Cambridge International AS & A Level

**Cambridge International Examinations**
Cambridge International Advanced Subsidiary and Advanced Level

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*6935260309*

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

Paper 6 Probability & Statistics 1 **(S1)** **October/November 2017**

**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.
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 **11** printed pages and **1** blank page.


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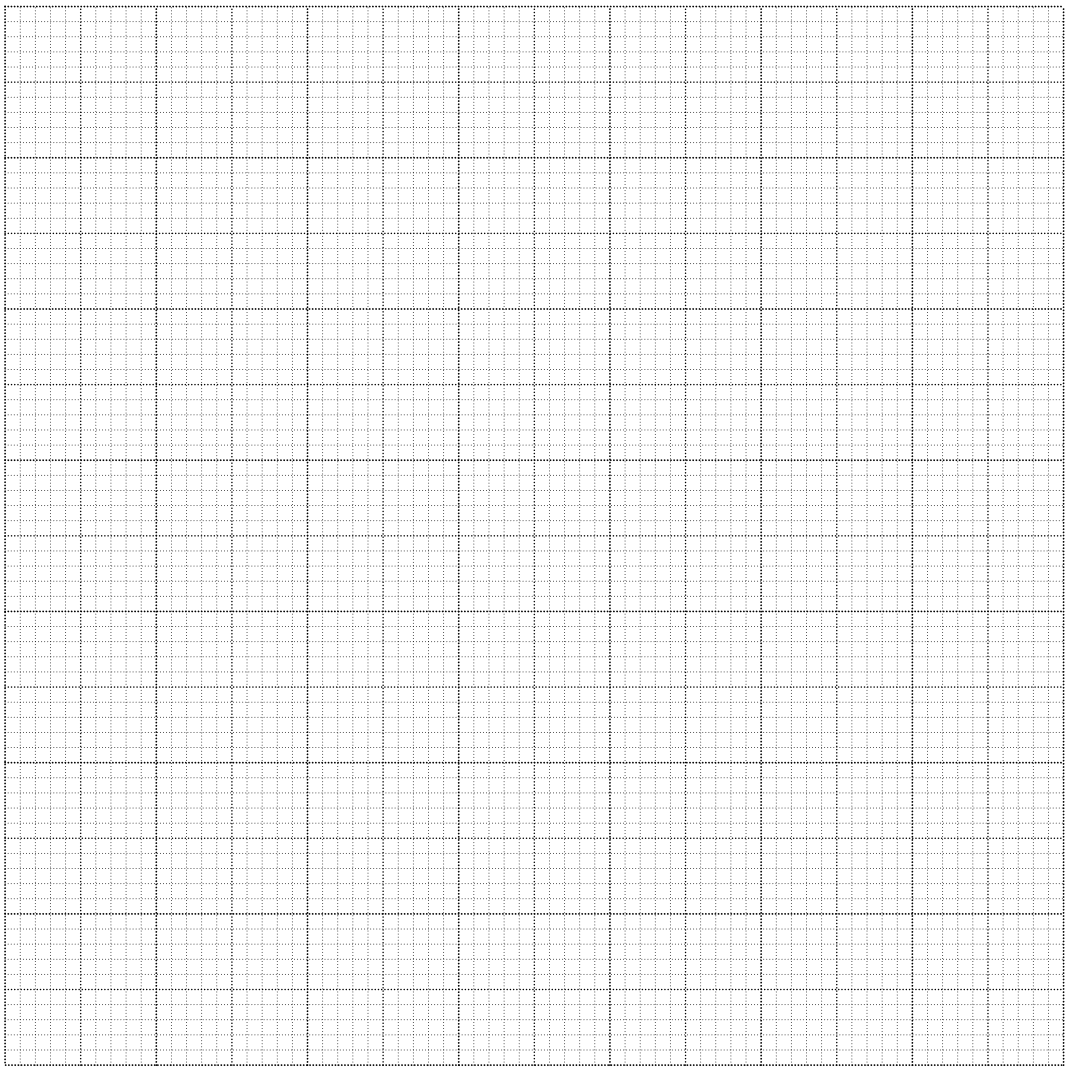
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**1** Andy counts the number of emails, $x$, he receives each day and notes that, over a period of $n$ days, $\Sigma(x - 10) = 27$ and the mean number of emails is 11.5. Find the value of $n$. [3]

**2** The circumferences, $c$ cm, of some trees in a wood were measured. The results are summarised in the table.

| Circumference ($c$ cm) | $40 < c \leqslant 50$ | $50 < c \leqslant 80$ | $80 < c \leqslant 100$ | $100 < c \leqslant 120$ |
|---|---|---|---|---|
| Frequency | 14 | 48 | 70 | 8 |

**(i)** On the grid, draw a cumulative frequency graph to represent the information. [3]



**(ii)** Estimate the percentage of trees which have a circumference larger than 75 cm. [2]

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**3** A box contains 6 identical-sized discs, of which 4 are blue and 2 are red. Discs are taken at random from the box in turn and not replaced. Let $X$ be the number of discs taken, up to and including the first blue one.

**(i)** Show that $P(X = 3) = \frac{1}{15}$. [2]

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**(ii)** Draw up the probability distribution table for $X$. [3]

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**4** A fair tetrahedral die has faces numbered 1, 2, 3, 4. A coin is biased so that the probability of showing a head when thrown is $\frac{1}{3}$. The die is thrown once and the number $n$ that it lands on is noted. The biased coin is then thrown $n$ times. So, for example, if the die lands on 3, the coin is thrown 3 times.

**(i)** Find the probability that the die lands on 4 and the number of times the coin shows heads is 2. [3]

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**(ii)** Find the probability that the die lands on 3 and the number of times the coin shows heads is 3. [1]

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**(iii)** Find the probability that the number the die lands on is the same as the number of times the coin shows heads. [3]

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**[Turn over**

**5** Blank CDs are packed in boxes of 30. The probability that a blank CD is faulty is 0.04. A box is rejected if more than 2 of the blank CDs are faulty.

**(i)** Find the probability that a box is rejected. [3]

**(ii)** 280 boxes are chosen randomly. Use an approximation to find the probability that at least 30 of these boxes are rejected. [5]

**6** **(a)** Find the number of different 3-digit numbers greater than 300 that can be made from the digits 1, 2, 3, 4, 6, 8 if

**(i)** no digit can be repeated, [3]

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**(ii)** a digit can be repeated and the number made is even. [3]

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**(b)** A team of 5 is chosen from 6 boys and 4 girls. Find the number of ways the team can be chosen if

**(i)** there are no restrictions, [1]

**(ii)** the team contains more boys than girls. [3]

**7** In Jimpuri the weights, in kilograms, of boys aged 16 years have a normal distribution with mean 61.4 and standard deviation 12.3.

**(i)** Find the probability that a randomly chosen boy aged 16 years in Jimpuri weighs more than 65 kilograms. [3]

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**(ii)** For boys aged 16 years in Jimpuri, 25% have a weight between 65 kilograms and $k$ kilograms, where $k$ is greater than 65. Find $k$. [4]

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In Brigville the weights, in kilograms, of boys aged 16 years have a normal distribution. 99% of the boys weigh less than 97.2 kilograms and 33% of the boys weigh less than 55.2 kilograms.

**(iii)** Find the mean and standard deviation of the weights of boys aged 16 years in Brigville. [5]

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