

## Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		



MATHEMATICS 9709/05

Paper 5 Probability & Statistics 1

For examination from 2020

SPECIMEN PAPER

1 hour 15 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

## **INSTRUCTIONS**

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Do not write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

## **INFORMATION**

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

This document has **14** pages. Blank pages are indicated.

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1 The following back-to-back stem-and-leaf diagram shows the annual salaries of a group of 39 females and 39 males.

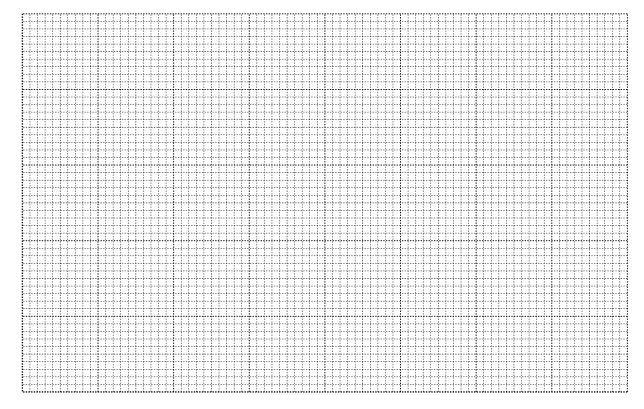
	Females		Males	
(4)	5 2 0 0	20	3	(1)
(9)	9 8 8 7 6 4 0 0 0	21	0 0 7	(3)
(8)	8 7 5 3 3 1 0 0	22	0 0 4 5 6 6	(6)
(6)	6 4 2 1 0 0	23	0 0 2 3 3 5 6 7 7	(9)
(6)	7 5 4 0 0 0	24	0 1 1 2 5 5 6 8 8 9	(10)
(4)	9 5 0 0	25	3 4 5 7 7 8 9	(7)
(2)	5 0	26	0 4 6	(3)

Key:  $2 \mid 20 \mid 3$  means \$20 200 for females and \$20 300 for males.

(a)	Find the median and the quartiles of the females' salaries.	[2]
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You are given that the median salary of the males is  $$24\,000$ , the lower quartile is  $$22\,600$  and the upper quartile is  $$25\,300$ .

(b) Draw a pair of box-and-whisker plots in a single diagram on the grid below to represent the data. [3]



2

information:

A summary of the speeds, x kilometres per hour, of 22 cars passing a certain point gave the following

$\Sigma(x-50) = 81.4$ and $\Sigma(x-50)^2 = 671.0$ .	
Find the variance of the speeds and hence find the value of $\Sigma x^2$ .	[4]

A book club sends 6 paperback and 2 hardback books to Mrs Hunt. She chooses 4 of these books at

3

Show that the probability that she chooses exactly 2 paperback books is $\frac{3}{14}$ .
Draw up the probability distribution table for $X$ .

(c)	You are given that $E(X) = 3$ .
(6)	Find $Var(X)$ . [2]

a)	Find on how many days of the year (365 days) the daily sales can be expected to exceed 390
	litres.
	daily sales at another petrol station are $X$ litres, where $X$ is normally distributed with mean $m$ and addred deviation 560. It is given that $P(X > 8000) = 0.122$ .
b)	Find the value of <i>m</i> .

Find the probability that daily sales at this petrol station exceed 8000 litres on fewer than 2 randomly chosen days.

5

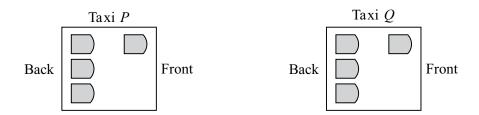
Use an ap	proximation	to find the	probability	that a 3 is	obtained fe	wer than 18 t	imes.
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,	Justify your use of the approximation in part (a).	[
n	another occasion, the same die is thrown repeatedly until a 3 is obtained.	
:)	Find the probability that obtaining a 3 requires fewer than 7 throws.	[

A group of 8 friends travels to the airport in two taxis, P and Q. Each taxi can take 4 passengers.

6

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l	Find the number of different ways in which this can be done.
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Each taxi can take 1 passenger in the front and 3 passengers in the back (see diagram). Mark sits in the front of taxi P and Jon and Sarah sit in the back of taxi P next to each other.

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7 Bag A contains 4 balls numbered 2, 4, 5, 8. Bag B contains 5 balls numbered 1, 3, 6, 8, 8. Bag C contains 7 balls numbered 2, 7, 8, 8, 8, 9. One ball is selected at random from each bag. Event *X* is 'exactly two of the selected balls have the same number'. Event *Y* is 'the ball selected from bag *A* has number 4'. (a) Find P(X). [5]

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## Additional page

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