

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

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## Pearson Edexcel International Advanced Level

Time 1 hour 30 minutes

Paper  
reference

**WST02/01**

### Mathematics

### International Advanced Subsidiary/Advanced Level Statistics S2

**You must have:**

Mathematical Formulae and Statistical Tables (Yellow), calculator

Total Marks

**Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.**

#### Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Values from the statistical tables should be quoted in full. If a calculator is used instead of the tables, the value should be given to an equivalent degree of accuracy.
- Inexact answers should be given to three significant figures unless otherwise stated.

#### Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 7 questions in this question paper. The total mark for this paper is 75.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

#### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over ►

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1 A local pottery makes cups. The number of faulty cups made by the pottery in a week follows a Poisson distribution with a mean of 6

In a randomly chosen week, the probability that there will be at least  $x$  faulty cups made is 0.1528

(a) Find the value of  $x$  (3)

(b) Use a normal approximation to find the probability that in 6 randomly chosen weeks the total number of faulty cups made is fewer than 32 (4)

A week is called a "poor week" if at least  $x$  faulty cups are made, where  $x$  is the value found in part (a).

(c) Find the probability that in 50 randomly chosen weeks, more than 1 is a "poor week". (4)

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**Question 2 continued**

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Question 2 continued

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Q2

(Total 8 marks)











4 The continuous random variable  $X$  has a probability density function given by

$$f(x) = \begin{cases} \frac{1}{2}k(x-1) & 1 \leq x \leq 3 \\ k & 3 < x \leq 6 \\ \frac{1}{4}k(10-x) & 6 < x \leq 10 \\ 0 & \text{otherwise} \end{cases}$$

where  $k$  is a positive constant.

(a) Sketch  $f(x)$  for all values of  $x$  (2)

(b) Show that  $k = \frac{1}{6}$  (2)

(c) Specify fully the cumulative distribution function  $F(x)$  of  $X$  (7)

Given that  $E(X) = \frac{61}{12}$

(d) find  $P(X > E(X))$  (2)

(e) Describe the skewness of the distribution, giving a reason for your answer. (2)

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- 5** Applicants for a pilot training programme with a passenger airline are screened for colour blindness. Past records show that the proportion of applicants identified as colour blind is 0.045
- (a) Write down a suitable model for the distribution of the number of applicants identified as colour blind from a total of  $n$  applicants. (1)
  
  - (b) State one assumption necessary for this distribution to be a suitable model of this situation. (1)
  
  - (c) Using a suitable approximation, find the probability that exactly 5 out of 120 applicants are identified as colour blind. (3)
  
  - (d) Explain why the approximation that you used in part (c) is appropriate. (2)
- Jaymini claims that 75% of all applicants for this training programme go on to become pilots.
- From a random sample of 96 applicants for this training programme 67 go on to become pilots.
- (e) Using a suitable approximation, test Jaymini's claim at the 5% level of significance. State your hypotheses clearly. (7)

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- 6 (a) Explain what you understand by the sampling distribution of a statistic. (1)

At Sam's cafe a standard breakfast consists of 6 breakfast items. Customers can then choose to upgrade to a medium breakfast by adding 1 extra breakfast item or they can upgrade to a large breakfast by adding 2 extra breakfast items. Standard, medium and large breakfasts are sold in the ratio 6:3:2 respectively.

A random sample of 2 customers is taken from customers who have bought a breakfast from Sam's cafe on a particular day.

- (b) Find the sampling distribution for the total number,  $T$ , of breakfast items bought by these 2 customers. Show your working clearly. (7)

- (c) Find  $E(T)$  (2)

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Question 6 continued

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Question 6 continued

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Q6

(Total 10 marks)



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**Question 7 continued**

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Q7

(Total 8 marks)

**TOTAL FOR PAPER: 75 MARKS**

**END**

