Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

5543033167

MATHEMATICS **9709/63**

Paper 6 Probability & Statistics 1 **(S1)** **May/June 2019**

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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1 The time taken, in minutes, by a ferry to cross a lake has a normal distribution with mean 85 and standard deviation 6.8.

(i) Find the probability that, on a randomly chosen occasion, the time taken by the ferry to cross the lake is between 79 and 91 minutes. [3]

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(ii) Over a long period it is found that 96% of ferry crossings take longer than a certain time t minutes. Find the value of t. [3]

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2 Megan sends messages to her friends in one of 3 different ways: text, email or social media. For each message, the probability that she uses text is 0.3 and the probability that she uses email is 0.2. She receives an immediate reply from a text message with probability 0.4, from an email with probability 0.15 and from social media with probability 0.6.

(i) Draw a fully labelled tree diagram to represent this information. [2]

(ii) Given that Megan does not receive an immediate reply to a message, find the probability that the message was an email. [4]

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3 Mr and Mrs Keene and their 5 children all go to watch a football match, together with their friends Mr and Mrs Uzuma and their 2 children. Find the number of ways in which all 11 people can line up at the entrance in each of the following cases.

(i) Mr Keene stands at one end of the line and Mr Uzuma stands at the other end. [2]

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(ii) The 5 Keene children all stand together and the Uzuma children both stand together. [3]

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4 **(i)** Find the number of ways a committee of 6 people can be chosen from 8 men and 4 women if there must be at least twice as many men as there are women on the committee. [3]

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(ii) Find the number of ways a committee of 6 people can be chosen from 8 men and 4 women if 2 particular men refuse to be on the committee together. [3]

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5 On average, 34% of the people who go to a particular theatre are men.

(i) A random sample of 14 people who go to the theatre is chosen. Find the probability that at most 2 people are men. [3]

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(ii) Use an approximation to find the probability that, in a random sample of 600 people who go to the theatre, fewer than 190 are men. [5]

6 A fair five-sided spinner has sides numbered 1, 1, 1, 2, 3. A fair three-sided spinner has sides numbered 1, 2, 3. Both spinners are spun once and the score is the product of the numbers on the sides the spinners land on.

(i) Draw up the probability distribution table for the score. [4]

(ii) Find the mean and the variance of the score. [3]

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(iii) Find the probability that the score is greater than the mean score. [2]

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7 The times in minutes taken by 13 pupils at each of two schools in a cross-country race are recorded in the table below.

Thaters School	38	43	48	52	54	56	57	58	58	61	62	66	75
Whitefay Park School	45	47	53	56	56	61	64	66	69	73	75	78	83

(i) Draw a back-to-back stem-and-leaf diagram to illustrate these times with Thaters School on the left. [4]

(ii) Find the interquartile range of the times for pupils at Thaters School. [2]

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The times taken by pupils at Whitefay Park School are denoted by x minutes.

(iii) Find the value of $\Sigma(x - 60)^2$. [2]

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(iv) It is given that $\Sigma(x - 60) = 46$. Use this result, together with your answer to part **(iii)**, to find the variance of x. [2]

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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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