Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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9813290190

MATHEMATICS **9709/62**

Paper 6 Probability & Statistics 1 **(S1)** **May/June 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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1 Rani and Diksha go shopping for clothes.

(i) Rani buys 4 identical vests, 3 identical sweaters and 1 coat. Each vest costs \$5.50 and the coat costs \$90. The mean cost of Rani's 8 items is \$29. Find the cost of a sweater. [3]

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(ii) Diksha buys 1 hat and 4 identical shirts. The mean cost of Diksha's 5 items is \$26 and the standard deviation is \$0. Explain how you can tell that Diksha spends \$104 on shirts. [2]

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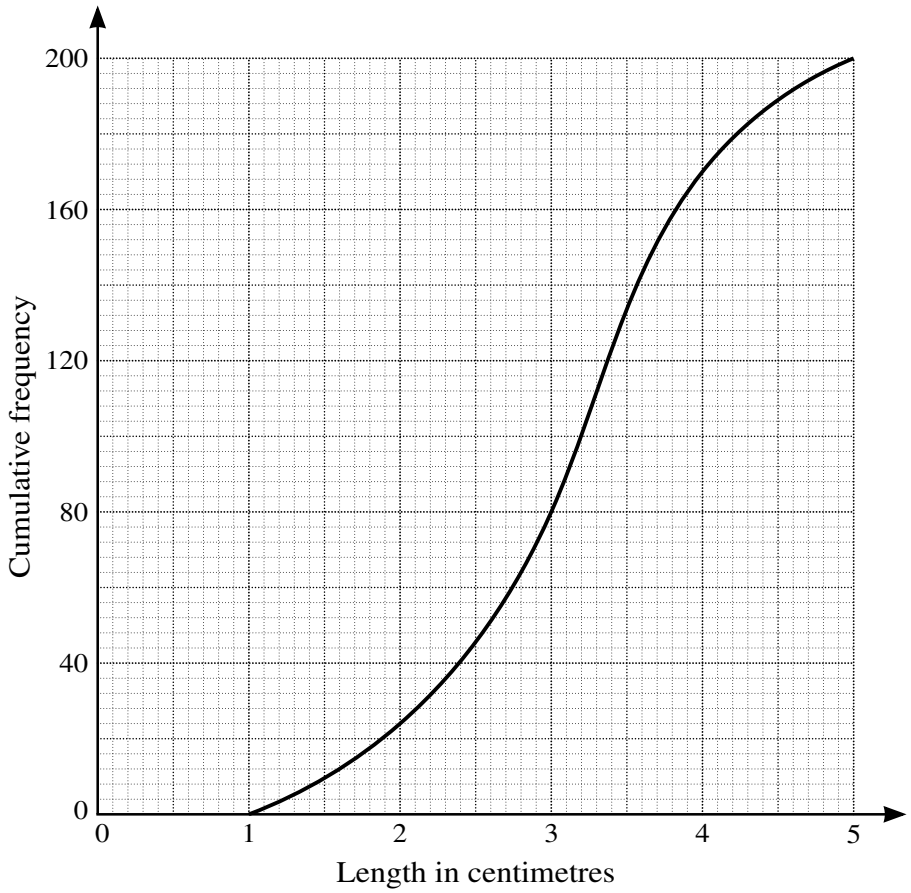
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2 Anabel measured the lengths, in centimetres, of 200 caterpillars. Her results are illustrated in the cumulative frequency graph below.



(i) Estimate the median and the interquartile range of the lengths. [3]

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(ii) Estimate how many caterpillars had a length of between 2 and 3.5 cm. [1]

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(iii) 6% of caterpillars were of length l centimetres or more. Estimate l. [2]

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[Turn over

3 In a probability distribution the random variable X takes the value x with probability kx^2, where k is a constant and x takes values -2, -1, 2, 4 only.

(i) Show that $P(X = -2)$ has the same value as $P(X = 2)$. [1]

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

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(iii) Find $E(X)$. [2]

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4 Two identical biased triangular spinners with sides marked 1, 2 and 3 are spun. For each spinner, the probabilities of landing on the sides marked 1, 2 and 3 are p, q and r respectively. The score is the sum of the numbers on the sides on which the spinners land. You are given that P(score is 6) = $\frac{1}{36}$ and P(score is 5) = $\frac{1}{9}$. Find the values of p, q and r. [6]

5 The lengths of videos of a certain popular song have a normal distribution with mean 3.9 minutes. 18% of these videos last for longer than 4.2 minutes.

(i) Find the standard deviation of the lengths of these videos. [3]

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(ii) Find the probability that the length of a randomly chosen video differs from the mean by less than half a minute. [4]

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The lengths of videos of another popular song have a normal distribution with the same mean of 3.9 minutes but the standard deviation is twice the standard deviation in part **(i)**. The probability that the length of a randomly chosen video of this song differs from the mean by less than half a minute is denoted by p.

(iii) Without any further calculation, determine whether p is more than, equal to, or less than your answer to part **(ii)**. You must explain your reasoning. [2]

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6 A library contains 4 identical copies of book A, 2 identical copies of book B and 5 identical copies of book C. These 11 books are arranged on a shelf in the library.

(i) Calculate the number of different arrangements if the end books are either both book A or both book B. [4]

(ii) Calculate the number of different arrangements if all the books A are next to each other and none of the books B are next to each other. [5]

7 During the school holidays, each day Khalid either rides on his bicycle with probability 0.6, or on his skateboard with probability 0.4. Khalid does not ride on both on the same day. If he rides on his bicycle then the probability that he hurts himself is 0.05. If he rides on his skateboard the probability that he hurts himself is 0.75.

(i) Find the probability that Khalid hurts himself on any particular day. [2]

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(ii) Given that Khalid hurts himself on a particular day, find the probability that he is riding on his skateboard. [2]

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(iii) There are 45 days of school holidays. Show that the variance of the number of days Khalid rides on his skateboard is the same as the variance of the number of days that Khalid rides on his bicycle. [2]

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(iv) Find the probability that Khalid rides on his skateboard on at least 2 of 10 randomly chosen days in the school holidays. [3]

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