IB MATHS AA HL · UNIT 4

Measures of Central Tendency: exam practice

10 questions · 29 marks · worked solutions and markschemes

Name _____ Date _____ Score / 29

- Answer every question before you look at the solutions. They start after the last question, with the marks for each line: M for method, A for accuracy, R for reasoning.
- Online, with more practice: ibmathrevision.com/hlaa/measures-of-central-tendency-exam-practice

1. **3 marks · Paper 1 style · no calculator**

The data set is $12,\ 15,\ 15,\ 18,\ 21,\ 22,\ 25,\ 30$.

Find the mean, median and mode. **[3]**

2. **2 marks · Paper 1 style · no calculator**

The mean of five numbers is 14. When a sixth number is added, the mean becomes 15.

Find the sixth number. **[2]**

3. **2 marks · Paper 1 style · no calculator**

A data set has mean 40 and standard deviation 6. Each value is multiplied by 3 and then 5 is subtracted.

Find the new mean and new standard deviation. **[2]**

4. **2 marks · Paper 2 style · calculator**

Two classes take the same test. Class A (20 students) has mean 64; class B (25 students) has mean 70.

Find the mean mark of all 45 students. **[2]**

5. **3 marks · Paper 2 style · calculator**

The masses, in kg, of 10 parcels are $2.1,\ 3.4,\ 2.8,\ 4.0,\ 3.1,\ 2.5,\ 3.7,\ 2.9,\ 3.3,\ 3.0$.

Find the mean and the standard deviation. **[3]**

6. **3 marks · Paper 2 style · calculator**

The number of goals scored in 40 matches is shown.

Goals	0	1	2	3	4
Frequency	6	13	11	7	3

Find the mean and the median number of goals. **[3]**

7. **3 marks · Paper 1 style · no calculator**

The mean of the numbers $3,\ 7,\ 8,\ x,\ 2x$ is 9.

Find x and the median. **[3]**

8. **3 marks · Paper 2 style · calculator**

The times, in minutes, of 50 runners are grouped.

Time t	$20 \leq t < 25$	$25 \leq t < 30$	$30 \leq t < 35$	$35 \leq t < 40$
Frequency	8	17	15	10

Find an estimate of the mean time. **[3]**

9. **3 marks · Paper 1 style · no calculator**

For 8 values, $\sum x = 72$ and $\sum x^2 = 708$.

Find the mean and the variance. **[3]**

10. **5 marks · Paper 2 style · calculator**

The data set is $4,\ 7,\ 9,\ 10,\ 12,\ 13,\ 15,\ 18,\ 40$.

(a) Find the interquartile range. **[3]**

(b) Show that 40 is an outlier. **[2]**

Answers and worked solutions

Question 1 — 3 marks

Answer: mean 19.75, median 19.5, mode 15

mean $\frac{158}{8} = 19.75$ **A1**

median 19.5 **A1**

mode 15 **A1**

Question 2 — 2 marks

Answer: 20

$6(15) - 5(14)$ **M1**

20 **A1**

Question 3 — 2 marks

Answer: mean 115, standard deviation 18

$3(40) - 5 = 115$ **A1**

$3(6) = 18$ **A1**

Question 4 — 2 marks

Answer: 67.3

$\frac{20(64) + 25(70)}{45}$ **M1**

67.3 **A1**

Question 5 — 3 marks

Answer: mean 3.08 kg, $\sigma = 0.529$ kg

mean 3.08 kg **A1**

GDC **(M1)**

$\sigma = 0.529$ kg **A1**

Question 6 — 3 marks

Answer: mean 1.7, median 2

$\frac{0 + 13 + 22 + 21 + 12}{40}$ **M1**

mean 1.7 **A1**

median 2 **A1**

Question 7 — 3 marks

Answer: $x = 9$, median 8

$18 + 3x = 45$ **M1**

$x = 9$ **A1**

data $3, 7, 8, 9, 18$; median 8 **A1**

Question 8 — 3 marks

Answer: 30.2 minutes

mid-points

$22.5,\ 27.5,\ 32.5,\ 37.5$ **A1**

$\frac{180 + 467.5 + 487.5 + 375}{50}$

M1

30.2 min **A1**

Question 9 — 3 marks

Answer: mean 9, variance 7.5

mean 9 **A1**

$\frac{708}{8} - 81$ **M1**

variance 7.5 **A1**

Question 10 — 5 marks

Answer: (a) $\frac{17}{2}$

(a)

$Q_1 = 8$ **A1**

$Q_3 = 16.5$ **A1**

IQR $= 8.5$ **A1**

(b)

$Q_3 + 1.5 \times 8.5 = 29.25$ **M1**

$40 > 29.25$ **R1 AG**

Every solution is also on ibmathrevision.com/hlaa/measures-of-central-tendency-exam-practice
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