UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education
Advanced Subsidiary Level and Advanced Level

MATHEMATICS **9709/63**

Paper 6 Probability & Statistics 1 **(S1)** **May/June 2011**

1 hour 15 minutes

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

4876101449

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 a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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.

JC11 06_9709_63/2R
© UCLES 2011

1 Red Street Garage has 9 used cars for sale. Fairwheel Garage has 15 used cars for sale. The mean age of the cars in Red Street Garage is 3.6 years and the standard deviation is 1.925 years. In Fairwheel Garage, $\Sigma x = 64$ and $\Sigma x^2 = 352$, where x is the age of a car in years.

(i) Find the mean age of all 24 cars. [2]

(ii) Find the standard deviation of the ages of all 24 cars. [4]

2 Fahad has 4 different coloured pairs of shoes (white, red, blue and black), 3 different coloured pairs of jeans (blue, black and brown) and 7 different coloured tee shirts (red, orange, yellow, blue, green, white and purple).

(i) Fahad chooses an outfit consisting of one pair of shoes, one pair of jeans and one tee shirt. How many different outfits can he choose? [1]

(ii) How many different ways can Fahad arrange his 3 jeans and 7 tee shirts in a row if the two blue items are not next to each other? [2]

Fahad also has 9 different books about sport. When he goes on holiday he chooses at least one of these books to take with him.

(iii) How many different selections are there if he can take any number of books ranging from just one of them to all of them? [3]

3 The following cumulative frequency table shows the examination marks for 300 candidates in country *A* and 300 candidates in country *B*.

Mark	<10	<20	<35	<50	<70	<100
Cumulative frequency, *A*	25	68	159	234	260	300
Cumulative frequency, *B*	10	46	72	144	198	300

(i) Without drawing a graph, show that the median for country *B* is higher than the median for country *A*. [2]

(ii) Find the number of candidates in country *A* who scored between 20 and 34 marks inclusive. [1]

(iii) Calculate an estimate of the mean mark for candidates in country *A*. [4]

© UCLES 2011

4 Tim throws a fair die twice and notes the number on each throw.

(i) Tim calculates his final score as follows. If the number on the second throw is a 5 he multiplies the two numbers together, and if the number on the second throw is not a 5 he adds the two numbers together. Find the probability that his final score is

(a) 12, [1]

(b) 5. [3]

(ii) Events A, B, C are defined as follows.

A: the number on the second throw is 5

B: the sum of the numbers is 6

C: the product of the numbers is even

By calculation find which pairs, if any, of the events A, B and C are independent. [5]

5 The random variable X is normally distributed with mean μ and standard deviation $\frac{1}{4}\mu$. It is given that $P(X > 20) = 0.04$.

(i) Find μ. [3]

(ii) Find $P(10 < X < 20)$. [3]

(iii) 250 independent observations of X are taken. Find the probability that at least 235 of them are less than 20. [5]

6 The probability that Sue completes a Sudoku puzzle correctly is 0.75.

(i) Sue attempts n Sudoku puzzles. Find the least value of n for which the probability that she completes all n puzzles correctly is less than 0.06. [3]

Sue attempts 14 Sudoku puzzles every month. The number that she completes successfully is denoted by X.

(ii) Find the value of X that has the highest probability. You may assume that this value is one of the two values closest to the mean of X. [3]

(iii) Find the probability that in exactly 3 of the next 5 months Sue completes more than 11 Sudoku puzzles correctly. [5]

© UCLES 2011

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.