



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

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**MATHEMATICS**

**9709/06**

Paper 6 Probability & Statistics 1 (S1)

**May/June 2008**

**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 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.

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



- 1 The stem-and-leaf diagram below represents data collected for the number of hits on an internet site on each day in March 2007. There is one missing value, denoted by  $x$ .

0	0 1 5 6	(4)
1	1 3 5 6 6 8	(6)
2	1 1 2 3 4 4 4 8 9	(9)
3	1 2 2 2 $x$ 8 9	(7)
4	2 5 6 7 9	(5)

Key: 1 | 5 represents 15 hits

- (i) Find the median and lower quartile for the number of hits each day. [2]
- (ii) The interquartile range is 19. Find the value of  $x$ . [2]
- 2 In country  $A$  30% of people who drink tea have sugar in it. In country  $B$  65% of people who drink tea have sugar in it. There are 3 million people in country  $A$  who drink tea and 12 million people in country  $B$  who drink tea. A person is chosen at random from these 15 million people.
- (i) Find the probability that the person chosen is from country  $A$ . [1]
- (ii) Find the probability that the person chosen does not have sugar in their tea. [2]
- (iii) Given that the person chosen does not have sugar in their tea, find the probability that the person is from country  $B$ . [2]
- 3 Issam has 11 different CDs, of which 6 are pop music, 3 are jazz and 2 are classical.
- (i) How many different arrangements of all 11 CDs on a shelf are there if the jazz CDs are all next to each other? [3]
- (ii) Issam makes a selection of 2 pop music CDs, 2 jazz CDs and 1 classical CD. How many different possible selections can be made? [3]
- 4 In a certain country the time taken for a common infection to clear up is normally distributed with mean  $\mu$  days and standard deviation 2.6 days. 25% of these infections clear up in less than 7 days.
- (i) Find the value of  $\mu$ . [4]
- In another country the standard deviation of the time taken for the infection to clear up is the same as in part (i), but the mean is 6.5 days. The time taken is normally distributed.
- (ii) Find the probability that, in a randomly chosen case from this country, the infection takes longer than 6.2 days to clear up. [3]

- 5 As part of a data collection exercise, members of a certain school year group were asked how long they spent on their Mathematics homework during one particular week. The times are given to the nearest 0.1 hour. The results are displayed in the following table.

Time spent ( $t$ hours)	$0.1 \leq t \leq 0.5$	$0.6 \leq t \leq 1.0$	$1.1 \leq t \leq 2.0$	$2.1 \leq t \leq 3.0$	$3.1 \leq t \leq 4.5$
Frequency	11	15	18	30	21

- (i) Draw, on graph paper, a histogram to illustrate this information. [5]
- (ii) Calculate an estimate of the mean time spent on their Mathematics homework by members of this year group. [3]
- 6 Every day Eduardo tries to phone his friend. Every time he phones there is a 50% chance that his friend will answer. If his friend answers, Eduardo does not phone again on that day. If his friend does not answer, Eduardo tries again in a few minutes' time. If his friend has not answered after 4 attempts, Eduardo does not try again on that day.

- (i) Draw a tree diagram to illustrate this situation. [3]
- (ii) Let  $X$  be the number of unanswered phone calls made by Eduardo on a day. Copy and complete the table showing the probability distribution of  $X$ . [4]

$x$	0	1	2	3	4
$P(X = x)$		$\frac{1}{4}$			

- (iii) Calculate the expected number of unanswered phone calls on a day. [2]
- 7 A die is biased so that the probability of throwing a 5 is 0.75 and the probabilities of throwing a 1, 2, 3, 4 or 6 are all equal.
- (i) The die is thrown three times. Find the probability that the result is a 1 followed by a 5 followed by any even number. [3]
- (ii) Find the probability that, out of 10 throws of this die, at least 8 throws result in a 5. [3]
- (iii) The die is thrown 90 times. Using an appropriate approximation, find the probability that a 5 is thrown more than 60 times. [5]

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