

2021 Assessment resources

GCSE Statistics

Measures

Answers and commentaries

The question numbers in this resource reflect the question numbers from the original papers and match the question numbers in the corresponding 2021 assessment materials.

Question 5(a)

No examples available

Commentary

A straightforward question on mean.

Question 5(b)

No examples available

Commentary

This requires using the mean in reverse.

Question 5(c)

No examples available

Commentary

Either means or totals can be compared – please note that this question follows through whatever values students obtained in parts a and b.

Question 2

Please see the mark scheme

Question 3(a)

No examples available

Commentary

A straightforward question on median, you should allow one error or omission when awarding the first mark for ordering.

Question 3(b)

No examples available

Commentary

Any reference to the fact that there is only one pack with fewer than 20 bars will score.

Question 5

- 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 _____

Student A

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]

$$\text{mode now} = 5$$

$$\text{mode 3 years ago} = 3$$

Comparison 1 Overall his friends have more devices
as there are no frequencies below 3

Comparison 2 The new mode is much higher now at
5 devices when the old one three years ago was
3

Commentary

Both modes are correct, and the comparison 1 response is acceptable (at this level) as the sample is the same people for both sets of data. No references to range nor comparison of spread evident.

3 marks

Student B

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

1
8
18
0
5

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]

$$1 + 8 + 18 + 0 + 5 = 32 \div 12 = 2.6$$
$$4 + 5 + 3 + 6 + 4 + 5 + 5 + 7 + 6 + 8 + 3 + 5 = 61 \div 12 = 5.083$$

Comparison 1 people have more internet enabled devices now.

Comparison 2 There is almost double the amount of devises

Commentary

Correct work on means but no reference to 'average' or 'overall' for the number of devices so no mark for the comparison.

2 marks

Question 9(a)

No examples available

Commentary

The correct answer is 40.43 (%) – no exemplification required.

Question 9(b)

9 (b) Identify the trend in mean score over the period shown.

[1 mark]

Student A

9 (b) Identify the trend in mean score over the period shown.

slowly increases.

Commentary

A minimal but perfectly acceptable response.

1 mark

Student B

9 (b) Identify the trend in mean score over the period shown.

[1] **S**

The mean score ~~ea~~ for each date range is very similar.

Commentary

The response does not reference the definite though small increases.

0 marks

Student C

9 (b) Identify the trend in mean score over the period shown.

It increases slowly with some decreasing.

Commentary

The response is seen as too contradictory to be acceptable.

0 marks

Question 9(c)(i)

Please see the mark scheme

Question 9(c)(ii)

Please see the mark scheme

Question 13(a)

No examples available

Commentary

Any reference to the difference between the two rates should probably score the mark. Acceptable answers may not be as detailed as in the mark scheme.

Question 13(b)

No examples available

Commentary

References to other reasons for why the town population may actually have decreased are looked for here.

Question 2

Please see the mark scheme

Question 2

Please see the mark scheme

Question 12(a)(i)

- 12 (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).

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

[3 marks]

Student A

- 12 (a)** Ravi decides to record the number of letters in the longest word on each of the 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).

S2

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

[3 marks]

median = ~~6~~ ~~7~~ ~~8~~ ~~8~~ 9 ~~9~~ ~~10~~ ~~10~~ ~~13~~ ~~16~~

$8 - 6 = 2$ 2

Commentary

A good example of a student who manages to get the required result but not for the correct reasons! However, the student can still be awarded the mark for ordering the data AND the mark for identifying the LQ and UQ in their list even though they do not go on to use them.

2 marks

Student B

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

[3 marks]

$$\begin{array}{r} 2590 = \textcircled{6}, \overset{7.5}{\textcircled{7}}, \overset{8.5}{\textcircled{8}}, \textcircled{8}, \textcircled{8}, \textcircled{9}, \textcircled{10}, \textcircled{12}, \textcircled{16} \\ \hline 7.5 \quad 11.5 \\ \hline 11.5 - 7.5 = 4 \end{array}$$

Commentary

Correct ordering of the data (with one omission) but then the omission has probably caused the rest of the work to go awry.

1 mark

Question 1

Please see the mark scheme

Question 4

Please see the mark scheme

Question 13(a)

- 13** Competitors in the Pairs Figure Skating competition in the Winter Olympics perform twice.

The competitors are awarded points each time.

The table shows the points awarded to the top 10 pairs in the 2018 Winter Olympics.

Names of competitors	Performance 1	Performance 2
Savchenko & Massot	76.59	159.31
Sui & Han	82.39	153.08
Duhamel & Radford	76.81	153.33
Tarasova & Morozov	81.68	143.25
James & Cipress	75.34	143.19
Marchei & Hotarek	74.50	142.09
Zabiiako & Enbert	74.34	138.53
Yu & Zhang	75.58	128.52
Seguin & Bilodeau	67.52	136.50
Della Monica & Guarise	74.00	128.74

Source: www.bbc.co.uk

- 13 (a)** Calculate the value of Spearman's Rank Correlation Coefficient between the points scored in the two performances.

Use $r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$ and $\sum d^2 = 50$

[2 marks]

Answer _____

Student A

- 13 (a) Calculate the value of Spearman's Rank Correlation Coefficient between the points scored in the two performances.

Use $r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$ and $\sum d^2 = 50$

[2 marks]

$$n = 10 \quad 1 - \frac{6(50)}{10(100 - 1)} = \frac{10}{33} = 0.30$$

$$r_s = 0.30$$

Answer 0.30

Commentary

Correct substitution but the student forgets to take the value from 1.

1 mark

Student B

- 13 (a) Calculate the value of Spearman's Rank Correlation Coefficient between the points scored in the two performances.

Use $r_s = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$ and $\sum d^2 = 50$

[2 marks]

$$1 - \frac{6(50)}{10(10^2 - 1)} = 0.697$$

Answer 0.697

Commentary

Fully correct answer.

2 marks

Question 13(b)

13 (b) Interpret your answer to part (a) in context.

[1 mark]

Student A

13 (b) Interpret your answer to part (a) in context.

[1 mark]

~~The scores increased overall in performance 2~~
The scores increased overall in P2 were higher than
scores achieved in P1.

Commentary

Not an interpretation of the correlation.

0 marks

Student B

13 (b) Interpret your answer to part (a) in context.

[1 mark]

~~Strong pos~~ Medium positive correlation

Commentary

Must be in context so does not get the mark.

0 marks

Student C

13 (b) Interpret your answer to part (a) in context.

[1 mark]

Most of the time pairs that scored higher in performance 1 had a better result after performance 2

Commentary

A good contextual response.

1 mark

Question 7(a)

No examples available

Commentary

Students need to know the formula for the mean, but only receive credit once they substitute values in it.

Question 7(b)

No examples available

Commentary

Note that students may use their value of the mean from part a and so the calculations and result may be different from that in the mark scheme.

Question 7(c)

No examples available

Commentary

Successful answer must make a contextual comment about the means and a contextual comment about the standard deviation. Both comments are based on the values that the students found in part a, and therefore may vary from the mark scheme.

Question 7(d)

No examples available

Commentary

It is unusual for the answer to one of these questions to be 'yes' so is seen as high demand as result.

Question 12(a)(i)

12 A trout is a type of fish.

Gemma wants to estimate the number of trout living in a lake.

She captures 138 trout from the lake.

She marks these trout and then releases them back into the lake.

The following week she captures a second sample of 95 trout.

She finds that 23 trout from her second sample are marked.

12 (a) (i) Calculate an estimate of the number of trout in the lake.

[3 marks]

Answer _____

Student A

12 (a) (i) Calculate an estimate of the number of trout in the lake.

[3 marks]

$$\begin{array}{r|l}
 \begin{array}{r}
 138 \\
 \times 95 \\
 \hline
 \end{array}
 &
 \begin{array}{r}
 138 = \frac{23}{95} \times x \\
 \frac{138}{x} \times 95 = 23 \\
 13110 = 23x \\
 \begin{array}{r}
 23 \\
 \times 23 \\
 \hline
 570
 \end{array}
 \end{array}
 \end{array}$$

Answer 570

Commentary

A good quality, fully correct response.

3 marks

Student B

12 (a) (i) Calculate an estimate of the number of trout in the lake.

[3 marks]

$$\frac{\text{sample 1} \times \text{sample 2}}{\text{tagged}} = \frac{138 \times 95}{23} = 570$$

Answer 570

Commentary

A successful, alternative method formula based approach.

3 marks

Question 12(a)(ii)

12 (a) (ii) Why does Gemma wait one week before she takes her second sample?

[1 mark]

Student A

12 (a) (ii) Why does Gemma wait one week before she takes her second sample?

[1 mark]

So that the marked fish have time to mix ~~thex~~ with the fish that have not been marked.

Commentary

A good response.

1 mark

Student B

12 (a) (ii) Why does Gemma wait one week before she takes her second sample?

[1 mark]

To See if more frogs enter
the lake.

Commentary

Would not be accepted for this mark.

0 marks