



H04-test Standard Deviation: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 25 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A cafe manager records how long, in minutes, 6 customers wait to be served:

3, 5, 4, 6, 3, 9

- (a)** Work out the mean waiting time.

(2)

- (b)** Work out the range of the waiting times.

(1)

(Total for Question 1 is 3 marks)

- 2** A hockey team scores the following number of goals in 5 matches:

2, 5, 3, 4, 6

The mean number of goals scored is 4.

Key formula: standard deviation = $\sqrt{\text{sum of } (x - \text{mean})^2 / n}$

- (a)** Show that the sum of $(x - \text{mean})^2$ for this data set is 10.

(2)

- (b)** Hence work out the standard deviation of the number of goals scored, giving your answer correct to 3 significant figures.

(2)

(Total for Question 2 is 4 marks)

3 Consider the evenly-spaced sequence of numbers:

5, 10, 15, 20, 25

(a) Using the symmetry of the sequence, write down its mean. **(1)**

(b) Calculate the standard deviation of the sequence, giving your answer correct to 3 **(3)**
significant figures.

(Total for Question 3 is 4 marks)

- 4 Two market stalls record their sales, in pounds, over the same 5 days.

Day	1	2	3	4	5
Stall A sales (£)	40	45	38	42	45
Stall B sales (£)	20	60	15	70	45

- (a) Show that the mean daily sales for both Stall A and Stall B is £42. (2)
- (b) Calculate the standard deviation of Stall A's daily sales, giving your answer correct to 3 significant figures. (3)
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- (c) Calculate the standard deviation of Stall B's daily sales, giving your answer correct to 3 significant figures. (3)
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- (d) Using the standard deviations, write down which stall has more consistent daily sales, giving a reason. (2)

(Total for Question 4 is 10 marks)

- 5** A student is asked to find the standard deviation of the data set 4, 8, 6, 10, 2, which has a mean of 6. Here is the student's working:

$$\text{sum of } (x - \text{mean})^2 = 40$$

$$\text{standard deviation} = \sqrt{\text{sum of } (x - \text{mean})^2} = \sqrt{40} = 6.32 \text{ (3 sf)}$$

- (a)** Identify the error in the student's working. (1)
- (b)** Work out the correct value of the standard deviation, giving your answer correct to 3 significant figures. (2)

(Total for Question 5 is 3 marks)

Mark scheme · H04-test Standard Deviation: Test Pack

Question 1

- (a) **M1** $(3+5+4+6+3+9)/6$, oe (adds all six values and divides by 6)
- (a) **A1** 5 (minutes) cao
- (a) **Answer: 5 minutes**
- (b) **B1** 6 (minutes) cao
- (b) **Answer: 6 minutes**

Question 2

- (a) **M1** deviations -2, 1, -1, 0, 2 (or squares 4, 1, 1, 0, 4), oe
- (a) **A1** 10 cso
- (a) **Answer: 10**
- (b) **M1** $10/5 (=2)$, oe
- (b) **A1** 1.41 (awrt)
- (b) **Answer: 1.41 (goals)**

Question 3

- (a) **B1** 15 cao
- (a) **Answer: 15**
- (b) **M1** deviations -10, -5, 0, 5, 10, so sum of $(x-\text{mean})^2 = 250$, oe
- (b) **M1** $250/5 (=50)$
- (b) **A1** 7.07 (awrt)
- (b) **Answer: 7.07**

Question 4

- (a) **B1** Stall A: $(40+45+38+42+45)/5 = 210/5 = 42$
- (a) **B1** Stall B: $(20+60+15+70+45)/5 = 210/5 = 42$
- (a) **Answer: £42 for both stalls**
- (b) **M1** deviations -2, 3, -4, 0, 3, so sum of $(x-\text{mean})^2 = 38$, oe
- (b) **M1** $38/5 (=7.6)$
- (b) **A1** £2.76 (awrt)
- (b) **Answer: £2.76**
- (c) **M1** deviations -22, 18, -27, 28, 3, so sum of $(x-\text{mean})^2 = 2330$, oe
- (c) **M1** $2330/5 (=466)$
- (c) **A1** £21.6 (awrt)
- (c) **Answer: £21.6**
- (d) **B1** Stall A cao
- (d) **B1** Stall A has the smaller standard deviation (£2.76 compared with £21.6), so even though both stalls have the same mean (£42), Stall A's daily sales vary less around it, oe
- (d) **Answer: Stall A, because it has the smaller standard deviation.**

Question 5

- (a) **B1** the student did not divide the sum of $(x-\text{mean})^2$ by $n (=5)$ before taking the square root; it should be $\sqrt{40/5}$, not $\sqrt{40}$, oe
- (a) **Answer: The student forgot to divide by $n (5)$ before taking the square root.**
- (b) **M1** $40/5 (=8)$, oe
- (b) **A1** 2.83 (awrt)
- (b) **Answer: 2.83**