Cambridge International AS & A Level

**Cambridge Assessment International Education**
Cambridge International Advanced Subsidiary and Advanced Level

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| CANDIDATE NAME | |
| CENTRE NUMBER | CANDIDATE NUMBER |

*6969801149*

**MATHEMATICS** **9709/62**

Paper 6 Probability & Statistics 1 **(S1)** **February/March 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** On each day that Tamar goes to work, he wears either a blue suit with probability 0.6 or a grey suit with probability 0.4. If he wears a blue suit then the probability that he wears red socks is 0.2. If he wears a grey suit then the probability that he wears red socks is 0.32.

**(i)** Find the probability that Tamar wears red socks on any particular day that he is at work. [2]

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**(ii)** Given that Tamar is not wearing red socks at work, find the probability that he is wearing a grey suit. [3]

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**2** For 40 values of the variable $x$, it is given that $\Sigma(x - c)^2 = 3099.2$, where $c$ is a constant. The standard deviation of these values of $x$ is 3.2.

**(i)** Find the value of $\Sigma(x - c)$. [3]

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**(ii)** Given that $c = 50$, find the mean of these values of $x$. [1]

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**3** The times taken, in minutes, for trains to travel between Alphaton and Beeton are normally distributed with mean 140 and standard deviation 12.

**(i)** Find the probability that a randomly chosen train will take less than 132 minutes to travel between Alphaton and Beeton. [3]

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**(ii)** The probability that a randomly chosen train takes more than $k$ minutes to travel between Alphaton and Beeton is 0.675. Find the value of $k$. [3]

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**4** The random variable $X$ takes the values $-1$, 1, 2, 3 only. The probability that $X$ takes the value $x$ is $kx^2$, where $k$ is a constant.

**(i)** Draw up the probability distribution table for $X$, in terms of $k$, and find the value of $k$. [3]

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**(ii)** Find $\mathrm{E}(X)$ and $\mathrm{Var}(X)$. [3]

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**5** The weights, in kg, of the 11 members of the Dolphins swimming team and the 11 members of the Sharks swimming team are shown below.

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Dolphins | 62 | 75 | 69 | 82 | 63 | 80 | 65 | 65 | 73 | 82 | 72 |
| Sharks | 68 | 84 | 59 | 70 | 71 | 64 | 77 | 80 | 66 | 74 | 72 |

**(i)** Draw a back-to-back stem-and-leaf diagram to represent this information, with Dolphins on the left-hand side of the diagram and Sharks on the right-hand side. [4]

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**(ii)** Find the median and interquartile range for the Dolphins. [3]

**6** The results of a survey by a large supermarket show that 35% of its customers shop online.

**(i)** Six customers are chosen at random. Find the probability that more than three of them shop online. [3]

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**(ii)** For a random sample of $n$ customers, the probability that at least one of them shops online is greater than 0.95. Find the least possible value of $n$. [3]

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**(iii)** For a random sample of 100 customers, use a suitable approximating distribution to find the probability that more than 39 shop online. [5]

**7** Find the number of different arrangements that can be made of all 9 letters in the word CAMERAMAN in each of the following cases.

**(i)** There are no restrictions. [2]

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**(ii)** The As occupy the 1st, 5th and 9th positions. [1]

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**(iii)** There is exactly one letter between the Ms. [4]

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Three letters are selected from the 9 letters of the word CAMERAMAN.

**(iv)** Find the number of different selections if the three letters include exactly one M and exactly one A. [1]

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**(v)** Find the number of different selections if the three letters include at least one M. [3]

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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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