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Surname

Other names

Pearson
Edexcel GCSE

Centre Number

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Candidate Number

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Mathematics B

Unit 1: Statistics and Probability (Calculator)

Higher Tier

Wednesday 2 November 2016 – Morning

Time: 1 hour 15 minutes

Paper Reference

5MB1H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

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 60
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

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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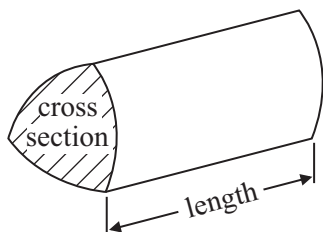
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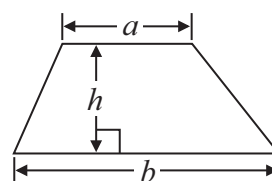
Formulae: Higher Tier

**You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.**

Volume of prism = area of cross section \times length

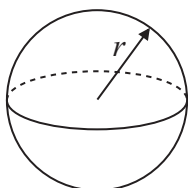


Area of trapezium = $\frac{1}{2} (a + b)h$



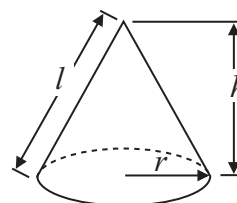
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$

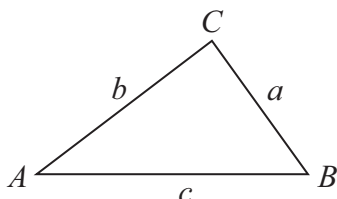


Volume of cone = $\frac{1}{3} \pi r^2 h$

Curved surface area of cone = $\pi r l$



In any triangle ABC



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2} ab \sin C$

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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

- 1 Jeremy catches 19 fish.

Here are the weights, in grams, of the fish.

50	61	57	47	53	75	62	48	64	73
78	51	66	58	66	48	55	69	50	

Draw an ordered stem and leaf diagram for these weights.



Key:

(Total for Question 1 is 3 marks)



2 Here are the ingredients needed to make 30 biscuits.

Biscuits	
Ingredients to make 30 biscuits	
400 g	of flour
320 g	of butter
180 g	of sugar

Helen wants to make 20 biscuits.

(a) How much sugar does Helen need?

..... 80
(2)

John has 1 kg of flour and enough of the other ingredients.

(b) Work out the greatest number of biscuits John can make.

.....
(2)

(Total for Question 2 is 4 marks)

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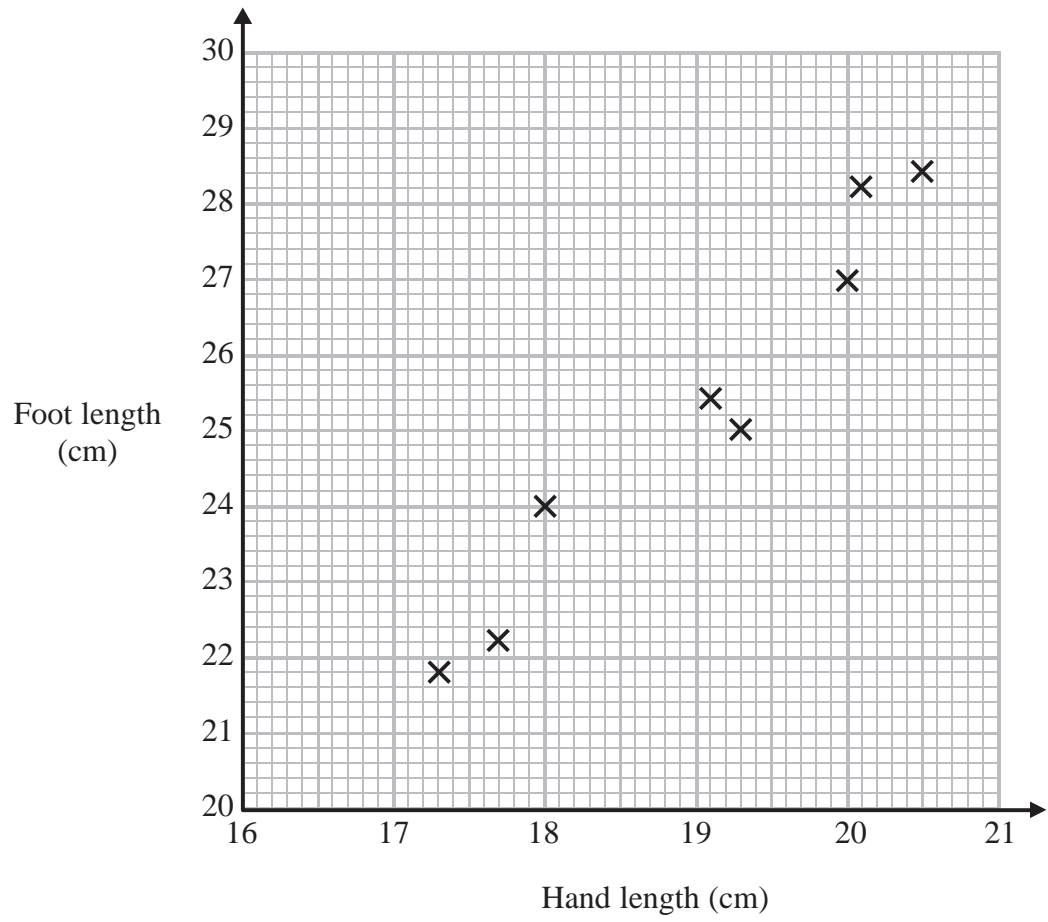


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3 The scatter graph gives information about the hand length and the foot length of each of 8 people.



(a) Describe the relationship between the hand length and the foot length of these people.

.....

.....

(1)

Toby has a hand length of 18.5 cm.

(b) Find an estimate for Toby's foot length.

.....cm

(2)

(Total for Question 3 is 3 marks)



- 4 Khanna wants to find out how much time people spend listening to the radio. She is going to use a questionnaire.

(a) Design a suitable question for Khanna to use on her questionnaire.

(2)

Khanna asks the people in her dance class to do the questionnaire.

(b) Her sample is biased.
Explain why.

(1)

(Total for Question 4 is 3 marks)

- 5 Steph's weight in kilograms is $2x + 9$
Kyle's weight in kilograms is $4x - 7$

Write down an expression, in terms of x , for the mean of their weights.

..... kilograms

(Total for Question 5 is 2 marks)

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*6 Fraya is planning a chess competition.

Here are the costs.

Prizes	Food and drink	Room
First prize £50		£168
Second prize £25		15% discount on Saturdays.
Third prize £15		£225

The competition will be on a Saturday.

There will be 48 players in the competition.

Each player will pay an entry fee of £9.50

Will Fraya get enough money from the entry fees to pay all the costs?

You must show your working.

(Total for Question 6 is 5 marks)



7 The table gives information about the areas, in cm^2 , of some growths of mould in an experiment.

Area ($a \text{ cm}^2$)	Frequency
$0 < a \leq 5$	4
$5 < a \leq 10$	7
$10 < a \leq 15$	9
$15 < a \leq 20$	15

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(a) Write down the class interval that contains the median area.

.....
(1)

(b) Work out an estimate for the mean area.

..... cm^2
(4)

(Total for Question 7 is 5 marks)



- 8 99 children each buy one drink.
They each buy cola or juice or water.

45 of these children are girls.

25 boys buy cola.

16 girls buy juice.

17 of the 37 children who buy water are boys.

Work out the number of children who buy cola.

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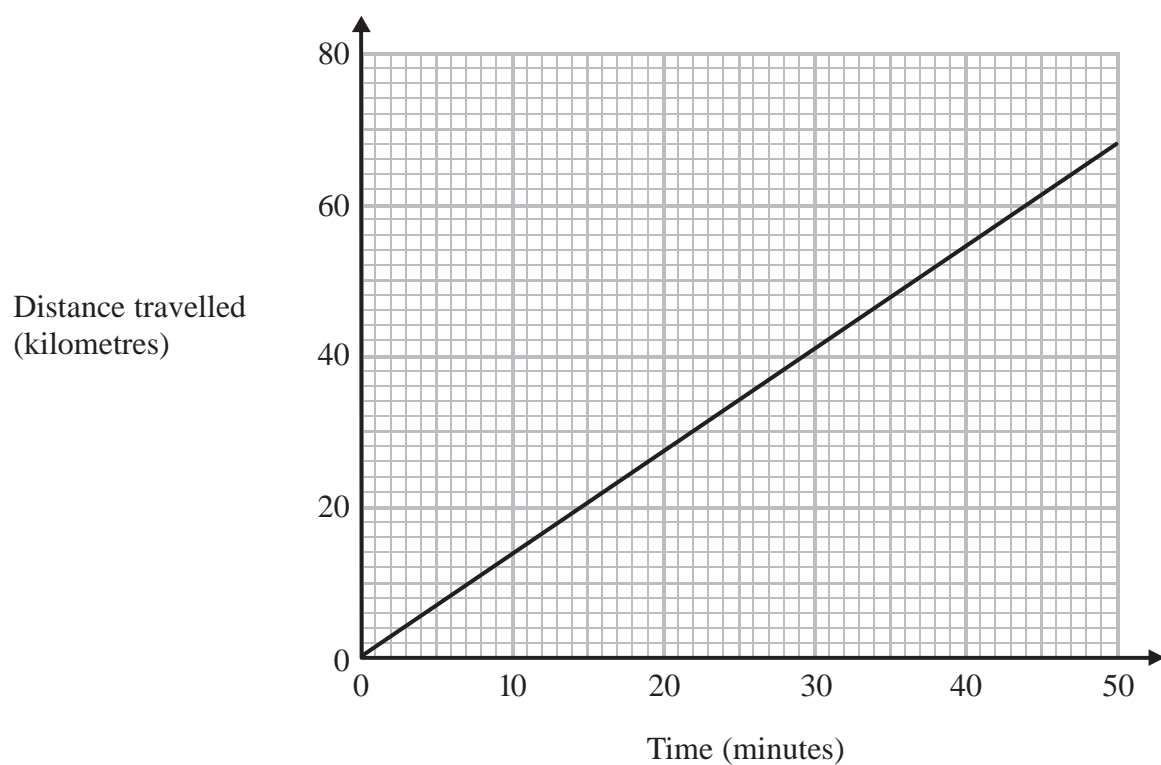
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.....
(Total for Question 8 is 4 marks)



- 9 The graph shows information about the distances travelled by a lorry.



The graph is a straight line.

- (a) Work out the gradient of the straight line.

.....
(2)

- (b) Write down a practical interpretation of the value you calculated in part (a).

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

(Total for Question 9 is 3 marks)

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10 50 students each did a mathematics test.
The mean score for these 50 students was 8.4

There were 30 boys.
The mean score for these 30 boys was 8.25

Work out the mean score for the girls.

.....
(Total for Question 10 is 3 marks)

11 A factory makes 5000 televisions.

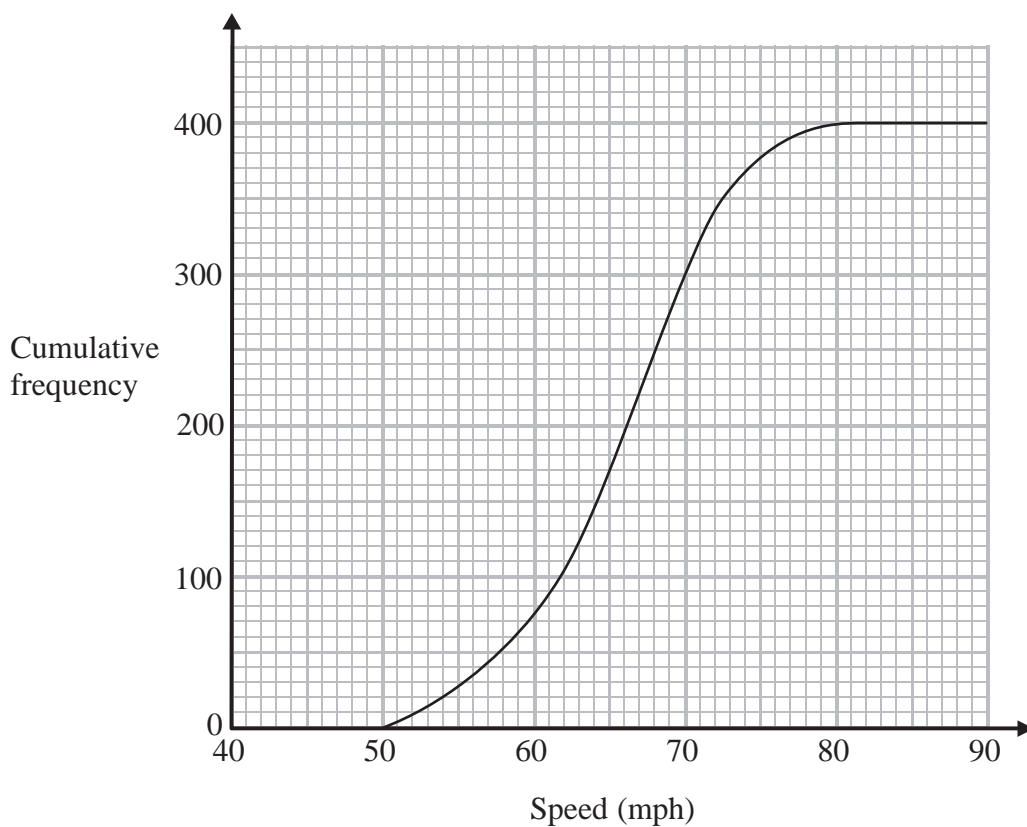
Greta is going to take a random sample of 25 of these televisions.

Describe a method she could use to select the sample.

.....
.....
.....
(Total for Question 11 is 1 mark)



- 12 The cumulative frequency graph gives information about the speeds, in mph, of 400 cars passing a speed camera between 7 am and 8 am one day.



- (a) Work out an estimate for the number of cars passing this speed camera at speeds greater than 72 mph.

.....
(2)

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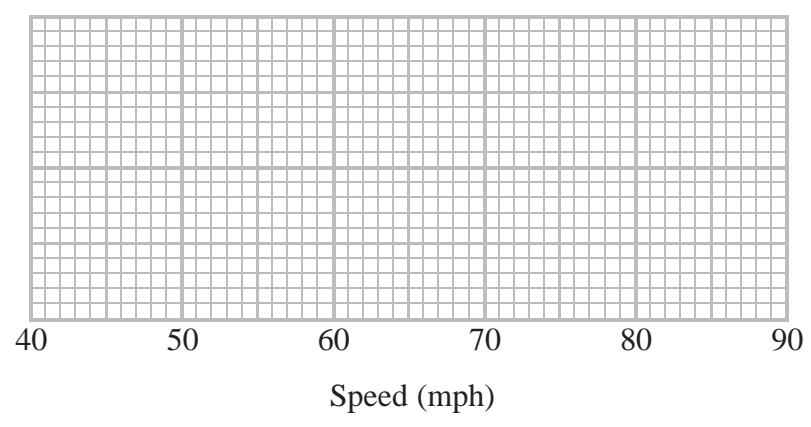


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The least speed for these 400 cars was 50 mph.
 The greatest speed for these 400 cars was 81 mph.

- (b) Use the cumulative frequency graph and the information above to draw a box plot to show the distribution of the speeds of these 400 cars.

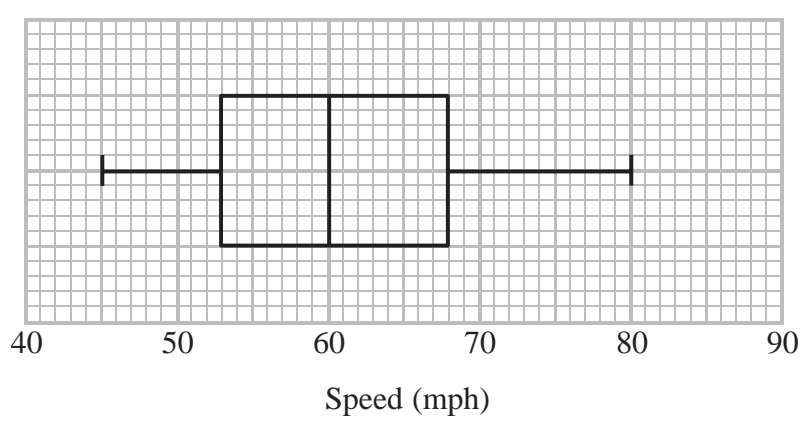
between 7 am
and 8 am



(3)

The box plot below shows the distribution of the speeds of the cars passing the speed camera between 1 pm and 2 pm the same day.

between 1 pm
and 2 pm



- *(c) Compare the two distributions of the speeds.

.....

.....

.....

.....

(2)

(Total for Question 12 is 7 marks)

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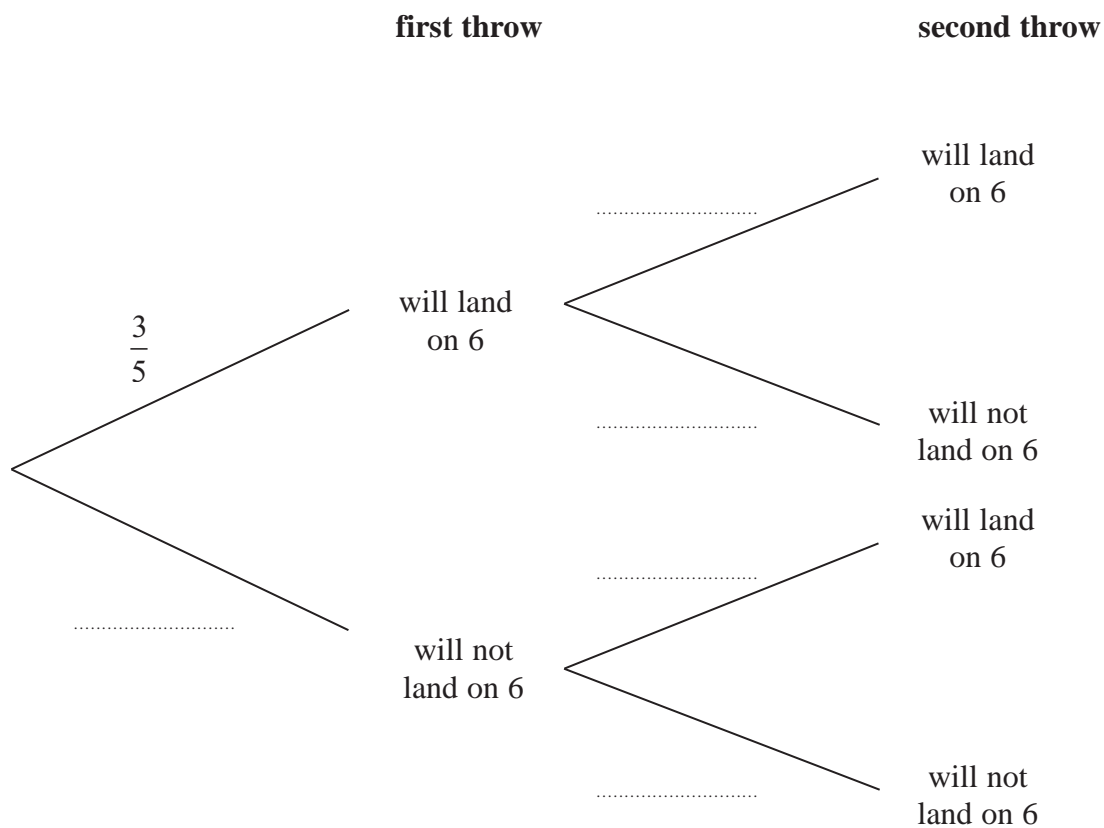


13 Seb has a biased dice.

When the dice is thrown once, the probability that it will land on 6 is $\frac{3}{5}$

Seb is going to throw the dice twice.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that the dice will land on 6 on the first throw and will **not** land on 6 on the second throw.

.....
(2)

(Total for Question 13 is 4 marks)

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- 14 176 people each bought a hot dog or a burger or a pizza from a snack bar.
The table gives information about the people and the type of food they bought.

	Hot dog	Burger	Pizza
Male	29	45	17
Female	23	37	25

Oscar is going to take a sample of 20 of these people.
The sample will be stratified by type of food and by gender.

Work out how many males who bought a pizza will be in the sample.

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

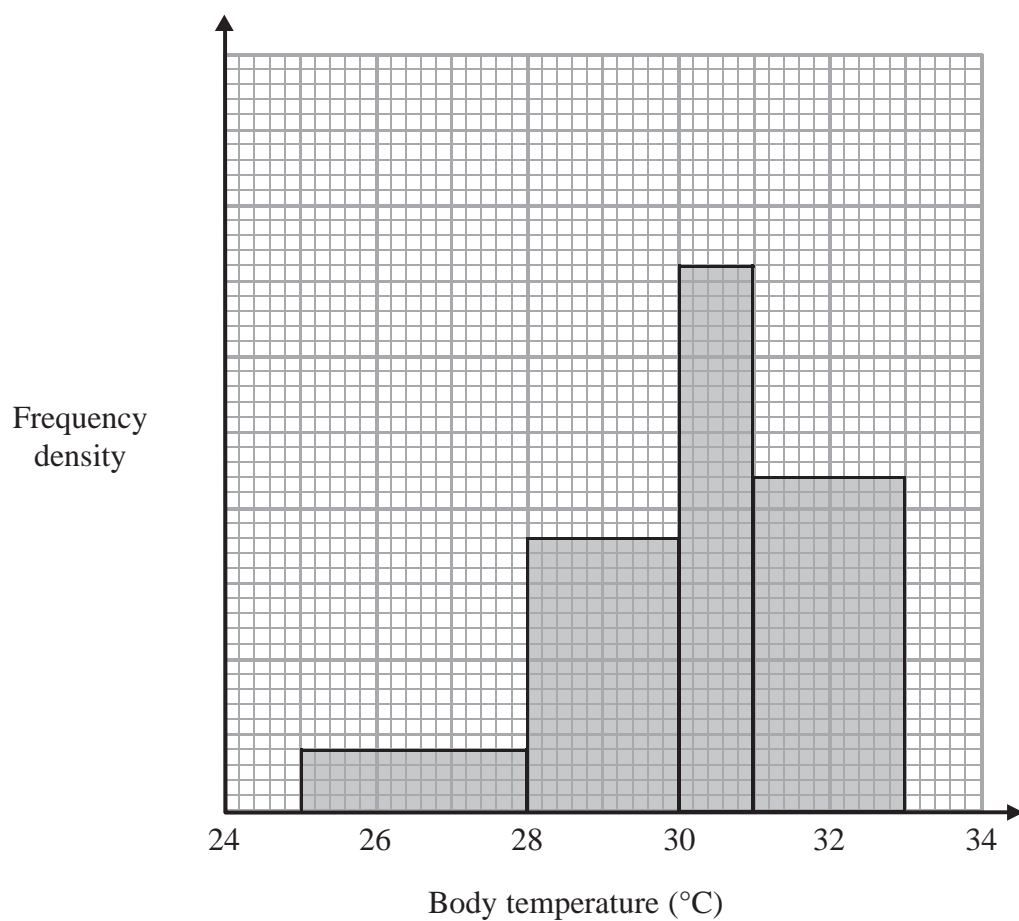
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15 The histogram gives information about the body temperatures of 320 lizards at 2 pm one day.



Work out how many of these lizards had a body temperature greater than 30°C .

(Total for Question 15 is 3 marks)



16 The probability that a car will pass a test is 0.95

Three cars are going to be tested.

(a) Work out the probability that none of these cars will pass the test.

.....
(2)

(b) Work out the probability that exactly two of these cars will pass the test.
You must show your working.

.....
(3)

(Total for Question 16 is 5 marks)

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- 17 There are a large number of white beads in a bag.
There are only white beads in the bag.

Felicity wants to find an estimate for the number of beads in the bag.

Felicity replaces 30 of the white beads in the bag with 30 black beads.

She then takes 50 beads from the bag.

2 of the 50 beads are black.

Felicity then puts the 50 beads back in the bag.

- (a) Work out an estimate for the number of beads in the bag.

.....
(2)

- (b) Write down one assumption you have made.

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

(Total for Question 17 is 3 marks)

TOTAL FOR PAPER IS 60 MARKS

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