

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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



General Certificate of Education
Advanced Level Examination
June 2013

Mathematics

MS2B

Unit Statistics 2B

Thursday 13 June 2013 9.00 am to 10.30 am

For this paper you must have:

- the blue AQA booklet of formulae and statistical tables.

You may use a graphics calculator.

Time allowed

- 1 hour 30 minutes

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.

Advice

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



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QUESTION
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2

A town council wanted residents to apply for grants that were available for home insulation. In a trial, a random sample of 200 residents was encouraged, either in a letter or by a phone call, to apply for the grants. The outcomes are shown in the table.

	Applied for grant	Did not apply for grant	Total
Letter	30	130	160
Phone call	14	26	40
Total	44	156	200

- (a) The council believed that a phone call was more effective than a letter in encouraging people to apply for a grant. Use a χ^2 -test to investigate this belief at the 5% significance level. (8 marks)

- (b) After the trial, all the residents in the town were encouraged, either in a letter or by a phone call, to apply for the grants. It was found that there was no association between the method of encouragement and the outcome. State, with a reason, whether a Type I error, a Type II error or neither occurred in carrying out the test in part (a). (2 marks)

QUESTION
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QUESTION
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Answer space for question 3

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QUESTION
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QUESTION
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7 A continuous random variable X has the probability density function defined by

$$f(x) = \begin{cases} x^2 & 0 \leq x \leq 1 \\ \frac{1}{3}(5 - 2x) & 1 \leq x \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

(a) Sketch the graph of f on the axes below. (3 marks)

(b) (i) Find the cumulative distribution function, F , for $0 \leq x \leq 1$. (2 marks)

(ii) Hence, or otherwise, find the value of the lower quartile of X . (2 marks)

(c) (i) Show that the cumulative distribution function for $1 \leq x \leq 2$ is defined by

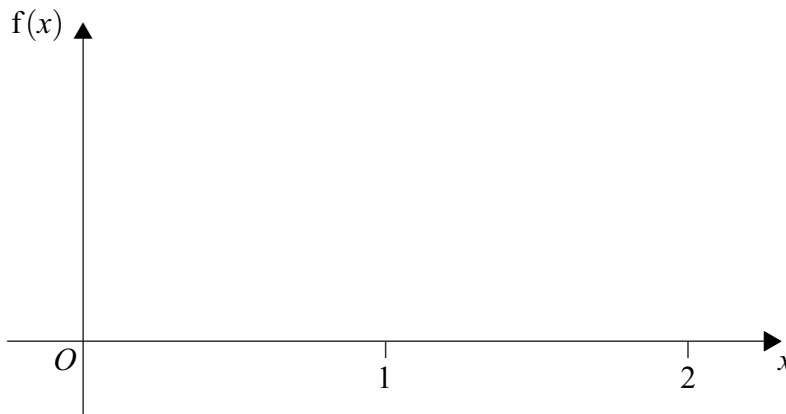
$$F(x) = \frac{1}{3}(5x - x^2 - 3) \quad (4 \text{ marks})$$

(ii) Hence, or otherwise, find the value of the upper quartile of X . (4 marks)

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Answer space for question 7

(a)



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ANSWER IN THE SPACES PROVIDED**

