

Centre No.						Paper Reference	Surname	Initial(s)
Candidate No.						<b>6 6 8 4 / 0 1</b>	Signature	

Paper Reference(s)  
**6684/01**

**Edexcel GCE**  
**Statistics S2**  
**Advanced/Advanced Subsidiary**  
**Thursday 8 June 2006 – Morning**  
**Time: 1 hour 30 minutes**

Examiner's use only

--	--	--

Team Leader's use only

--	--	--

<b>Materials required for examination</b>	<b>Items included with question papers</b>
Mathematical Formulae (Green)	Nil

**Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may NOT use calculators such as the Texas Instruments TI 89, TI 92, Casio CFX 9970G, Hewlett Packard HP 48G.**

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
Total	

**Instructions to Candidates**

---

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.  
 Check that you have the correct question paper.  
 You must write your answer for each question in the space following the question.  
 Values from the statistical tables should be quoted in full. When a calculator is used, the answer should be given to an appropriate degree of accuracy.

**Information for Candidates**

---

A booklet 'Mathematical Formulae and Statistical Tables' is provided.  
 Full marks may be obtained for answers to ALL questions.  
 Marks for individual questions and parts of questions are shown in round brackets: e.g. (2).  
 There are 7 questions in this question paper.  
 The total for this question paper is 75.  
 There are 24 pages in this question paper. Any blank pages are indicated.

**Advice to Candidates**

---

You must ensure that your answers to parts of questions are clearly labelled.  
 You must show sufficient working to make your methods clear to the examiner. Answers without working may gain no credit.





Leave  
blank

2. The continuous random variable  $L$  represents the error, in mm, made when a machine cuts rods to a target length. The distribution of  $L$  is continuous uniform over the interval  $[-4.0, 4.0]$ .

Find

(a)  $P(L < -2.6)$ , (1)

(b)  $P(L < -3.0 \text{ or } L > 3.0)$ . (2)

A random sample of 20 rods cut by the machine was checked.

(c) Find the probability that more than half of them were within 3.0 mm of the target length. (4)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---















Leave  
blank

**Question 5 continued**

Ruled area for writing answers.



N 2 2 3 3 8 A 0 1 5 2 4

Leave  
blank

6. The continuous random variable  $X$  has probability density function

$$f(x) = \begin{cases} \frac{1+x}{k}, & 1 \leq x \leq 4, \\ 0, & \text{otherwise.} \end{cases}$$

- (a) Show that  $k = \frac{21}{2}$ . (3)
- (b) Specify fully the cumulative distribution function of  $X$ . (5)
- (c) Calculate  $E(X)$ . (3)
- (d) Find the value of the median. (3)
- (e) Write down the mode. (1)
- (f) Explain why the distribution is negatively skewed. (1)

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---





Leave blank

7. It is known from past records that 1 in 5 bowls produced in a pottery have minor defects. To monitor production a random sample of 25 bowls was taken and the number of such bowls with defects was recorded.

(a) Using a 5% level of significance, find critical regions for a two-tailed test of the hypothesis that 1 in 5 bowls have defects. The probability of rejecting, in either tail, should be as close to 2.5% as possible.

(6)

(b) State the actual significance level of the above test.

(1)

At a later date, a random sample of 20 bowls was taken and 2 of them were found to have defects.

(c) Test, at the 10% level of significance, whether or not there is evidence that the proportion of bowls with defects has decreased. State your hypotheses clearly.

(7)

Blank lined area for student response.



Leave  
blank

**Question 7 continued**

Lined area for writing answers to Question 7 continued.

