

CANDIDATE  
NAME

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CENTRE  
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**MATHEMATICS**

**9709/61**

Paper 6 Probability & Statistics 1 (S1)

**May/June 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 **15** printed pages and **1** blank page.



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1 The times,  $t$  seconds, taken to swim 100 m were recorded for a group of 9 swimmers and were found to be as follows.

95    126    117    135    120    125    114    119    136

(i) Find the values of  $\Sigma(t - 120)$  and  $\Sigma(t - 120)^2$ . [2]

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(ii) Using your values found in part (i), calculate the variance of  $t$ . [2]

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- 2 Jameel has 5 plums and 3 apricots in a box. Rosa has  $x$  plums and 6 apricots in a box. One fruit is chosen at random from Jameel's box and one fruit is chosen at random from Rosa's box. The probability that both fruits chosen are plums is  $\frac{1}{4}$ . Write down an equation in  $x$  and hence find  $x$ . [3]

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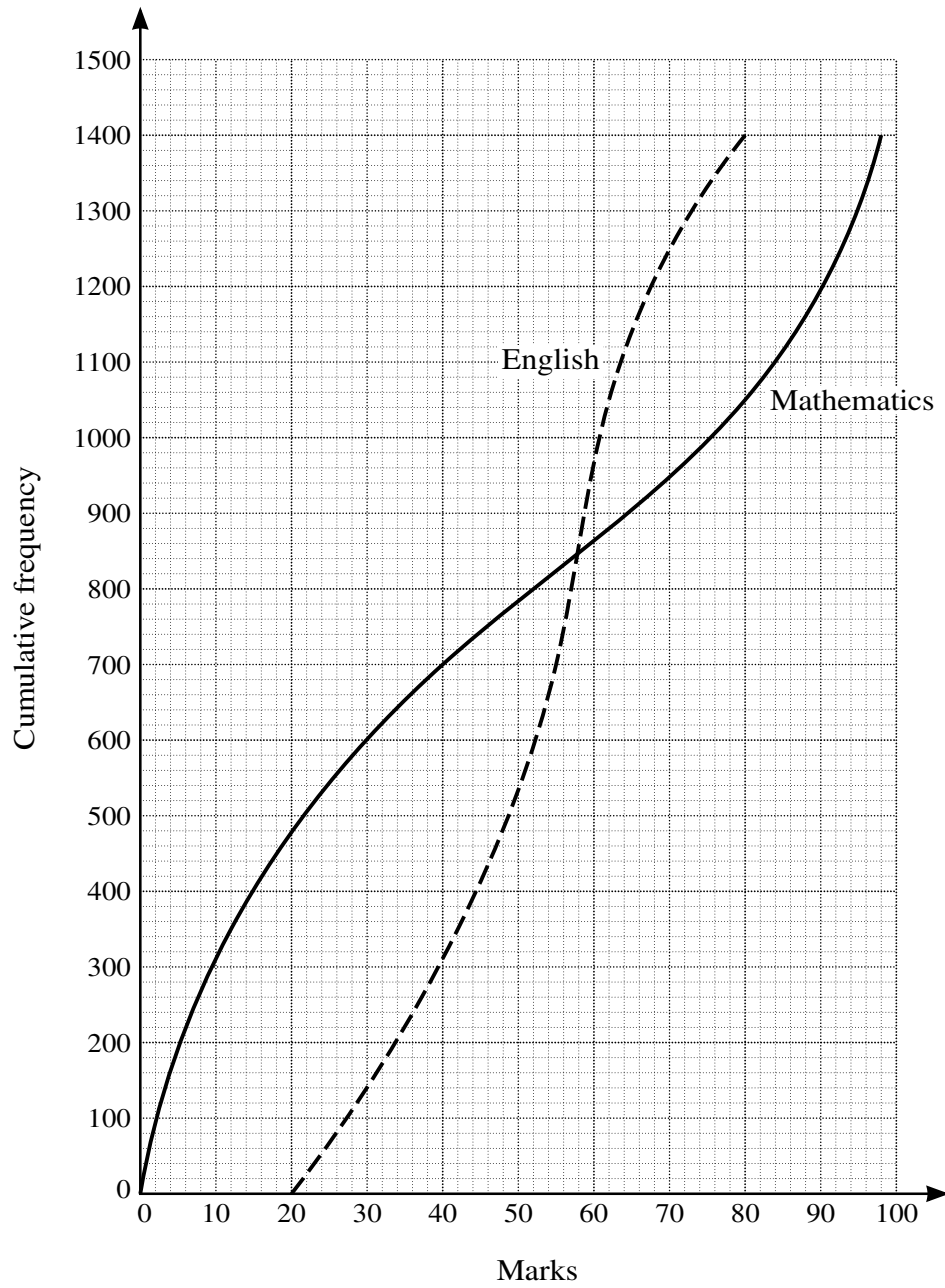
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- 4 The Mathematics and English A-level marks of 1400 pupils all taking the same examinations are shown in the cumulative frequency graphs below. Both examinations are marked out of 100.



Use suitable data from these graphs to compare the central tendency and spread of the marks in Mathematics and English. [6]

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5 In a certain country the probability that a child owns a bicycle is 0.65.

(i) A random sample of 15 children from this country is chosen. Find the probability that more than 12 own a bicycle. [3]

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7 The weight of adult female giraffes has a normal distribution with mean 830 kg and standard deviation 120 kg.

(i) There are 430 adult female giraffes in a particular game reserve. Find the number of these adult female giraffes which can be expected to weigh less than 700 kg. [4]

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(ii) Given that 90% of adult female giraffes weigh between  $(830 - w)$  kg and  $(830 + w)$  kg, find the value of  $w$ . [3]

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The weight of adult male giraffes has a normal distribution with mean 1190 kg and standard deviation  $\sigma$  kg.

(iii) Given that 83.4% of adult male giraffes weigh more than 950 kg, find the value of  $\sigma$ . [3]

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8 Freddie has 6 toy cars and 3 toy buses, all different. He chooses 4 toys to take on holiday with him.

(i) In how many different ways can Freddie choose 4 toys? [1]

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(ii) How many of these choices will include both his favourite car and his favourite bus? [2]

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Freddie arranges these 9 toys in a line.

(iii) Find the number of possible arrangements if the buses are all next to each other. [3]

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