IB MATHS AA SL · UNIT 4

Presentation of Data: exam practice

10 questions · 37 marks · worked solutions and markschemes

Name _____ Date _____ Score / 37

- 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/slaa/presentation-of-data-exam-practice

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

The data set $\{4, 7, x, 11, 15\}$ has a mean of 9. Find the exact value of x.

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

A cumulative frequency table for the heights of 40 plants is shown.

Height h (cm)	$h \leq 5$	$h \leq 10$	$h \leq 15$	$h \leq 20$	$h \leq 25$
Cumulative frequency	3	12	28	36	40

a. Find the number of plants with height greater than 10 cm but at most 15 cm. **[1]**

b. Find the percentage of plants taller than 20 cm. **[2]**

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

A school has 300 students in Year 11 and 200 students in Year 12. A stratified sample of 40 students is taken, by year group.

(a) Find the number of Year 11 students in the sample. **[2]**

(b) Give one reason why a stratified sample may be better than a simple random sample here. **[1]**

4. **4 marks · Paper 1 style · no calculator**

A factory makes 2400 phones a day, numbered in order. A systematic sample of 60 phones is chosen for testing, starting with phone number 17.

(a) Find the sampling interval. **[1]**

(b) Find the number of the fifth phone chosen. **[2]**

(c) State one disadvantage of this method if a fault happens every 40th phone. **[1]**

5. **3 marks · Paper 1 style · no calculator**

The data set $3,\ 5,\ 7,\ 7,\ 8,\ 10,\ x$ has a mean of 7.

(a) Find the value of x. **[2]**

(b) Find the median of the data. **[1]**

6. **4 marks · Paper 2 style · calculator**

The lengths, L cm, of 50 leaves are shown in the table.

Length, L	$4 \leq L < 6$	$6 \leq L < 8$	$8 \leq L < 10$	$10 \leq L < 12$
Frequency	7	18	16	9

(a) Use mid-interval values to estimate the mean length. **[2]**

(b) Estimate the standard deviation of the lengths. **[2]**

7. **4 marks · Paper 1 style · no calculator**

A data set of 10 values has mean 12 and standard deviation 3. Each value is multiplied by 4 and then 5 is subtracted.

(a) Find the new mean. **[2]**

(b) Find the new variance. **[2]**

8. **5 marks · Paper 2 style · calculator**

The number of emails received by a worker on each of 12 days was:

$$3,\ 5,\ 7,\ 7,\ 8,\ 10,\ 12,\ 13,\ 15,\ 16,\ 18,\ 30$$

(a) Write down the five-number summary of the data. **[3]**

(b) Show that 30 is an outlier. **[2]**

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

A systematic sample of 50 people is taken from a numbered list of 2000 people. The first person chosen is number 13.

a. Find the sampling interval. **[1]**

b. Find the number of the 10th person chosen. **[2]**

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

The marks of 8 students in a test are $52,\ 61,\ 64,\ 68,\ 70,\ 73,\ 75,\ 81$. A ninth student's mark, m, is added. The mean of all nine marks is 66.

(a) Find m. **[2]**

(b) Find the standard deviation of the nine marks. **[2]**

(c) Find the median of the nine marks. **[1]**

Answers and worked solutions

Question 1

3 marks

Answer: $x = 8$

1. Set up the mean equation: $\frac{4+7+x+11+15}{5} = 9$. **M1**
2. Simplify: $\frac{37+x}{5} = 9 \implies 37 + x = 45$. **(A1)**
3. $x = 8$. **A1**

Question 2

3 marks

Answer: (a) 16; (b) 10

a. $28 - 12 = 16$ **A1**

b. $\frac{4}{40} \times 100$ **(M1)**
$= 10\%$ **A1**

Question 3

3 marks

Answer: (a) 24

(a)

$\frac{300}{500} \times 40$ **(M1)**

24 **A1**

(b)

both year groups are represented in proportion **R1**

Question 4

4 marks

Answer: (a) 40; (b) 177

(a)

$\frac{2400}{60} = 40$ **A1**

(b)

$17 + 4 \times 40$ **(M1)**

177 **A1**

(c)

the sample could miss (or pick only) the faulty phones, so it would be biased **R1**

Question 5

3 marks

Answer: (a) 9; (b) 7

(a)

$40 + x = 49$ **(M1)**

$x = 9$ **A1**

(b)

7 **A1**

Question 6

4 marks

Answer: (a) 8.08 cm; (b) 1.89 cm

(a)

mid-values $5, 7, 9, 11$ **(M1)**

8.08 cm **A1**

(b)

GDC with mid-values and frequencies **(M1)**

1.89 cm **A1**

Question 7

4 marks

Answer: (a) 43; (b) 144

(a)

$4 \times 12 - 5$ **(M1)**

43 **A1**

(b)

new standard deviation $4 \times 3 = 12$ **(M1)**

variance 144 **A1**

Question 8

5 marks

Answer: (a) $3,\ 7,\ 11,\ 15.5,\ 30$

(a)

min 3, max 30 **A1**

median 11 **A1**

$Q_1 = 7$, $Q_3 = 15.5$ **A1**

(b)

$15.5 + 1.5 \times 8.5 = 28.25$ **M1**

$30 > 28.25$ **R1 AG**

Question 9

3 marks

Answer: (a) 40; (b) 373

a. $\frac{2000}{50} = 40$ **A1**

b. $13 + 9 \times 40$ **(M1)**

$= 373$ **A1**

Question 10

5 marks

Answer: (a) 50; (b) 9.75; (c) 68

(a)

$544 + m = 594$ **(M1)**

$m = 50$ **A1**

(b)

GDC **(M1)**

9.75 **A1**

(c)

68 **A1**

Every solution is also on ibmathrevision.com/slaa/presentation-of-data-exam-practice
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