



Please write clearly in block capitals.

Centre number

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Candidate number

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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.

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

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.



JUN17MS1B01

IB/G/Jun17/E4

MS1B

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.

$$S_{xx} = 89375 \quad S_{xy} = 44725 \quad \bar{x} = 162.5 \quad \bar{y} = 83.0$$

- (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

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 duration of telephone calls to the helpline.

[7 marks]

- (b)** Hence comment, with justification, on a claim that the mean duration of telephone calls to the helpline is 25 minutes.

[2 marks]

QUESTION
PART
REFERENCE

Answer space for question 2



- 3 The heights, in centimetres, of a sample of 80 men were measured. For each man, his height in excess of 175 cm was recorded. The results are summarised 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

- (a) Calculate estimates for the mean and the variance of the heights in the table. **[4 marks]**
- (b) Hence find estimates for the mean and the variance of the actual heights of the 80 men. **[2 marks]**
- (c) Given that 1 foot is equal to 30.48 cm, find, in **feet**, estimates for the mean and the variance of the actual heights of the 80 men. Give your answers to three significant figures. **[3 marks]**

QUESTION
PART
REFERENCE

Answer space for question 3



5 The weight, X grams, of a bar of *PureAV* soap may be modelled by a normal distribution with mean 105 grams and standard deviation 4 grams.

(a) Determine the probability that the weight of a randomly selected bar is:

- (i)** less than 105 grams;
- (ii)** **not** exactly 100 grams;
- (iii)** more than 110 grams;
- (iv)** between 102 grams and 108 grams.

[8 marks]

(b) The weight, Y grams, of a bar of *RichAV* soap may be modelled by a normal distribution with mean 160 grams, unknown standard deviation σ grams and $P(Y < 150) = 0.05$.

(i) Determine the value of σ . Give your answer to two decimal places.

[3 marks]

(ii) *RichAV* soap is sold in packs of 3 bars. The bars in a pack may be assumed to be a random sample.

Determine the probability that:

- (A)** the weight of **each** of the 3 bars in a randomly selected pack is more than 150 grams;
- (B)** the **mean** weight of the 3 bars in a randomly selected pack is more than 162.5 grams.

[5 marks]

QUESTION
PART
REFERENCE

Answer space for question 5



