eClassroom

INTERNATIONAL A LEVEL MATHEMATICS • STATISTICS 1 (WST01)

Statistics 1 Practice Paper 2

Edexcel IAL Statistics 1

AIMING FOR A

Written in the style of the Pearson Edexcel International Advanced Level paper (WST01/01) • Calculator allowed

A full 75-mark paper, harder than a typical real series, with fewer steps given and topics combined in every question

Time	Total	You must have
1 hour 30 minutes	**75 marks**	**Mathematical Formulae and Statistical Tables, calculator**

Instructions

- Use black ink or ball-point pen. Pencil may be used for diagrams and sketches.
- Answer **all** questions, in the spaces provided.
- Show enough working to make your method clear. Answers without working may not gain full credit.
- Give inexact answers to **three significant figures** unless the question says otherwise.

Information

- There are 7 questions in this paper. The total mark is 75.
- The marks for each question are shown in brackets.

Advice

- Sit the paper in one go, in 1 hour 30 minutes, with the mark scheme closed.
- Read each question carefully and try every question. Check your answers if you have time.
- Then mark it line by line with the mark scheme and fill in your score.

Track your score

Q	Topic	Marks	Score
1	The larger of two spins	10	
2	Combining and correcting two classes	11	
3	Regression with coded data	11	
4	Normal mean and standard deviation	10	
5	A Venn diagram of a survey	11	
6	A histogram and a normal model	11	
7	Two observations of a random variable	11	
	Total	**75**	

Rough grade guide (out of 75): A **58** • B **49** • C **40**

Based on recent WST01 grade boundaries. Real boundaries change every series, so treat this as a guide, not a grade.

Mark scheme **Exam questions by topic** **More practice papers**

Name ..... Date .....

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1.

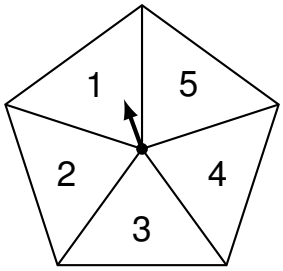

Figure 1

Figure 1 shows a fair five-sided spinner with sides numbered 1, 2, 3, 4 and 5

Rosa spins the spinner twice. The random variable X is the larger of the two scores. If the two scores are equal, X is that score.

(a) Find the probability distribution of X

(3)

(b) Find $\mathrm{E}(X)$

(2)

(c) Find $\mathrm{Var}(X)$

(3)

In a game, Rosa wins W points, where $W = 3X - 8$

(d) Find the probability that Rosa wins more than $\mathrm{E}(W)$ points.

(2)

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Question 1 continued

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(Total for Question 1 is 10 marks)

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2. The marks, x, of the 20 students in class A and the marks, y, of the 30 students in class B in a test are summarised below.

Class A : $\sum x = 1240$ $\sum x^2 = 78\,160$ Class B : $\sum y = 1680$ $\sum y^2 = 97\,080$

(a) Find the mean and the standard deviation of the marks of all 50 students.

(4)

It was later discovered that one mark in class B had been recorded as 48 when it should have been 78

(b) Find the corrected mean and standard deviation of the marks of all 50 students.

(3)

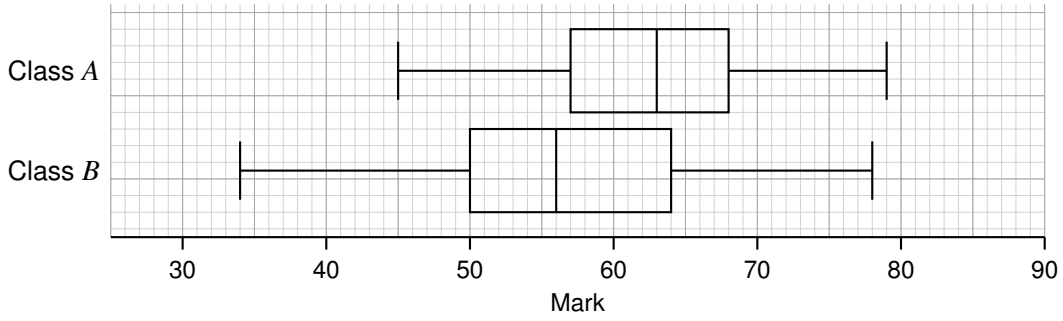

Figure 2

Figure 2 shows box plots of the corrected marks for the two classes.

(c) Compare the marks of the two classes, giving two comparisons.

(2)

The teacher scales every corrected mark using $s = 1.5x - 10$, where x is the corrected mark.

(d) Find the mean and the standard deviation of the scaled marks of all 50 students.

(2)

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Question 2 continued

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(Total for Question 2 is 11 marks)

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3. A biologist measures the length, x mm, and the mass, y g, of 8 fish of the same species. The data are coded using

$$u = \frac{x - 200}{10} \quad \text{and} \quad v = \frac{y - 100}{5}$$

and the coded results are summarised below.

$$\sum u = 24 \quad \sum v = 40 \quad \sum u^2 = 314 \quad \sum v^2 = 404 \quad \sum uv = 331$$

(a) Find S_{uu}, S_{vv} and S_{uv}

(3)

(b) Find the product moment correlation coefficient between x and y, explaining why the coding does not affect your answer.

(2)

(c) Find the equation of the regression line of y on x, in the form $y = a + bx$, giving a and b to 3 significant figures.

(4)

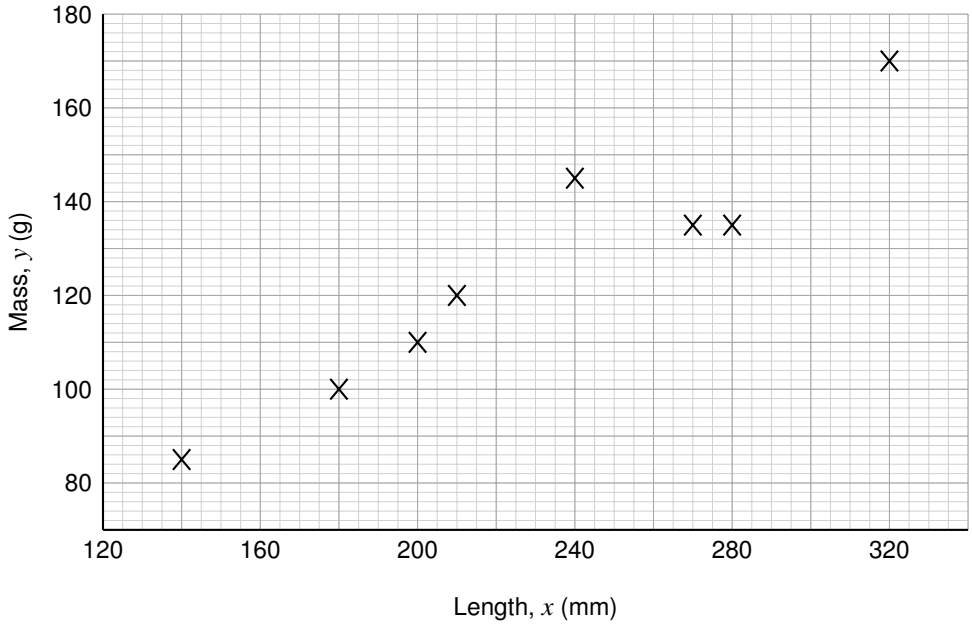

Figure 3

Figure 3 shows a scatter diagram of the original data.

(d) Draw your regression line on Figure 3.

(1)

(e) Interpret the value of b in the context of the question.

(1)

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Question 3 continued

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(Total for Question 3 is 11 marks)

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4. The lengths, L cm, of the leaves on a plant are modelled by a normal distribution with mean μ and standard deviation σ

Of these leaves, 10% are shorter than 48.8 cm and 20% are longer than 54.1 cm.

(a) Find the value of μ and the value of σ

(5)

(b) A leaf is chosen at random. Given that it is longer than 52 cm, find the probability that it is longer than 55 cm.

(3)

Three leaves are chosen at random.

(c) Find the probability that exactly one of them is longer than 55 cm.

(2)

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Question 4 continued

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(Total for Question 4 is 10 marks)

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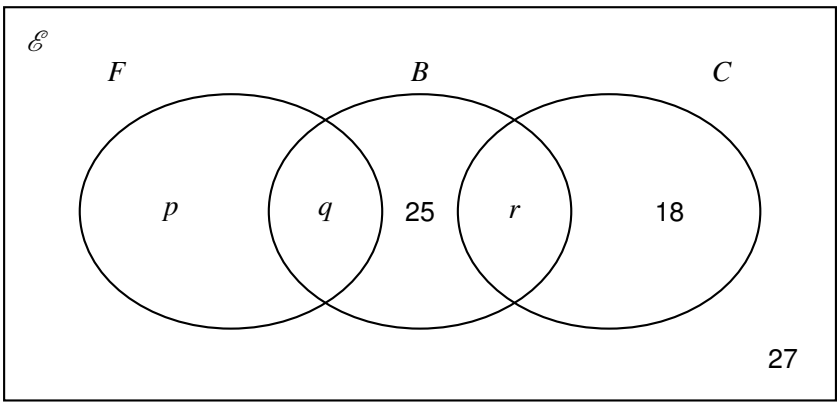

Figure 4

Each of the 120 students in a year group was asked which of three sports, football (F), basketball (B) and cricket (C), they play. The Venn diagram in Figure 4 shows the numbers of students, where p, q and r are integers.

No student plays both football and cricket. A total of 45 students play basketball. The events "a randomly chosen student plays football" and "a randomly chosen student plays basketball" are independent.

(a) Find the values of p, q and r

(5)

A student is chosen at random.

(b) Given that the student plays basketball, find the probability that the student plays cricket.

(2)

(c) Given that the student does not play cricket, find the probability that the student plays football.

(2)

(d) Show that the events B and C are not independent.

(2)

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Question 5 continued

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(Total for Question 5 is 11 marks)

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6. The masses, m grams, of 200 tomatoes are summarised in the table below.

Mass (m grams)	Frequency
$60 \leqslant m < 70$	6
$70 \leqslant m < 80$	28
$80 \leqslant m < 85$	40
$85 \leqslant m < 90$	52
$90 \leqslant m < 100$	60
$100 \leqslant m < 120$	14

A histogram is drawn to represent these data. The bar for the class $70 \leqslant m < 80$ is 3 cm wide and 1.4 cm high.

(a) Find the width and the height of the bar for the class $85 \leqslant m < 90$

(3)

(b) Use linear interpolation to estimate the lower quartile and the upper quartile of the masses.

(3)

The median mass is 87.5 grams. The masses are to be modelled by a normal distribution with mean equal to this median and with the same interquartile range as the data.

(c) Find the standard deviation of the normal model.

(3)

(d) Use the model to estimate the number of these tomatoes with a mass of more than 100 grams, and comment on the suitability of the model.

(2)

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Question 6 continued

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(Total for Question 6 is 11 marks)

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7. The discrete random variable X has the probability distribution below, where a and b are constants.

x	1	2	3	4	5
$P(X = x)$	0.2	a	0.25	b	0.1

Given that $E(X) = 2.85$

(a) find the value of a and the value of b

(3)

(b) Find $\text{Var}(5 - 3X)$

(3)

Two independent observations, X_1 and X_2, are taken of X

(c) Find $P(X_1 + X_2 = 4)$

(3)

(d) Find $P(X_1 > X_2)$

(2)

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Question 7 continued

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TOTAL FOR PAPER IS 75 MARKS

END

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