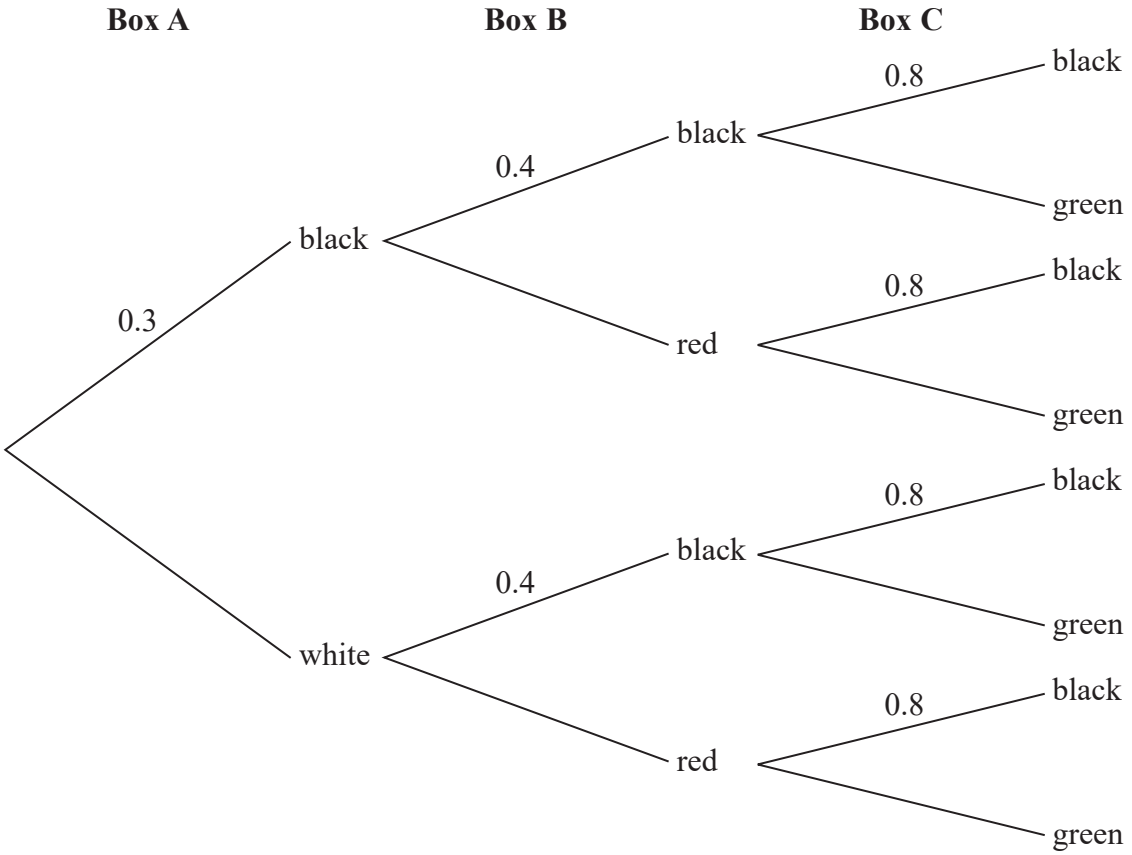
16 Box A contains only black counters and white counters.

Box B contains only black counters and red counters.

Box C contains only black counters and green counters.

The incomplete probability tree diagram shows the probability of taking a black counter from each of the boxes.



Jason is going to take at random a counter from Box A, a counter from Box B and a counter from Box C.

(a) Work out the probability that all three counters will be black.

.....

(2)

(b) Work out the probability that the counter from Box A will be white, the counter from Box B will be black and the counter from Box C will be green.

.....

(3)

(Total for Question 16 is 5 marks)

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17 $\frac{\sum x}{n} = 4.6$

$\frac{\sum x^2}{n} = 27.8$

Work out the standard deviation.
Give your answer correct to 3 significant figures.

.....

(Total for Question 17 is 2 marks)

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18 In 2015, Mary recorded the midday temperature in her garden for each day in January, in February and in March.

She used this information to produce the following table.

	January	**February**	**March**
Mean midday temperature (°C)	5.5	8.25	10.5
Number of days	31	28	31

Work out the mean midday temperature for the 90 days.
Give your answer correct to 1 decimal place.

..... °C

(Total for Question 18 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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