

Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/51

Paper 5 Probability & Statistics 1

October/November 2020

1 hour 15 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

INSTRUCTIONS

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Do not write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

Two ordinary fair dice, one red and the other blue, are thrown.

1

	Event <i>A</i> is 'the score on the red die is divisible by 3'.	
	Event <i>B</i> is 'the sum of the two scores is at least 9'.	
a)	Find $P(A \cap B)$.	[2
b)	Hence determine whether or not the events A and B are independent.	[2
b)	Hence determine whether or not the events <i>A</i> and <i>B</i> are independent.	
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b)		

in tl in tl	probability that a student at a large music college plays in the band is 0.6 . For a student who play he band, the probability that she also sings in the choir is 0.3 . For a student who does not plane band, the probability that she sings in the choir is x . The probability that a randomly chose tent from the college does not sing in the choir is 0.58 .
(a)	Find the value of x .
Γwα	o students from the college are chosen at random.
(b)	Find the probability that both students play in the band and both sing in the choir.

Kayla is competing in a throwing event. A throw is counted as a success if the distance achieved is

a)	Find the probability that Kayla takes more than 6 throws to achieve a success.	[2]
,	That the probability that Rayla takes more than 6 throws to achieve a success.	[4]
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	Find the probability that, for a random sample of 10 throws, Kayla achieves at least 3 succe	
		[3]
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ļ	of X	random variable X takes each of the values 1, 2, 3, 4 with probability $\frac{1}{4}$. Two independent values X are chosen at random. If the two values of X are the same, the random variable Y takes that i.e. Otherwise, the value of Y is the larger value of X minus the smaller value of X .
	(a)	Draw up the probability distribution table for Y . [4]
	(b)	Find the probability that $Y = 2$ given that Y is even. [2]

The time in hours that Davin plays on his games machine each day is normally distributed with

	than 4.2 hours.	101 [3
		••••
		•••
(b)	On 90% of days Davin plays on his games machine for more than t hours. Find the value of	
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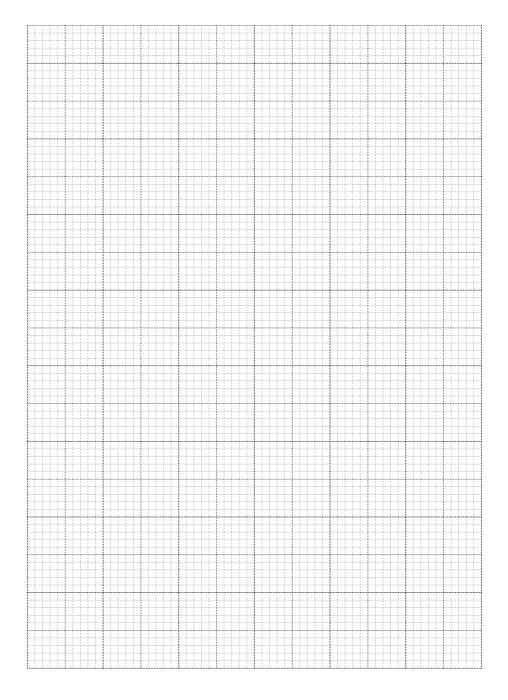
(c)	Calculate an estimate for the number of days in a year (365 days) on which Davin plays on his games machine for between 2.8 and 4.2 hours.

6 The times, *t* minutes, taken by 150 students to complete a particular challenge are summarised in the following cumulative frequency table.

Time taken (t minutes)	<i>t</i> ≤ 20	<i>t</i> ≤ 30	<i>t</i> ≤ 40	<i>t</i> ≤ 60	<i>t</i> ≤ 100
Cumulative frequency	12	48	106	134	150

(a) Draw a cumulative frequency graph to illustrate the data.

[2]



estimate the value of k .	[2]
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Calculate estimates of the mean and the standard deviation of the time taken to complete t	
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	arranged so that all 3 Es are together.	
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(b)	Find the number of different ways in which the 10 letters of the word SHOPKEEPI arranged so that the Ps are not next to each other.	ER cai
		•••••

	SHOPKEEPER has an E at the beginning and an E at the end.	
		••••••
	a law are and a law at force the 10 law are of the control CHODKEEDED	
	r letters are selected from the 10 letters of the word SHOPKEEPER.	
)	Find the number of different calestians if the four letters include another one D	
	Find the number of different selections if the four letters include exactly one P.	
	Find the number of different selections if the four letters include exactly one P.	

Additional Page

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