

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

WST01/01

Mathematics

International Advanced Subsidiary/Advanced Level Statistics S1

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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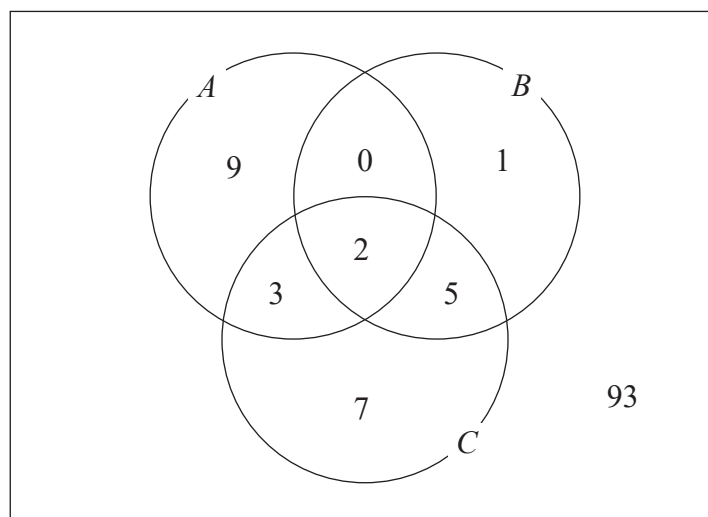


Pearson

1. A factory produces shoes.

A quality control inspector at the factory checks a sample of 120 shoes for each of three types of defect. The Venn diagram represents the inspector's results.

A represents the event that a shoe has defective stitching
 B represents the event that a shoe has defective colouring
 C represents the event that a shoe has defective soles



One of the shoes in the sample is selected at random.

- Find the probability that it does **not** have defective soles. (1)
- Find $P(A \cap B \cap C')$ (1)
- Find $P(A \cup B \cup C')$ (2)
- Find the probability that the shoe has at most one type of defect. (2)
- Given the selected shoe has at most one type of defect, find the probability it has defective stitching. (2)

The random variable X is the number of the events A, B, C that occur for a randomly selected shoe.

- Find $E(X)$ (3)



Question 1 continued

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Question 1 continued

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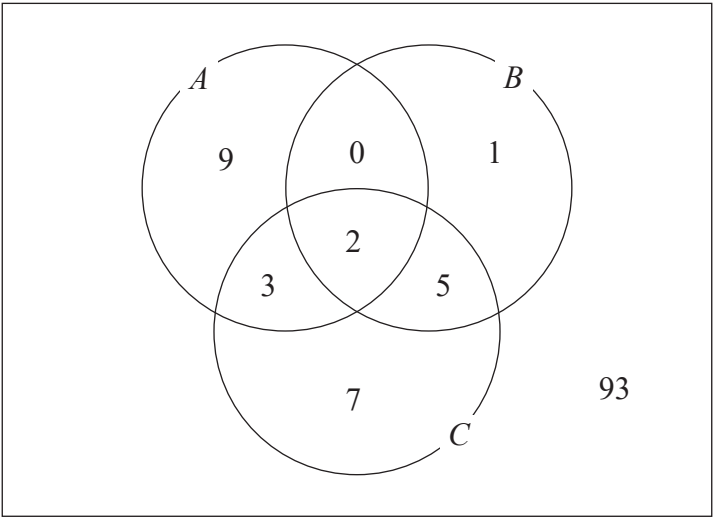
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Question 1 continued

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(Total 11 marks)

Q1



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Question 2 continued

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Question 2 continued

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Question 2 continued

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(Total 6 marks)

Q2



3. The stem and leaf diagram shows the number of deliveries made by Pat each day for 24 days

Key: 10 | 8 represents 108 deliveries

10	8	9										(2)
11	0	3	6	6	6	8	8	9	9	9	9	(11)
12	4	5	5	5	5	5	5	8				(8)
13	a	b	c									(3)

where a , b and c are positive integers with $a < b < c$

An outlier is defined as any value greater than $1.5 \times$ interquartile range above the upper quartile.

Given that there is only one outlier for these data,

- (a) show that $c = 9$

(3)

The number of deliveries made by Pat each day is represented by d

The data in the stem and leaf diagram are coded using

$$x = d - 125$$

and the following summary statistics are obtained

$$\sum x = -96 \quad \text{and} \quad \sum (x - \bar{x})^2 = 1306$$

- (b) Find the mean number of deliveries.

(3)

- (c) Find the standard deviation of the number of deliveries.

(2)

One of these 24 days is selected at random. The random variable D represents the number of deliveries made by Pat on this day.

The random variable $X = D - 125$

- (d) Find $P(D > 118 | X < 0)$

(2)

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Question 3 continued

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Question 3 continued

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Question 3 continued

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(Total 10 marks)

Q3



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Question 4 continued

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Question 4 continued

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Question 4 continued

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(Total 13 marks)

Q4

Grading boxes for Q4.



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Question 5 continued

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Question 5 continued

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Question 5 continued

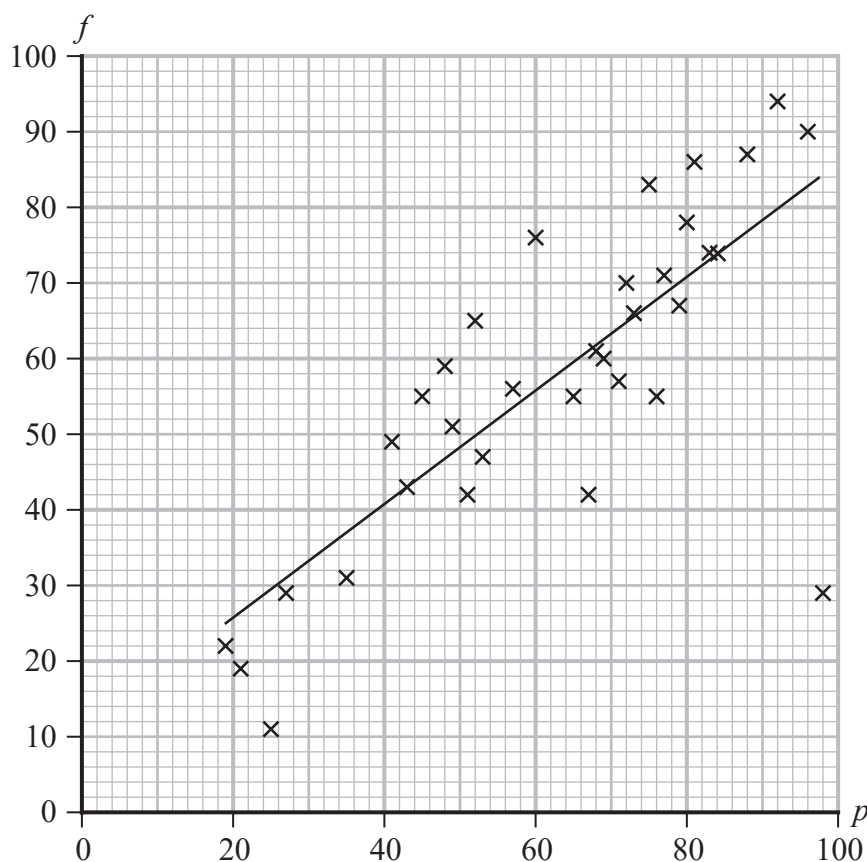
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(Total 11 marks)

Q5



6. Students on a psychology course were given a pre-test at the start of the course and a final exam at the end of the course. The teacher recorded the number of marks achieved on the pre-test, p , and the number of marks achieved on the final exam, f , for 34 students and displayed them on the scatter diagram.



The equation of the least squares regression line for these data is found to be

$$f = 10.8 + 0.748p$$

For these students, the mean number of marks on the pre-test is 62.4

- (a) Use the regression model to find the mean number of marks on the final exam. (2)
- (b) Give an interpretation of the gradient of the regression line. (1)
- Considering the equation of the regression line, Priya says that she would expect someone who scored 0 marks on the pre-test to score 10.8 marks on the final exam.
- (c) Comment on the reliability of Priya's statement. (1)
- (d) Write down the number of marks achieved on the final exam for the student who exceeded the expectation of the regression model by the largest number of marks. (1)

Question 6 continues on page 24.



Question 6 continued

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Question 6 continues on page 24.



Question 6 continued

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- (e) Find the range of values of p for which this regression model, $f = 10.8 + 0.748p$, predicts a greater number of marks on the final exam than on the pre-test. (3)

Later the teacher discovers an error in the recorded data. The student who achieved a score of 98 on the pre-test, scored 92 not 29 on the final exam.

The summary statistics used for the model $f = 10.8 + 0.748p$ are corrected to include this information and a new least squares regression line is found.

Given the **original** summary statistics were,

$$n = 34 \quad \sum p = 2120 \quad \sum pf = 133\,486 \quad S_{pp} = 15\,573.76 \quad S_{pf} = 11\,648.35$$

- (f) calculate the gradient of the new regression line. Show your working clearly. (5)



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Question 6 continued

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(Total 13 marks)

Q6

Grading boxes for Question 6.



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Question 7 continued

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Question 7 continued

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Q7

(Total 11 marks)

TOTAL FOR PAPER: 75 MARKS

END

