

Measure of Location and spread – GCSE Statistics**1. No.5**

Sam asks some friends how many internet-enabled devices are in their homes.

The results are

4 5 3 6 4 5 5 7 6 8 3 5

Three years earlier he had asked the same friends the same question.

The results were

Number of devices three years earlier	Frequency
1	1
2	4
3	6
4	0
5	1

By calculating a measure of average and a measure of spread, make **two** comparisons between the current data and the data for three years ago.

[5 marks]

Comparison 1 _____

Comparison 2 _____

2. No.2

Here are some summary measures for a distribution.

Smallest value	2nd decile	Largest value
11	35	161

The difference between the 2nd and 8th deciles is 30% less than the range.

Circle the value of the 8th decile.

[1 mark]

80

105

140

155

3. No.3

The geometric mean of 3 and x is 6Circle the value of x .

[1 mark]

2

4

9

12

4. No.13

A machine fills bottles with orange juice.

The amount of orange juice in a bottle follows a normal distribution with a mean of 500 ml and a standard deviation of 10 ml.

- (a) Approximately, what percentage of bottles contain more than 510 ml of orange juice?
Circle your answer.

[1 mark]

16%

32%

68%

84%

- (b) The manufacturer would like **almost all** bottles to contain between 488 ml and 512 ml of orange juice.

Sophie says that this could be achieved by reducing the standard deviation to 4 ml.

Comment on Sophie's claim.

You **must** show your working.

[2 marks]

5. No.15

In this question you will need to use,

$$\text{standardised score} = \frac{\text{score} - \text{mean}}{\text{standard deviation}}$$

Swimmers in a competition swim two races.

Swimmers use breaststroke in Race 1 and backstroke in Race 2

The mean and standard deviation of the times in each race are shown in the table.

	Mean (seconds)	Standard deviation (seconds)
Race 1	45.5	2.4
Race 2	41.7	1.8

- (a) Rachel's time in **Race 1** was 48.7 seconds.
Her standardised score in both races was the same.

Calculate Rachel's time in **Race 2**

[3 marks]

Answer _____ seconds

- (b) Kim and Pria also swim in the competition.

Their times in each race are shown in the table below.

	Kim		Pria	
	Time (secs)	Standardised score	Time (secs)	Standardised score
Race 1	43.7		44.3	
Race 2	40.5		40.3	

Complete the table and use it to decide which race each girl swam better in.

Give a reason for each of your decisions.

[5 marks]

[illegible]

6. No.1

In a sample of 30 hockey matches, Natalie scored in 6 of them.

Estimate the proportion of all hockey matches in which Natalie scores.

Circle your answer.

[1 mark]

0.18

0.2

0.3

0.6

7. No.4

Which word describes the extent to which something measures what it is supposed to measure?

Circle your answer.

[1 mark]

bias

reliability

validity

accuracy

8. No.5

Asha is learning to throw the javelin.

During training one day, she threw the javelin these distances (in metres).

21.4	18.8	23.7	3.9	17.9	26.1
32.4	26.8	18.6	22.2	30.5	

Asha wants to be able to see if her performance improves in the future.

She decides to calculate the median and range of the data.

(a) Work out the median of the data.

[2 marks]

Answer _____ metres

(b) Work out the range of the data.

[2 marks]

Answer _____ metres

(c) Give **one** reason why the range might **not** be a good measure of spread to use here.

[1 mark]

- (d) Six months later Asha calculates her median throw length again after training one day. Her median is 31.7 metres.

She says,

“On average, my throws are getting longer, so if I keep training my distances will continue to increase.”

Comment on **both** parts of Asha’s statement, giving a reason for whether you think she is correct.

[2 marks]

“On average, my throws are getting longer...”

“... if I keep training my distances will continue to increase.”

9. No.12a

There are many ways to judge how hard it is to read a piece of text in a book.

- (a) Ravi decides to record the number of letters in the longest word on each of the first 11 pages of a book.

His results are

7 13 8 9 6 10 16 9 10 8 8

He calculates the interquartile range (IQR).

- (a) (i) Show that he should get a value of 2

[3 marks]

- (a) (ii) For a second book, Ravi again counts the number of letters in the longest word on each of the first 11 pages.

He works out that the IQR is 3

Ravi says,

“The second book will be harder to read than the first as its IQR is bigger.”

Is he correct?

Give a reason for your answer.

[1 mark]

10. No.2

A set of 16 data values, x , has,

$$\sum (x - \bar{x})^2 = 36$$

Circle the standard deviation of the data.

Use,

$$\text{standard deviation} = \sqrt{\frac{1}{N} \sum (x - \bar{x})^2}$$

[1 mark]

0.375

1.5

2.25

6