Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International Advanced Level

Friday 5 June 2026

Afternoon (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. The Headteacher of a large school is considering proposed changes to the school canteen. He decides to carry out a survey using a random sample of the students.

(a) Suggest a suitable sampling frame for the sample.

(1)

(b) Identify the sampling units for the sample.

(1)

(c) Give one advantage **and** one disadvantage of taking a random sample rather than a census.

(2)

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Question 1 continued

(Total for Question 1 is 4 marks)

2. The continuous random variable X has cumulative distribution function $\mathrm{F}(x)$ given by

$$\mathrm{F}(x) = \begin{cases} 0 & x < -3 \\ k(x+3) & -3 \leqslant x \leqslant 5 \\ 1 & x > 5 \end{cases}$$

where k is a positive constant.

(a) Show that $k = \frac{1}{8}$

(2)

(b) Find

(i) $\mathrm{P}(X > 2)$

(ii) $\mathrm{P}(X = 5)$

(3)

(c) Specify the probability density function of X, for all values of x

(3)

(d) State the name of this probability distribution.

(1)

(e) Find

(i) $\mathrm{E}(X)$

(ii) $\mathrm{Var}(X)$

(3)

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Question 2 continued

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Question 2 continued

(Total for Question 2 is 12 marks)

3. During weekday mornings, cars are known to pass a certain junction on a road at a mean rate of 4.25 each minute.

(a) Suggest a suitable distribution to model the number of cars that pass this junction in a 2-minute interval on weekday mornings.

(1)

(b) State an assumption necessary for this distribution to be a suitable model of this situation.

(1)

(c) Find the probability that in a given 2-minute interval on a weekday morning

(i) fewer than 3 cars pass the junction,

(ii) more than 5 but fewer than 11 cars pass the junction.

(3)

(d) Use a suitable approximation to find the probability that more than 280 cars will pass the junction in a one-hour period during a weekday morning.
You must show your working.

(4)

Traffic calming measures are installed on the road.

A council officer wishes to perform a hypothesis test to determine whether there are now fewer cars passing the junction each minute.

The officer notes the number of cars passing the junction during a randomly chosen 2-minute period on a weekday morning.

(e) Write down suitable null and alternative hypotheses for the test.

(1)

(f) Find, using a 5% significance level, the critical region for the test.

(2)

During the randomly chosen 2-minute period, the council officer noted exactly 5 cars passing the junction.

(g) Comment on this finding in the light of your critical region found in part (f)

(2)

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Question 3 continued

Question 3 continued

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Question 3 continued

(Total for Question 3 is 14 marks)

4. An electrical shop sells 4 watt, 5 watt and 6 watt LED light bulbs.

For customers who buy exactly one LED light bulb from the shop

- 25% are 4 watt and sell for a price of £5
- 40% are 5 watt and sell for a price of £6
- the rest are 6 watt and sell for a price of £7

(a) Find the mean **price** of all LED light bulbs sold by the shop to these customers.

(2)

A random sample of size 3 is taken from these customers.

(b) List all the possible combinations of **prices** paid by the customers in this sample.

(2)

The random variable R is the range of the **prices** for this sample of 3 customers.

(c) Find the sampling distribution of R

(6)

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Question 4 continued

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Question 4 continued

(Total for Question 4 is 10 marks)

5. Paula is practising her BMX bike tricks.

Each day she attempts 20 medium tricks and 30 hard tricks.

Every time she attempts

- a medium trick, there is a probability of 0.45 that she successfully completes the trick
- a hard trick, there is a probability of 0.2 that she successfully completes the trick

(a) Find the probability that, on a particular day, she successfully completes

(i) exactly 6 **medium** tricks,

(ii) 12 or more **hard** tricks.

(4)

Each day Paula attempts 10 **easy** tricks.

Every time she attempts an easy trick, there is a probability of p that she successfully completes the trick.

Given that the number of times Paula successfully completes an easy trick each day has a standard deviation of 1.5

(b) find the two possible values for the mean number of times she successfully completes an easy trick each day.

(5)

(c) Using your answer to part (b), suggest the more likely value for the mean number of times Paula successfully completes an easy trick each day.
Give a reason for your answer.

(2)

Paula buys a new BMX bike and believes that this has increased the probability that she completes a **hard** trick successfully.

On a particular day Paula attempted 30 hard tricks and found that she completed 10 tricks successfully.

(d) Test, at the 5% level of significance, whether there is significant evidence to support Paula's belief.
State your hypotheses clearly.

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Question 5 continued

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Question 5 continued

(Total for Question 5 is 16 marks)

6. The random variable X has a binomial distribution $X \sim \mathrm{B}(n, p)$

Given that

$$\text{variance of } X = \frac{9}{10} \times \text{mean of } X$$

(a) find the value of p

(2)

The distribution of X is approximated by Y with a Poisson distribution with mean λ

Given that $Y \sim \mathrm{Po}(\lambda)$ and $\mathrm{P}(Y = 19) = \mathrm{P}(Y = 20)$

(b) find the value of n

(5)

(c) State whether or not the Poisson approximation is reasonable in this case.
Give a reason for your answer.

(1)

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Question 6 continued

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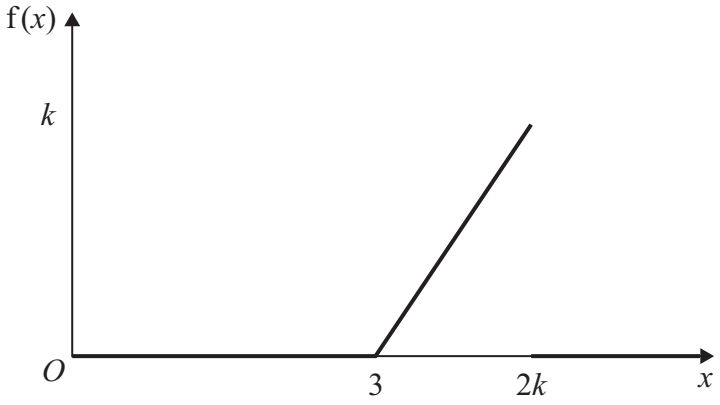
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Question 6 continued

(Total for Question 6 is 8 marks)

7. The probability density function of the continuous random variable X is shown in the graph below, where k is a constant.



(a) Show that $k = 2$

(2)

(b) State the mode of X

(1)

(c) Specify fully the probability density function of X

(3)

Given that $\mathrm{E}(X) = \frac{11}{3}$

(d) find the exact value of $\mathrm{Var}(X)$
(*Solutions relying entirely on calculator technology are not acceptable.*)

(5)

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Question 7 continued

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Question 7 continued

Question 7 continued

(Total for Question 7 is 11 marks)

TOTAL FOR PAPER IS 75 MARKS

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