Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

MATHEMATICS **9709/62**

Paper 6 Probability & Statistics 1 **(S1)** **February/March 2016**

1 hour 15 minutes

Additional Materials: List of Formulae (MF9)

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READ THESE INSTRUCTIONS FIRST

An answer booklet and a graph paper booklet are provided inside this question paper. You should follow the instructions on the front cover of both booklets. If you need additional answer paper or graph paper ask the invigilator for a continuation booklet or graph paper booklet.
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.

This document consists of **3** printed pages, **1** blank page and **2** inserts.

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1 For 10 values of x the mean is 86.2 and $\Sigma(x - a) = 362$. Find the value of

(i) Σx, [1]

(ii) the constant a. [2]

2 A flower shop has 5 yellow roses, 3 red roses and 2 white roses. Martin chooses 3 roses at random. Draw up the probability distribution table for the number of white roses Martin chooses. [4]

3 A fair eight-sided die has faces marked 1, 2, 3, 4, 5, 6, 7, 8. The score when the die is thrown is the number on the face the die lands on. The die is thrown twice.

- Event R is 'one of the scores is exactly 3 greater than the other score'.
- Event S is 'the product of the scores is more than 19'.

(i) Find the probability of R. [2]

(ii) Find the probability of S. [2]

(iii) Determine whether events R and S are independent. Justify your answer. [3]

4 A survey was made of the journey times of 63 people who cycle to work in a certain town. The results are summarised in the following cumulative frequency table.

Journey time (minutes)	$\leqslant 10$	$\leqslant 25$	$\leqslant 45$	$\leqslant 60$	$\leqslant 80$
Cumulative frequency	0	18	50	59	63

(i) State how many journey times were between 25 and 45 minutes. [1]

(ii) Draw a histogram on graph paper to represent the data. [4]

(iii) Calculate an estimate of the mean journey time. [2]

5 In a certain town, 35% of the people take a holiday abroad and 65% take a holiday in their own country. Of those going abroad 80% go to the seaside, 15% go camping and 5% take a city break. Of those taking a holiday in their own country, 20% go to the seaside and the rest are divided equally between camping and a city break.

(i) A person is chosen at random. Given that the person chosen goes camping, find the probability that the person goes abroad. [5]

(ii) A group of n people is chosen randomly. The probability of all the people in the group taking a holiday in their own country is less than 0.002. Find the smallest possible value of n. [3]

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6 Hannah chooses 5 singers from 15 applicants to appear in a concert. She lists the 5 singers in the order in which they will perform.

(i) How many different lists can Hannah make? [2]

Of the 15 applicants, 10 are female and 5 are male.

(ii) Find the number of lists in which the first performer is male, the second is female, the third is male, the fourth is female and the fifth is male. [2]

Hannah's friend Ami would like the group of 5 performers to include more males than females. The order in which they perform is no longer relevant.

(iii) Find the number of different selections of 5 performers with more males than females. [3]

(iv) Two of the applicants are Mr and Mrs Blake. Find the number of different selections that include Mr and Mrs Blake and also fulfil Ami's requirement. [3]

7 The times taken by a garage to fit a tow bar onto a car have a normal distribution with mean m hours and standard deviation 0.35 hours. It is found that 95% of times taken are longer than 0.9 hours.

(i) Find the value of m. [3]

(ii) On one day 4 cars have a tow bar fitted. Find the probability that none of them takes more than 2 hours to fit. [5]

The times in hours taken by another garage to fit a tow bar onto a car have the distribution $N(\mu, \sigma^2)$ where $\mu = 3\sigma$.

(iii) Find the probability that it takes more than 0.6μ hours to fit a tow bar onto a randomly chosen car at this garage. [3]

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