



eClassroom

INTERNATIONAL A LEVEL MATHEMATICS • STATISTICS 1

Statistics 1

Exam Questions by Topic

Pearson Edexcel International Advanced Level (WST01/01) • Calculator and Statistical Tables allowed

Multi-step exam questions at the difficulty of the real WST01 paper, with a full mark scheme

Chapters (tap a chapter to jump to it)	Qs	Marks	Page	My score
1 Mathematical Modelling Not examined on its own: modelling ideas are tested within Chapters 2 to 7	—	—	Not applicable	
2 Measures of Location and Spread Averages, quartiles, interpolation, standard deviation, coding	10	83	2	
3 Representations of Data Histograms, stem and leaf, box plots, outliers, skewness, comparisons	10	80	own PDF	
4 Probability Venn and tree diagrams, conditional probability, independence	10	80	own PDF	
5 Correlation and Regression PMCC, least squares regression, interpretation, coding	10	84	own PDF	
6 Discrete Random Variables Probability and cumulative distributions, $E(X)$, $\text{Var}(X)$, uniform	10	82	own PDF	
7 The Normal Distribution Standardising, tables, finding μ and σ , conditional problems	10	83	own PDF	

[Full mark scheme](#)

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Name

Class

Date



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CHAPTER 2 • KEY SKILLS

2

Measures of Location and Spread

Specification S1: summary of data • 10 questions • 83 marks • about 100 minutes

1 Types of data and classes

Discrete: counted. Continuous: measured. For “150–159” to the nearest cm the class boundaries are 149.5 and 159.5

2 Averages from tables

$\bar{x} = \frac{\sum fx}{\sum f}$, using class midpoints for grouped data (an estimate).

3 Quartiles for discrete data

$\frac{n}{4}$ not whole: round up. $\frac{n}{4}$ whole: halfway between that value and the next. Same for $\frac{n}{2}$, $\frac{3n}{4}$

4 Interpolation

For grouped data the median is the $\frac{n}{2}$ th value: lower boundary + $\frac{\text{values needed}}{\text{class frequency}} \times \text{class width}$

5 Variance and standard deviation

$\sigma^2 = \frac{\sum x^2}{n} - \bar{x}^2 = \frac{S_{xx}}{n}$; for tables use $\frac{\sum fx^2}{\sum f} - \bar{x}^2$

6 Coding

If $y = \frac{x-a}{b}$ then $\bar{x} = b\bar{y} + a$ and $\sigma_x = b \sigma_y$
Variances scale by b^2 .

7 Combining data sets

Work with totals: $\sum x = n\bar{x}$ and $\sum x^2 = n(\sigma^2 + \bar{x}^2)$, then add.

8 Changing the data

A value equal to the mean leaves $\bar{x}$ unchanged but reduces σ . Correct a value by changing $\sum x$ and $\sum x^2$.

9 Choosing a measure

Median and IQR resist extreme values. The mean uses all the data. Always interpret in context.

Skills map every skill above is tested at least once; interleaved skills come from GCSE or other chapters

Skill	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Marks	6	5	5	6	5	12	11	10	11	12
1 Types of data and classes		•				•				
2 Averages from tables	•	•				•		•	•	
3 Quartiles for discrete data	•								•	
4 Interpolation		•				•		•		
5 Variance and standard deviation	•		•		•	•		•	•	•
6 Coding				•			•			•
7 Combining data sets					•		•			•
8 Changing the data			•				•		•	•
9 Choosing a measure								•	•	•
Interleaved: probability without replacement (GCSE, Chapter 4)						•				
Interleaved: linear and simultaneous equations (P1)									•	
Interleaved: percentages and claims in context								•		•

Exam difficulty. Questions 1 to 5 check each skill on its own. Questions 6 to 10 are multi-part questions built like the 11 to 14 mark questions on a real WST01 paper, where one part leads into the next and skills are combined.

Must learn. You may use the formula booklet and a calculator. Give inexact answers to 3 significant figures unless told otherwise, and write interpretations in the context of the question.



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1. The number of goals scored by a football team in each of 40 matches is summarised below.

Number of goals, x	0	1	2	3	4	5
Frequency, f	7	12	10	6	3	2

- (a) Find the median and the interquartile range of the number of goals.

(3)

- (b) Find the mean and the standard deviation of the number of goals.

(3)

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Question 1 continued

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(Total for Question 1 is 6 marks)



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2. The heights, to the nearest cm, of 80 students are summarised below.

Height (cm)	150–159	160–169	170–179	180–194	195–209
Frequency	8	22	30	15	5

- (a) Write down the class boundaries and the midpoint of the 180–194 class. (1)
- (b) Calculate an estimate of the mean height. (2)
- (c) Use linear interpolation to estimate the median height. (2)

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Question 2 continued

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3. The times, x minutes, taken by 25 people to complete a task are summarised by

$$\sum x = 1150 \quad \sum x^2 = 53850$$

- (a) Find the mean and the standard deviation of x .

(3)

It is then found that one of the times was recorded as 38 minutes when it should have been 58 minutes.

- (b) Find the correct mean of the 25 times.

(2)

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Question 3 continued

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4. The masses, x grams, of 16 apples are coded using $y = \frac{x - 200}{5}$ and summarised by

$$\sum y = 64 \quad \sum y^2 = 544$$

- (a) Find the mean of x . (2)
- (b) Find the standard deviation of x . (3)
- (c) Write down the variance of x . (1)

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Question 4 continued

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5. Two classes sat the same test. The results are summarised below.

	Number of students	Mean mark	Standard deviation
Class A	12	64	5
Class B	8	59	4

- (a) Find the mean mark of all 20 students.

(2)

- (b) Find the standard deviation of the marks of all 20 students.

(3)

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Question 5 continued

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6. The masses, m grams, of a random sample of 60 potatoes are summarised below.

Mass, m (g)	Frequency, f
$100 \leq m < 120$	6
$120 \leq m < 140$	15
$140 \leq m < 150$	18
$150 \leq m < 170$	13
$170 \leq m < 200$	8

(You may use $\sum fx^2 = 1\,311\,150$, where x is the midpoint of each class.)

- (a) Use linear interpolation to estimate the median and the interquartile range of the masses. (4)
- (b) Estimate the mean and the standard deviation of the masses. (4)
- (c) Estimate the number of potatoes with a mass of more than 160 g. (2)
- Two of the 60 potatoes are chosen at random.
- (d) Find the probability that both of them have a mass in the class $140 \leq m < 150$ (2)



Question 6 continued

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Question 6 continued

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7. The weights, w grams, of 40 parcels are coded using $y = \frac{w - 50}{4}$ and summarised by

$$\sum y = 58 \quad \sum y^2 = 262$$

- (a) Show that the mean of w is 55.8 g (2)

- (b) Find the standard deviation of w . (3)

- (c) Find the values of $\sum w$ and $\sum w^2$ (3)

A 41st parcel, of weight 55.8 g, is added to the sample.

- (d) State, giving a reason in each case, the effect this has on
(i) the mean weight,
(ii) the standard deviation of the weights. (3)



Question 7 continued

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Question 7 continued

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(Total for Question 7 is 11 marks)



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8. A bank records how long, t minutes, each of 50 customers waits to be served.

Waiting time, t (min)	Frequency, f
$0 \leq t < 5$	6
$5 \leq t < 10$	14
$10 \leq t < 15$	16
$15 \leq t < 20$	9
$20 \leq t < 30$	5

- (a) Estimate the mean and the standard deviation of the waiting times.

(4)

The bank claims that “only 10% of our customers wait longer than 18 minutes”.

- (b) By calculating a suitable percentile, comment on this claim.

(3)

- (c) Estimate the number of customers who waited more than one standard deviation above the mean.

(3)



Question 8 continued

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Question 8 continued

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9. The number of books, x , read by each member of a book club in one month is summarised below, where p is a positive integer.

Number of books, x	1	2	3	4	5
Frequency	4	p	10	7	3

The mean number of books read is exactly 3

- (a) Show that $p = 5$ (3)

- (b) Find the median and the interquartile range. (3)

- (c) Find the standard deviation of the number of books read. (3)

A new member joins the club and reads k books in that month. The mean for all the members then becomes 3.1

- (d) Find the value of k . (2)



Question 9 continued

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Question 9 continued

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(Total for Question 9 is 11 marks)



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10. Two machines fill bags of flour.

A random sample of 30 bags from machine *A* has a mean mass of 502 g and a standard deviation of 3 g.

A random sample of 20 bags from machine *B* has masses x grams, coded using $y = x - 500$, with

$$\sum y = 30 \quad \sum y^2 = 245$$

- (a) Find the mean and the standard deviation of the masses of the bags from machine *B*. (3)

- (b) Find the mean mass of all 50 bags. (2)

- (c) Find the standard deviation of the masses of all 50 bags. (4)

It is discovered that one bag from machine *A*, recorded as 511 g, actually had a mass of 501 g.

- (d) Find the corrected mean mass of the bags from machine *A*, and state, with a reason, whether the corrected standard deviation for machine *A* is greater or less than 3 g. (3)



Question 10 continued

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Question 10 continued

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TOTAL FOR CHAPTER 2 IS 83 MARKS

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