Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

MATHEMATICS **9709/63**

Paper 6 Probability & Statistics 1 **(S1)** **May/June 2014**

1 hour 15 minutes

Additional Materials: Answer Booklet/Paper
Graph Paper
List of Formulae (MF9)

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READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.
Write your Centre number, candidate number and name on all the work you hand in.
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.
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.
Questions carrying smaller numbers of marks are printed earlier in the paper, and questions carrying larger numbers of marks later in the paper.

This document consists of **3** printed pages and **1** blank page.

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1 Some adults and some children each tried to estimate, without using a watch, the number of seconds that had elapsed in a fixed time-interval. Their estimates are shown below.

Adults:	55	58	67	74	63	61	63	71	56	53	54	78	73	64	62
Children:	86	95	89	72	61	84	77	92	81	54	43	68	62	67	83

(i) Draw a back-to-back stem-and-leaf diagram to represent the data. [3]

(ii) Make two comparisons between the estimates of the adults and the children. [2]

2 There is a probability of $\frac{1}{7}$ that Wenjie goes out with her friends on any particular day. 252 days are chosen at random.

(i) Use a normal approximation to find the probability that the number of days on which Wenjie goes out with her friends is less than than 30 or more than 44. [5]

(ii) Give a reason why the use of a normal approximation is justified. [1]

3 A pet shop has 6 rabbits and 3 hamsters. 5 of these pets are chosen at random. The random variable X represents the number of hamsters chosen.

(i) Show that the probability that exactly 2 hamsters are chosen is $\frac{10}{21}$. [2]

(ii) Draw up the probability distribution table for X. [4]

4 The heights, x cm, of a group of 28 people were measured. The mean height was found to be 172.6 cm and the standard deviation was found to be 4.58 cm. A person whose height was 161.8 cm left the group.

(i) Find the mean height of the remaining group of 27 people. [2]

(ii) Find Σx^2 for the original group of 28 people. Hence find the standard deviation of the heights of the remaining group of 27 people. [4]

5 When Moses makes a phone call, the amount of time that the call takes has a normal distribution with mean 6.5 minutes and standard deviation 1.76 minutes.

(i) 90% of Moses's phone calls take longer than t minutes. Find the value of t. [3]

(ii) Find the probability that, in a random sample of 9 phone calls made by Moses, more than 7 take a time which is within 1 standard deviation of the mean. [5]

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6 Tom and Ben play a game repeatedly. The probability that Tom wins any game is 0.3. Each game is won by either Tom or Ben. Tom and Ben stop playing when one of them (to be called the champion) has won two games.

(i) Find the probability that Ben becomes the champion after playing exactly 2 games. [1]

(ii) Find the probability that Ben becomes the champion. [3]

(iii) Given that Tom becomes the champion, find the probability that he won the 2nd game. [4]

7 Nine cards are numbered 1, 2, 2, 3, 3, 4, 6, 6, 6.

(i) All nine cards are placed in a line, making a 9-digit number. Find how many different 9-digit numbers can be made in this way

(a) if the even digits are all together, [4]

(b) if the first and last digits are both odd. [3]

(ii) Three of the nine cards are chosen and placed in a line, making a 3-digit number. Find how many different numbers can be made in this way

(a) if there are no repeated digits, [2]

(b) if the number is between 200 and 300. [2]

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