

Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	
		January 2023	
Pearson Edexcel International Advanced Level			
Time 1 hour 30 minutes		Paper reference	WST01/01
Mathematics			
International Advanced Subsidiary/Advanced Level			
Statistics S1			
You must have: Mathematical Formulae and Statistical Tables (Yellow), calculator			Total Marks

Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Values from the statistical tables should be quoted in full. If a calculator is used instead of the tables, the value should be given to an equivalent degree of accuracy.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 6 questions in this question paper. The total mark for this paper is 75.
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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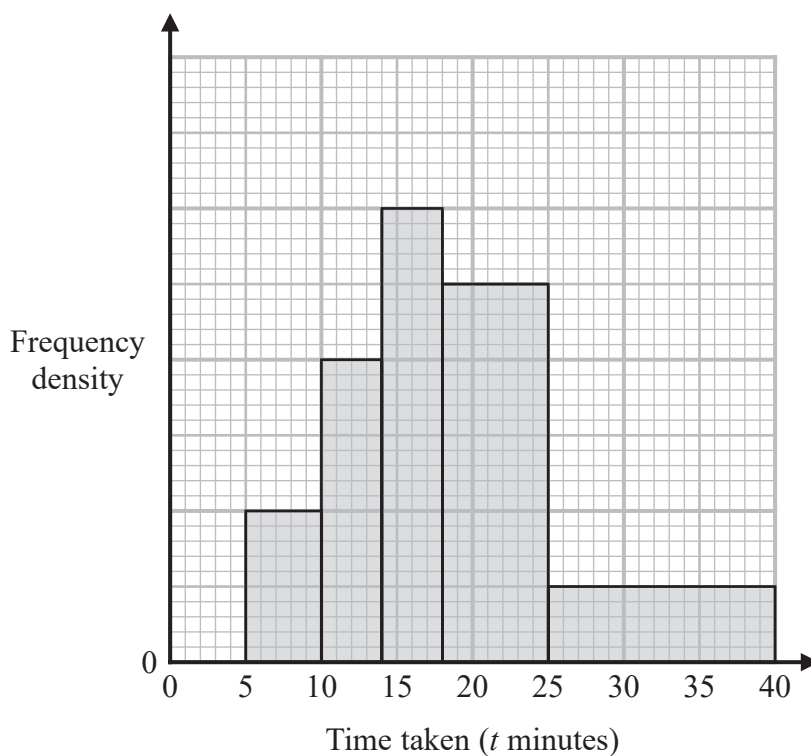
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1. The histogram shows the times taken, t minutes, by each of 100 people to swim 500 metres.



- (a) Use the histogram to complete the frequency table for the times taken by the 100 people to swim 500 metres.

Time taken (t minutes)	5 – 10	10 – 14	14 – 18	18 – 25	25 – 40
Frequency (f)	10	16	24		

(1)

- (b) Estimate the number of people who took less than 16 minutes to swim 500 metres.

(2)

- (c) Find an estimate for the mean time taken to swim 500 metres.

(2)

Given that $\sum ft^2 = 41\,033$

- (d) find an estimate for the standard deviation of the times taken to swim 500 metres.

(2)

Given that $Q_3 = 23$

- (e) use linear interpolation to estimate the interquartile range of the times taken to swim 500 metres.

(3)



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Question 1 continued

Lined area for writing the answer to Question 1.



Question 1 continued

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Question 1 continued

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(Total for Question 1 is 10 marks)



2. Two bags, X and Y , each contain green marbles (G) and blue marbles (B) only.

- Bag X contains 5 green marbles and 4 blue marbles
- Bag Y contains 6 green marbles and 5 blue marbles

A marble is selected at random from bag X and placed in bag Y

A second marble is selected at random from bag X and placed in bag Y

A third marble is then selected, this time from bag Y

(a) Use this information to complete the tree diagram shown on page 7 (3)

(b) Find the probability that the 2 marbles selected from bag X are of different colours. (2)

(c) Find the probability that all 3 marbles selected are the same colour. (2)

Given that all three marbles selected are the same colour,

(d) find the probability that they are all green. (3)



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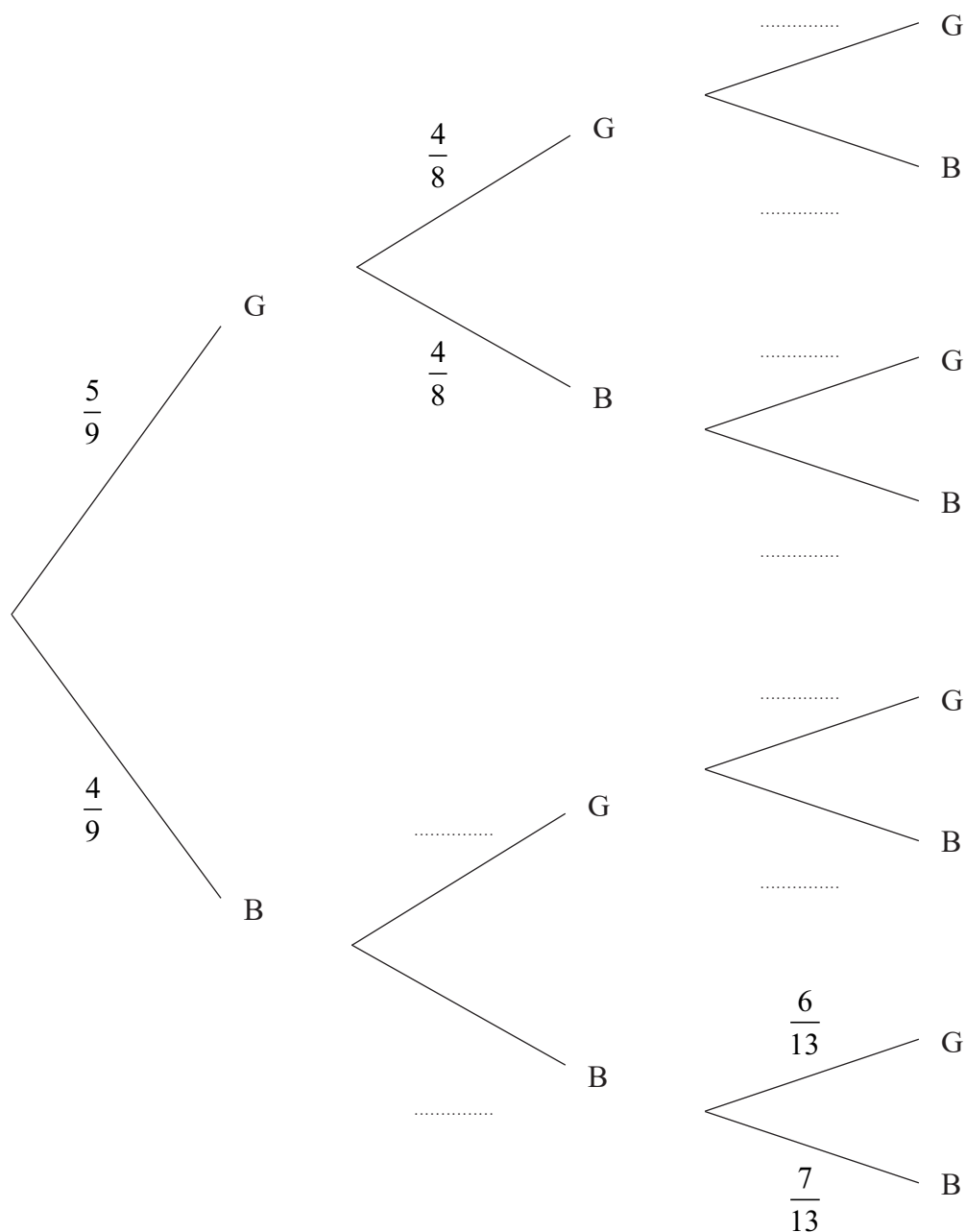
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Question 2 continued

1st Marble
(from bag X)

2nd Marble
(from bag X)

3rd Marble
(from bag Y)





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Question 2 continued

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Question 2 continued

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(Total for Question 2 is 10 marks)

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Question 3 continued

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(Total for Question 3 is 11 marks)



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Question 4 continued

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Question 4 continued

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Question 4 continued

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(Total for Question 4 is 13 marks)



5. The lengths, L mm, of housefly wings are normally distributed with $L \sim N(4.5, 0.4^2)$
- (a) Find the probability that a randomly selected housefly has a wing length of less than 3.86 mm.
- (b) Find
- (i) the upper quartile (Q_3) of L
- (ii) the lower quartile (Q_1) of L

A value that is greater than $Q_3 + 1.5 \times (Q_3 - Q_1)$ or smaller than $Q_1 - 1.5 \times (Q_3 - Q_1)$ is defined as an outlier.

- (c) Find these two outlier limits. (3)

A housefly is selected at random.

- (d) Using standardisation, show that the probability that this housefly is **not** an outlier is 0.993 to 3 decimal places. (3)

Given that this housefly is **not** an outlier,

- (e) showing your working, find the probability that the wing length of this housefly is greater than 5 mm. (4)



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Question 5 continued

Lined area for writing the answer to Question 5.



Question 5 continued

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Question 5 continued

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(Total for Question 5 is 17 marks)



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Question 6 continued

Lined area for writing the answer to Question 6.



Question 6 continued

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Question 6 continued

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(Total for Question 6 is 14 marks)

TOTAL FOR PAPER IS 75 MARKS

