Pearson Edexcel International Advanced Level

Tuesday 20 January 2026

Morning (Time: 1 hour 30 minutes)

Paper reference **WST02/01A**

Mathematics

International Advanced Subsidiary/Advanced Level
Statistics S2
Question Paper

You must have:
Answer book (sent separately).
Do not return this question paper with the answer book.

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1. A shop sells rods of nominal length 200 cm. The rods are bought from a manufacturer who uses a machine to cut rods of length L cm, where $L \sim N(\mu, 0.2^2)$

The value of μ is such that there is only a 5% chance that the rod, selected at random from those supplied to the shop, will have a length less than 200 cm.

(a) Find the value of μ to one decimal place.

(3)

A customer buys a random sample of 8 of these rods.

(b) Find the probability that at least 3 of these rods will have a length less than 200 cm.

(3)

Another customer buys a random sample of 60 of these rods.

(c) Using a suitable approximation, find the probability that more than 5 of these rods will have length less than 200 cm.

(3)

(Total for Question 1 is 9 marks)

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2. The random variable $X \sim B(10, p)$

(a) (i) Write down an expression for $P(X = 3)$ in terms of p

(ii) Find the value of p such that $P(X = 3)$ is 16 times the value of $P(X = 7)$

(4)

The random variable $Y \sim Po(\lambda)$

(b) Find the value of λ such that $P(Y = 3)$ is 5 times the value of $P(Y = 5)$

(3)

The random variable $W \sim B(n, 0.4)$

(c) Find the value of n and the value of α such that W can be approximated by the normal distribution, $N(32, \alpha)$

(3)

(Total for Question 2 is 10 marks)

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3. The continuous random variable X has cumulative distribution function given by

$$F(x) = \begin{cases} 0 & x < 0 \\ \frac{1}{6}x(x+1) & 0 \leqslant x \leqslant 2 \\ 1 & x > 2 \end{cases}$$

(a) Find the value of a such that $P(X > a) = 0.4$
Give your answer to 3 significant figures.

(3)

(b) Use calculus to find

(i) $E(X)$

(ii) $Var(X)$

(*Solutions relying on calculator technology are not acceptable.*)

(8)

(Total for Question 3 is 11 marks)

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4. A company claims that 35% of its peas germinate. In order to test this claim Ann decides to plant 15 of these peas and record the number which germinate.

(a) (i) State suitable hypotheses for a two tailed test of this claim.

(ii) Using a 5% level of significance, find an appropriate critical region for this test. The probability in each of the tails should be as close to 2.5% as possible.

(4)

(b) Ann found that 8 of the 15 peas germinated. State whether or not the company's claim is supported. Give a reason for your answer.

(2)

(c) State the actual significance level of this test.

(1)

(Total for Question 4 is 7 marks)

5. A string of length 40 cm is cut into 2 pieces at a random point.
The continuous random variable L represents the length of the longer piece of string.

(a) Write down the distribution of L

(2)

(b) Find the probability that the length of the longer piece of string is 28 cm to the nearest cm.

(2)

Each piece of string is used to form the perimeter of a square.

(c) Calculate the probability that the area of the larger square is less than $64\,\text{cm}^2$

(3)

(d) Calculate the probability that the difference in area between the two squares is greater than $81\,\text{cm}^2$

(4)

(Total for Question 5 is 11 marks)

6. The continuous random variable X has probability density function $\mathrm{f}(x)$ given by

$$\mathrm{f}(x) = \begin{cases} \frac{1}{20}x^3 & 0 \leqslant x \leqslant 2 \\ \frac{1}{10}(6-x) & 2 < x \leqslant 6 \\ 0 & \text{otherwise} \end{cases}$$

(a) Sketch the graph of $\mathrm{f}(x)$ for all values of x

(3)

(b) Write down the mode of X

(1)

(c) Show that $\mathrm{P}(X > 2) = 0.8$

(2)

(d) Define fully the cumulative distribution function $\mathrm{F}(x)$

(4)

Given that $\mathrm{P}(X < a \mid X > 2) = \frac{5}{8}$

(e) find the value of $\mathrm{F}(a)$

(2)

(f) Hence, or otherwise, find the value of a. Give your answer to 3 significant figures.

(3)

(Total for Question 6 is 15 marks)

7. Members of a conservation group record the number of sightings of a rare animal. The number of sightings follows a Poisson distribution with a rate of 1 every 2 months.

(a) Find the smallest value of n such that the probability that there are at least n sightings in 2 months is less than 0.05

(2)

(b) Find the smallest number of months, m, such that the probability of no sightings in m months is less than 0.05

(2)

(c) Find the probability that there is at least 1 sighting per month in each of 3 consecutive months.

(3)

(d) Find the probability that the number of sightings in an 8 month period is equal to the expected number of sightings for that period.

(2)

(e) Given that there were 4 sightings in a 4 month period, find the probability that there were more sightings in the last 2 months than in the first 2 months.

(3)

(Total for Question 7 is 12 marks)

TOTAL FOR PAPER IS 75 MARK

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Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

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Paper reference **WST02/01A**

Mathematics

International Advanced Subsidiary/Advanced Level
Statistics S2
Answer Book

You must have:
Question paper (sent separately)
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.

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Question 1

Write the answer to Question 1 on these 2 pages

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Question 1 continued

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(Total for Question 1 is 9 marks)

Question 2

Write the answer to Question 2 on these 4 pages

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DO NOT WRITE IN THIS AREA

Question 2 continued

Question 2 continued

Question 2 continued

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(Total for Question 2 is 10 marks)

Question 3

Write the answer to Question 3 on these 4 pages

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Question 3 continued

Question 3 continued

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Question 3 continued

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(Total for Question 3 is 11 marks)

Question 4

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Question 4 continued

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(Total for Question 4 is 7 marks)

Question 5

Write the answer to Question 5 on these 4 pages

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Question 5 continued

Question 5 continued

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Question 5 continued

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(Total for Question 5 is 11 marks)

Question 6

Write the answer to Question 6 on these 4 pages

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Question 6 continued

Question 6 continued

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Question 6 continued

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(Total for Question 6 is 15 marks)

Question 7

Write the answer to Question 7 on these 3 pages

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Question 7 continued

Question 7 continued

(Total for Question 7 is 12 marks)

TOTAL FOR PAPER IS 75 MARKS

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