HIGHER

3.3 Standard Deviation: 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A set of journey times in minutes has mean 46 and standard deviation 6. Each value is multiplied by 2. Write down the new mean and the new standard deviation.

(Total for Question 1 is 3 marks)

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2 Here are the number of minutes 8 trains were late.

16, 17, 5, 1, 2, 6, 13, 20

The mean is 10. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 2 is 4 marks)

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3 A set of weights in kilograms has mean 10 and standard deviation 9. Each value is multiplied by 10 and then 10 is added. Write down the new mean and the new standard deviation.

(Total for Question 3 is 3 marks)

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4 Here are the test marks of The Year 9 pupils and The Year 11 pupils.

The Year 9 pupils: 21, 48, 74, 31, 45, 48, 76
The Year 11 pupils: 49, 58, 67, 52, 57, 58, 67

(a) Work out the median and the range for each set of data.
(b) Compare the two sets of data. Refer to the medians and the ranges in your answer.

(Total for Question 4 is 4 marks)

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5 Here are the daily rainfall, in millimetres, on 6 days in a town.

6, 9, 5, 12, 10, 6

The mean is 8. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 5 is 4 marks)

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6 Here are the ages, in years, of 8 members of a cycling club.

39, 51, 20, 18, 60, 66, 30, 20

The mean is 38. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 6 is 4 marks)

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7 Here are the time, in minutes, taken by Shop A and Shop B to run 1 mile.

Shop A: 21, 49, 23, 69, 62, 48, 41
Shop B: 36, 45, 37, 52, 50, 45, 43

(a) Work out the median and the range for each set of data.
(b) Compare the two sets of data. Refer to the medians and the ranges in your answer.

(Total for Question 7 is 4 marks)

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8 Here are the heights, in centimetres, of 8 sunflower seedlings.

35, 12, 43, 26, 52, 30, 34, 40

The mean is 34. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 8 is 4 marks)

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9 Here are the time, in minutes, Jack took to walk to school on 8 mornings.

13, 21, 12, 15, 23, 22, 17, 29

The mean is 19. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 9 is 4 marks)

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10 Here are the daily number of customers at The morning group and The evening group.

The morning group: 27, 34, 49, 69, 60, 52, 72
The evening group: 55, 57, 62, 69, 66, 63, 70

(a) Work out the median and the range for each set of data.
(b) Compare the two sets of data. Refer to the medians and the ranges in your answer.

(Total for Question 10 is 4 marks)

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11 Here are the number of books borrowed from a library by 6 readers in a month.

18, 3, 16, 1, 5, 17

The mean is 10. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 11 is 4 marks)

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12 Here are the waiting times, in minutes, of 6 patients at a clinic.

6, 27, 23, 15, 8, 35

The mean is 19. Use standard deviation = $\sqrt{\text{sum of (x - mean)}^2 / \text{n}}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 12 is 4 marks)

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13 Here are the number of pages read by Sofia on each of 5 evenings.

54, 9, 56, 42, 9

The mean is 34. Use standard deviation = $\sqrt{\text{sum of } (x - \text{mean})^2 / n}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 13 is 4 marks)

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14 Here are the marks scored by 8 pupils in a spelling test out of 30.

22, 13, 11, 22, 28, 24, 33, 23

The mean is 22. Use standard deviation = $\sqrt{\text{sum of } (x - \text{mean})^2 / n}$ to work out the standard deviation. Give your answer to 2 decimal places.

(Total for Question 14 is 4 marks)

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15 Here are the test marks of The morning group and The evening group.

The morning group: 77, 55, 22, 68, 60, 50, 46
The evening group: 57, 46, 30, 53, 49, 44, 42

(a) Work out the median and the range for each set of data.
(b) Compare the two sets of data. Refer to the medians and the ranges in your answer.

(Total for Question 15 is 4 marks)

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Mark scheme · 3.3 Standard Deviation: 1-hour Pack

Question 1

uses the multiplier on both measures	**M1**
new mean 92	**B1**
new standard deviation 12 (the addition does not change it)	**B1**

Answer: mean 92; standard deviation 12

Question 2

deviations from the mean found (at least 4 correct)	**M1**
squares summed (380) and divided by 8	**M1**
square root taken	**M1**
6.89 cao	**A1**

Answer: 6.89

Question 3

uses the multiplier on both measures	**M1**
new mean 110	**B1**
new standard deviation 90 (the addition does not change it)	**B1**

Answer: mean 110; standard deviation 90

Question 4

The Year 9 pupils: median 48 and range 55	**B1**
The Year 11 pupils: median 58 and range 18	**B1**
comparison of averages in context: the higher median is for The Year 11 pupils	**B1**
comparison of spread in context: The Year 11 pupils has the smaller range so the data is more consistent	**B1**

Answer: (a) The Year 9 pupils: median 48, range 55; The Year 11 pupils: median 58, range 18; (b) the higher median is for The Year 11 pupils (58 compared with 48); the data for The Year 11 pupils is more consistent (range 18 compared with 55)

Question 5

deviations from the mean found (at least 4 correct)	**M1**
squares summed (38) and divided by 6	**M1**
square root taken	**M1**
2.52 cao	**A1**

Answer: 2.52

Question 6

deviations from the mean found (at least 4 correct)	**M1**
squares summed (2550) and divided by 8	**M1**
square root taken	**M1**
17.85 cao	**A1**

Answer: 17.85

Question 7

Shop A: median 48 and range 48	**B1**
Shop B: median 45 and range 16	**B1**
comparison of averages in context: the higher median is for Shop A	**B1**
comparison of spread in context: Shop B has the smaller range so the data is more consistent	**B1**

Answer: (a) Shop A: median 48, range 48; Shop B: median 45, range 16; (b) the higher median is for Shop A (48 compared with 45); the data for Shop B is more consistent (range 16 compared with 48)

Question 8

deviations from the mean found (at least 4 correct)	**M1**
squares summed (1006) and divided by 8	**M1**
square root taken	**M1**
11.21 cao	**A1**

Answer: 11.21

Question 9

deviations from the mean found (at least 4 correct)	**M1**
squares summed (234) and divided by 8	**M1**
square root taken	**M1**
5.41 cao	**A1**

Answer: 5.41

Question 10

The morning group: median 52 and range 45	**B1**
The evening group: median 63 and range 15	**B1**
comparison of averages in context: the higher median is for The evening group	**B1**
comparison of spread in context: The evening group has the smaller range so the data is more consistent	**B1**

Answer: (a) The morning group: median 52, range 45; The evening group: median 63, range 15; (b) the higher median is for The evening group (63 compared with 52); the data for The evening group is more consistent (range 15 compared with 45)

Question 11

deviations from the mean found (at least 4 correct)	**M1**
squares summed (304) and divided by 6	**M1**
square root taken	**M1**
7.12 cao	**A1**

Answer: 7.12

Question 12

deviations from the mean found (at least 4 correct)	**M1**
squares summed (642) and divided by 6	**M1**
square root taken	**M1**
10.34 cao	**A1**

Answer: 10.34

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Question 13

deviations from the mean found (at least 4 correct)	**M1**
squares summed (2198) and divided by 5	**M1**
square root taken	**M1**
20.97 cao	**A1**

Answer: 20.97

Question 14

deviations from the mean found (at least 4 correct)	**M1**
squares summed (364) and divided by 8	**M1**
square root taken	**M1**
6.75 cao	**A1**

Answer: 6.75

Question 15

The morning group: median 55 and range 55	**B1**
The evening group: median 46 and range 27	**B1**
comparison of averages in context: the higher median is for The morning group	**B1**
comparison of spread in context: The evening group has the smaller range so the data is more consistent	**B1**

Answer: (a) The morning group: median 55, range 55; The evening group: median 46, range 27; (b) the higher median is for The morning group (55 compared with 46); the data for The evening group is more consistent (range 27 compared with 55)

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