

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

Two variables have no correlation.

Which of these could be the value of the Spearman's Rank Correlation Coefficient between the two variables?

Circle your answer.

[1 mark]

1

– 1

0.05

0.5

2. No.2Which one of these is **not** a measure of spread?

Circle your answer.

[1 mark]

interdecile range

interpercentile range

standard deviation

skewness

3. No.14

14

The number of days between snow events (a day when it snows) in a Scottish town during winter 2020 – 2021 was recorded.

The data has been **ordered by size**.

0 0 0 1 1 3 4 4 10 28

For example, a value of 0 indicates it snowed on two consecutive days.

14 (a)

Rhona says that it snowed on three consecutive days.

Is she correct?

Tick (✓) a box.

Yes

☐

No

☐

Cannot tell

☒

Give a reason for your answer.

[1 mark]

The data has been ordered so we can't tell whether the values of 0 are for consecutive days.

14 (b) Use the formulae

$$\text{skew} = \frac{3(\text{mean} - \text{median})}{\text{standard deviation}} \quad \text{and standard deviation} = \sqrt{\frac{\sum x^2}{N} - \left(\frac{\sum x}{N}\right)^2}$$

to show that the skew of the data is +1.14 (to 2 decimal places).

[6 marks]

$$\begin{array}{cccccccccc} \cancel{0} & \cancel{0} & \cancel{0} & \cancel{1} & 1 & 3 & 4 & 4 & 10 & 28 \\ \text{Median} & = & \frac{1+3}{2} & = & 2 \end{array}$$

$$\sum x = 1 + 1 + 3 + 4 + 4 + 10 + 28 = 51$$

$$\Rightarrow \text{Mean} = \frac{\sum x}{n} = \frac{51}{10} = 5.1$$

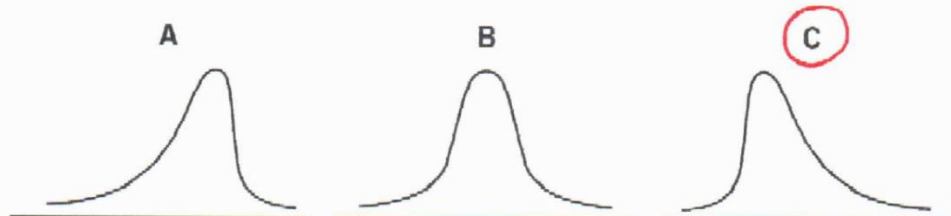
$$\sum x^2 = 1^2 + 1^2 + 3^2 + 4^2 + 4^2 + 10^2 + 28^2 = 921$$

$$\Rightarrow \text{Standard deviation} = \sqrt{\frac{921}{10} - (5.1)^2} = 8.166$$

$$\begin{aligned} \text{Skew} &= \frac{3(5.1 - 2)}{8.166} = \frac{3 \times 3.1}{8.166} \\ &= 1.14 \text{ (3 s.f.)} \end{aligned}$$

14 (c) Circle the letter of the diagram that shows data with a positive skew.

[1 mark]



The distribution has its tail on the right side.

4. No.1

1

A set of data is ordered from smallest to largest.

What is the name given to the measure that is one quarter along the ordered data?

Circle your answer.

[1 mark]

range
↓
Maximum - minimum
Value Value

lower quartile

upper quartile
↓
 $\frac{3}{4}$ along the
ordered data

median
↓
 $\frac{1}{2}$ along the
ordered data.

5. No.2

2

Look at these sets of data.

A 2, 4, 5, 5, 7, 8

B 0, 5, 3, 6, 1, 4

C 9, 8, 7, 7, 6, 5

D 5, -1, 3, 2, 0, 1

Circle the letter below for the data set which has a **different range** to the others.

[1 mark]

A

B

C

D

Range = Largest number - Smallest number.

For A : Range = $8 - 2 = 6$

For B : Range = $6 - 0 = 6$

For C : Range = $9 - 5 = 4$

For D : Range = $5 - (-1) = 5 + 1 = 6$

∴ Different range is from C.

6. No.16

16

Here is an experiment which is designed to find the best trained dog out of Troy, Buddy, Bruno, Murphy and Bumble.

- Each of the five owners asks their dog to sit and then walks away.
- The time for which each dog sits is recorded.

The experiment is repeated 4 more times.

16 (a) Here are the data for the five dogs.

Dog	Time for which each dog sits (nearest second)				
	Experiment 1	Experiment 2	Experiment 3	Experiment 4	Experiment 5
Troy	15	18	19	13	13
Buddy	21	22	14	20	12
Bruno	39	20	17	12	12
Murphy	24	17	18	2	24
Bumble	7	12	14	12	10

The dog which sits for the longest **average** time is declared the winner.

Give a reason why each of the three dogs stated on the next page could be declared the winner.

In each answer you **must** state or calculate appropriate measures.

Mean

Troy = $\frac{15 + 18 + 19 + 13 + 13}{5} = \frac{78}{5} = 15.6$

Buddy = $\frac{21 + 22 + 14 + 20 + 12}{5} = \frac{89}{5} = 17.8$

Bruno = $\frac{39 + 20 + 17 + 12 + 12}{5} = \frac{100}{5} = 20$

Murphy = $\frac{24 + 17 + 18 + 2 + 24}{5} = \frac{85}{5} = 17$

Bumble = $\frac{7 + 12 + 14 + 12 + 10}{5} = \frac{55}{5} = 11$

∴ greatest mean = 20 from Bruno.

Mode (Most common) [6 marks]

Troy = 13

Buddy = (no mode)

Bruno = 12

Murphy = 24

Bumble = 12

∴ greatest mode = 24 (Murphy)

Median (arrange in order)

Troy: 13 13 15 18 19
= 15

Buddy: 12 14 20 21 22
= 20

Bruno: 12 12 17 20 39
= 17

Murphy: 2 17 18 24 24
= 18

Bumble: 7 10 12 12 14
= 12

Buddy as their median is greatest at 20.

Bruno as their mean is greatest at 20.

Murphy as their mode is greatest at 24.

16 (b) Give **one** reason why this experiment is unlikely to have high validity.

[1 mark]

The sample of experiments is small.