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Surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Statistics S2

Advanced/Advanced Subsidiary

Friday 29 January 2016 – Morning

Time: 1 hour 30 minutes

Paper Reference

WST02/01

You must have:

Mathematical Formulae and Statistical Tables (Blue)

Total Marks

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. 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). Coloured pencils and highlighter pens must not be used.
- **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. When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information

- 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.

Turn over ►

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- (a) Identify one potential problem with this sampling frame.

A random sample of 20 customers is taken.

- (2)

- (2)

Question 1 continued

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Q1

(Total 5 marks)



2. The continuous random variable X is uniformly distributed over the interval $[a, b]$

Given that $P(3 < X < 5) = \frac{1}{8}$ and $E(X) = 4$

- (a) find the value of a and the value of b (3)
- (b) find the value of the constant, c , such that $E(cX - 2) = 0$ (2)
- (c) find the exact value of $E(X^2)$ (3)
- (d) find $P(2X - b > a)$ (2)

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Question 2 continued

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Lined area for writing the answer to Question 2.

Q2

(Total 10 marks)



3. Left-handed people make up 10% of a population. A random sample of 60 people is taken from this population. The discrete random variable Y represents the number of left-handed people in the sample.

- (a) (i) Write down an expression for the exact value of $P(Y \leq 1)$
(ii) Evaluate your expression, giving your answer to 3 significant figures. (3)
- (b) Using a Poisson approximation, estimate $P(Y \leq 1)$ (2)
- (c) Using a normal approximation, estimate $P(Y \leq 1)$ (5)
- (d) Give a reason why the Poisson approximation is a more suitable estimate of $P(Y \leq 1)$ (1)

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Question 3 continued

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Question 3 continued

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Q3

(Total 11 marks)



- $$F(x) = \begin{cases} 0 & x < 0 \\ \frac{1}{4}x & 0 \leq x \leq 1 \\ \frac{1}{20}x^4 + \frac{1}{5} & 1 < x \leq d \\ 1 & x > d \end{cases}$$

- (a) Show that $d = 2$ (2)
- (b) Find $P(X < 1.5)$ (2)
- (c) Write down the value of the lower quartile of X (1)
- (d) Find the median of X (3)
- (e) Find, to 3 significant figures, the value of k such that $P(X > 1.9) = P(X < k)$ (4)

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Question 4 continued

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(Total 12 marks)

Q4



- (2)

- (2)

(3)

(1)

- (2)

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Question 5 continued

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Question 5 continued

Lined area for writing the answer to Question 5.



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Question 5 continued

Handwriting practice area with horizontal lines.

(Total 10 marks)

Q5



6. A continuous random variable X has probability density function

$$f(x) = \begin{cases} ax^2 + bx & 1 \leq x \leq 7 \\ 0 & \text{otherwise} \end{cases}$$

where a and b are constants.

- (a) Show that $114a + 24b = 1$

(4)

Given that $a = \frac{1}{90}$

- (b) use algebraic integration to find $E(X)$

(4)

- (c) find the cumulative distribution function of X , specifying it for all values of x

(3)

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

(2)

- (e) use your answer to part (d) to describe the skewness of the distribution.

(2)

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Question 6 continued

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Question 6 continued

Lined area for writing the answer to Question 6.

(Total 15 marks)

Q6



- The fisherman takes 5 fishing trips each lasting 1 hour.

- (6)

Given that the fisherman caught 14 fish in a 2 hour period using the new equipment,

- (6)

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Question 7 continued

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Question 7 continued

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Q7

(Total 12 marks)

TOTAL FOR PAPER: 75 MARKS

END

