Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

7871699732

MATHEMATICS **9709/62**

Paper 6 Probability & Statistics 1 **(S1)** **February/March 2018**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: List of Formulae (MF9)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions in the space provided. If additional space is required, you should use the lined page at the end of this booklet. The question number(s) must be clearly shown.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
The use of an electronic calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 50.

This document consists of **12** printed pages.

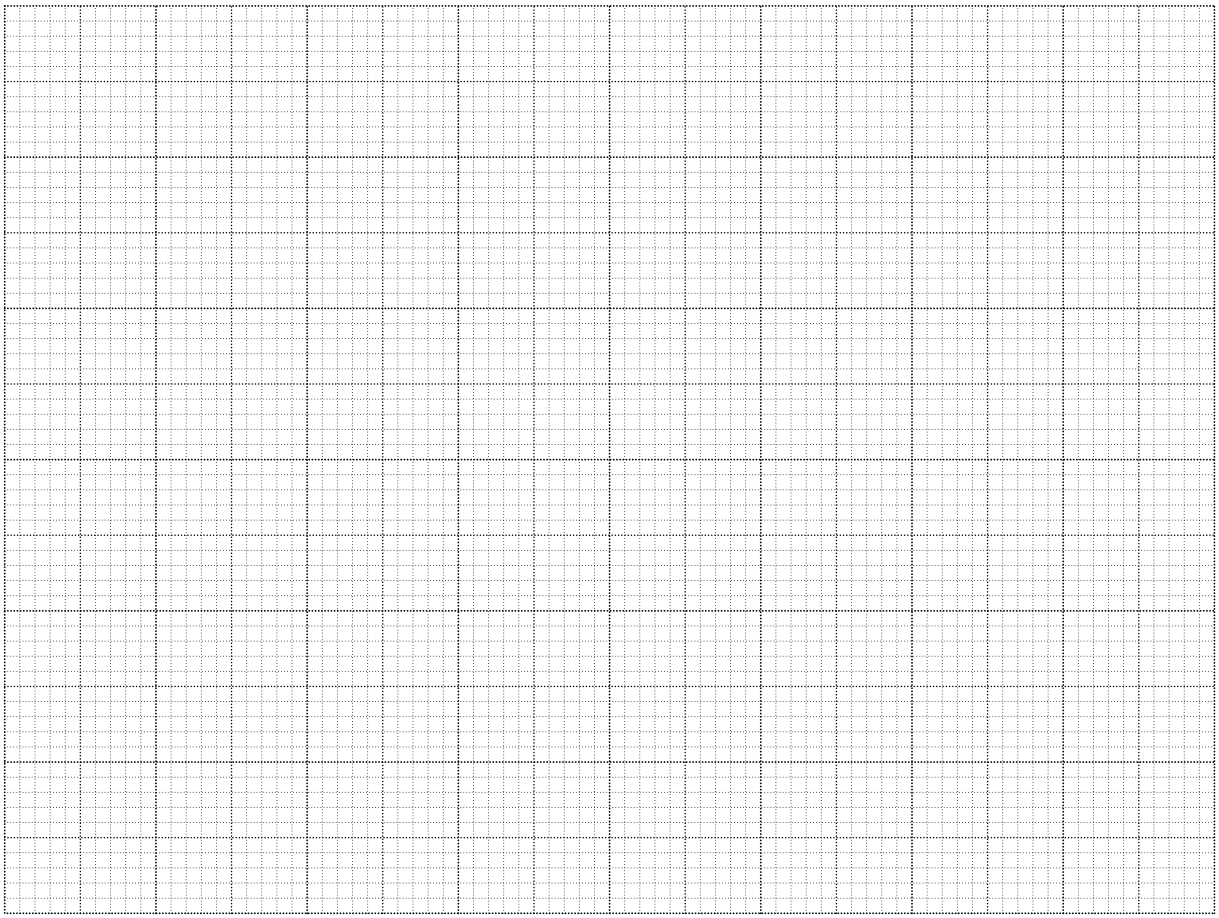
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CAMBRIDGE International Examinations

1 There are 900 students in a certain year-group. An identical puzzle is given to each student and the time taken, t minutes, to complete the puzzle is recorded. These times are summarised in the following frequency table.

Time taken, t minutes	$t \leqslant 3$	$3 < t \leqslant 4$	$4 < t \leqslant 5$	$5 < t \leqslant 6$	$6 < t \leqslant 8$	$8 < t \leqslant 10$	$10 < t \leqslant 14$
Frequency	120	180	200	160	110	80	50

On the grid, draw a cumulative frequency graph to represent the data. Use your graph to estimate the median time taken by these students to complete the puzzle. [4]



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2 A selection of 3 letters from the 8 letters of the word COLLIDER is made.

(i) How many different selections of 3 letters can be made if there is exactly one L? [1]

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(ii) How many different selections of 3 letters can be made if there are no restrictions? [3]

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3 Last Saturday, Sarah recorded the colour and type of 160 cars in a car park. All the cars that were not red or silver in colour were grouped together as 'other'. Her results are shown in the following table.

		Type of car		
		Saloon	Hatchback	Estate
Colour of car	Red	20	40	12
	Silver	14	26	10
	Other	6	24	8

(i) Find the probability that a randomly chosen car in the car park is a silver estate car. [1]

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(ii) Find the probability that a randomly chosen car in the car park is a hatchback car. [1]

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(iii) Find the probability that a randomly chosen car in the car park is red, given that it is a hatchback car. [2]

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(iv) One of the cars in the car park is chosen at random. Determine whether the events 'the car is a hatchback car' and 'the car is red' are independent, justifying your answer. [2]

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4 The discrete random variable X has the following probability distribution.

x	−2	0	1	3	4
$P(X = x)$	0.2	0.1	p	0.1	q

(i) Given that $E(X) = 1.7$, find the values of p and q. [4]

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(ii) Find $\text{Var}(X)$. [2]

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5 A summary of n values of x gave the following information:

$$\Sigma(x - 20) = 136, \qquad \Sigma(x - 20)^2 = 2888.$$

The mean of the n values of x is 24.25.

(i) Find the value of n. [2]

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(ii) Find Σx^2. [4]

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6 The digits 1, 3, 5, 6, 6, 6, 8 can be arranged to form many different 7-digit numbers.

(i) How many of the 7-digit numbers have all the even digits together and all the odd digits together? [3]

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(ii) How many of the 7-digit numbers are even? [3]

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7 The weights of packets of a certain type of biscuit are normally distributed with mean 400 grams and standard deviation σ grams.

(i) In a random sample of 6000 packets of this type of biscuit, 225 packets weighed more than 410 grams. Find the value of σ. [4]

(ii) In a random sample of 500 packets of this type of biscuit, how many packets would you expect to find with weights that are more than 1.5 standard deviations from the mean? [4]

8 The results of a survey at a certain large college show that the proportion of students who own a car is $\frac{1}{4}$.

(i) Five students at the college are chosen at random. Find the probability that at least four of these students own a car. [3]

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(ii) For a random sample of n students at the college, the probability that at least one of the students owns a car is greater than 0.995. Find the least possible value of n. [3]

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(iii) For a random sample of 160 students at the college, use a suitable approximate distribution to find the probability that fewer than 50 own a car. [4]

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Additional Page

If you use the following lined page to complete the answer(s) to any question(s), the question number(s) must be clearly shown.

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