

Please write clearly in block capitals.	
Centre number	Candidate number
Surname	
Forename(s)	
Candidate signature	

AS MATHEMATICS

Unit Statistics 1B

Wednesday 7 June 2017

Morning

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

• the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer all questions.
- Write the question part reference (eg (a), (b)(i) etc) in the left-hand margin.
- You must answer each question in the space provided for that question.
 If you require extra space, use an AQA supplementary answer book; do not use the space provided for a different question.
- Do not write outside the box around each page.
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- The **final** answer to questions requiring the use of tables or calculators should normally be given to three significant figures.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 75.
- Unit Statistics 1B has a written paper only.

Advice

- Unless stated otherwise, you may quote formulae, without proof, from the booklet.
- You do not necessarily need to use all the space provided.



For Exam	iner's Use
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	

		Answer all questions.
		Answer each question in the space provided for that question.
1		A tennis ball was dropped onto a concrete floor from 12 different heights between 25 cm and 300 cm. In each case, the height, x cm, from which the ball was dropped and the height, y cm, above the floor to which the ball bounced were measured.
		The results are summarised as follows.
		$S_{xx} = 89375$ $S_{xy} = 44725$ $\overline{x} = 162.5$ $\overline{y} = 83.0$
(a)		Calculate the equation of the least squares regression line of y on x . [3 marks]
(b)) (i)	Estimate the height to which the tennis ball bounces when it is dropped from a height above the floor of 175 cm .
	(ii)	Explain why your equation may not be appropriate to estimate the height to which the tennis ball bounces when it is dropped from a height above the floor of 4 metres. [2 marks]
QUESTION PART REFERENCE	Ans	swer space for question 1



QUESTION PART REFERENCE	Answer space for question 1

2	The durations, in minutes, of a sample of 10 telephone calls to a helpline were as follows.
	32 15 10 17 32 8 20 38 25 18
	The duration of calls to the helpline has a known standard deviation of 7.5 minutes.
(a)	Stating two necessary assumptions, construct a 95% confidence interval for the mean
	[7 marks]
(b)	Hence comment, with justification, on a claim that the mean duration of telephone calls to the beloline is 25 minutes
	[2 marks]
QUESTION PART REFERENCE	Answer space for question 2



QUESTION PART REFERENCE	Answer space for question 2



3	The heigh height in	nts, in centimetres, of a same excess of 175 cm was rec	nple of 80 men were measure orded. The results are summ	ed. For each man, his narised in the table.
		Height (cm)	Number of men	
		0-2	5	
		2-4	9	
		4-6	11	
		6 - 8	21	
		8-10	17	
		10-12	10	
		12 - 14	7	
		Total	80	
(b) (c)	Hence fin	d estimates for the mean a	nd the variance of the actual	heights of the 80 men. [2 marks]
(0)	variance	of the actual heights of the	80 men. Give your answers t	to three significant
	figures.			[3 marks]
				[0
QUESTION PART REFERENCE	Answer spac	e for question 3		



QUESTION PART	Answer space for question 3
REFERENCE	



4		Every table s weight	week, shows t, <i>y</i> gra	Hilda the tot ims, of	buys fo al weig the th	our app ght, <i>x</i> g ree ba	oles an Irams, nanas	nd three of the for eac	e bana four ap ch of a	nas fro oples a rando	om her nd the m sarr	local (corres	greeng spondi 13 wee	rocer. ng tota eks.	The I
	x	562	633	578	621	558	593	607	638	527	623	579	588	524	
	у	366	320	379	407	422	394	325	369	387	395	446	364	457	
(a))	Calcul coeffic	ate, to cient, <i>r</i>	three , betw	decima een x a	al place and y .	es, the	value	of the	produo	ct mon	nent co	orrelatio	on [3 m	arks]
(b)	Interp	ret, in d	contex	t, your	value	for <i>r</i> .							[2 m	arks]
(c))	Howaı banan	rd, Hilc as or s	la's hu small a	sband pples	, claim and sn	s that e nall ba	each w nanas.	eek sł	ne buy:	s eithe	r big a	pples a	and big)
		Comm	nent or	n Howa	ard's cl	aim.								[2 m	arks]
QUESTION PART REFERENCE	Ans	swer sp	bace fo	or que	stion	4									



QUESTION PART REFERENCE	Answer space for question 4







QUESTION PART	Answer space for question 5
REFERENCE	



QUESTION	Answer space for question 5
REFERENCE	• •



QUESTION PART REFERENCE	Answer space for question 5



6		When a patient takes the painkilling drug <i>PD1</i> , the patient may have no side effects (event A), slight side effects (event B) or severe side effects (event C).
		It has been established that $P(A) = 0.85$, $P(B) = 0.10$ and $P(C) = 0.05$.
(a)		A doctor prescribes <i>PD1</i> to three unrelated patients.
		Calculate the probability that:
	(i)	all three patients have no side effects;
	(ii)	two patients have no side effects and one patient has slight side effects;
	(iii)	one patient has no side effects, one patient has slight side effects and one patient has severe side effects.
(h)		Other painkilling drugs are available
	,	Of notion to taking RD1 none of these who suffer no side effects will share to excelher
		drug, 25 per cent of those who suffer slight side effects will change to another drug, and 90 per cent of those who suffer severe side effects will change to another drug.
		A second doctor prescribes PD1 to a patient.
		Calculate the probability that:
	(i)	the patient does not change to another drug;
	(ii)	the patient changes to another drug, given that the patient experienced side effects from
		[6 marks]
QUESTION PART REFERENCE	Ans	swer space for question 6



QUESTION PART	Answer space for question 6
REFERENCE	



QUESTION PART	Answer space for question 6
REFERENCE	



QUESTION PART	Answer space for question 6
REFERENCE	



7		In a certain country, 25 per cent of the adult population have blond hair.	
(a))	A random sample of 30 adults is selected.	
		Determine the probability that the number of adults with blond hair in the samp	le is:
	(i)	exactly 5;	10
	(!!)	forward the set 10 s	[2 marks]
	(11)	rewer than 10;	[1 mark]
	(iii)	at least 6 but at most 12;	
			[3 marks]
	(iv)	more than the mean of the distribution $B(30, 0.25)$.	[3 marks]
(b)		The random variable Y has a binomial distribution with parameters n and p .	
	(i)	Given that Y has a mean of 16 and a standard deviation of 2.4, find values for X	<i>n</i> and <i>p</i> . [5 marks]
	(ii)	Hence determine $P(Y=20)$.	10
			[2 marks]
QUESTION PART REFERENCE	Ans	wer space for question 7	



QUESTION PART REFERENCE	Answer space for question 7



QUESTION PART REFERENCE	Answer space for question 7
	END OF QUESTIONS

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