Descriptive Statistics: exam practice

10 questions · 38 marks · worked solutions and markschemes

Name _____ Date _____ Score / 38

- 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/slai/descriptive-statistics-exam-practice

1. **2 marks · Paper 1 style · calculator allowed**

A dataset has a mean of 15 and a standard deviation of 3. A new dataset is formed by taking every value in the original dataset, multiplying it by 2, and then adding 4. Find the exact variance of the new dataset.

2. **2 marks · Paper 1 style · calculator allowed**

A running club has 16 junior members, whose mean 5 km time is 26 minutes, and 24 senior members, whose mean time is 31 minutes.

Calculate the mean 5 km time for the whole club. **[2]**

3. **4 marks · Paper 1 style · calculator allowed**

The mean of 8 distinct numbers is 14. Two numbers from this dataset, 10 and 18, are completely removed.

Find the exact new mean of the remaining 6 numbers.

4. **4 marks · Paper 1 style · calculator allowed**

The number of goals scored by a football team in their last seven matches are:

$$4,\ 6,\ 6,\ 8,\ 11,\ 12,\ 16$$

1. Find the median number of goals scored.
2. Write down the mode.
3. Calculate the exact mean number of goals scored.

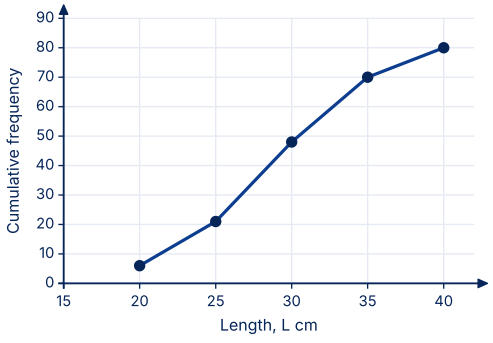
5. **3 marks · Paper 1 style · calculator allowed**

The lengths of 80 fish are summarised in the cumulative frequency table.

Length, L cm	$L < 20$	$L < 25$	$L < 30$	$L < 35$	$L < 40$
Cumulative frequency	6	21	48	70	80

(a) Find the number of fish with length from 25 cm up to 30 cm. **[1]**

(b) Find the percentage of fish that are at least 35 cm long. **[2]**



Lengths of 80 fish

6. **4 marks · Paper 1 style · calculator allowed**

A dataset consists of the following 7 numbers, listed in ascending order: $5, 8, 12, 15, 18, 22, 25$.

1. Write down the median of the dataset.
2. Find the lower quartile (Q_1) and upper quartile (Q_3).
3. Calculate the Interquartile Range (IQR).

7. **4 marks · Paper 2 style · calculator allowed**

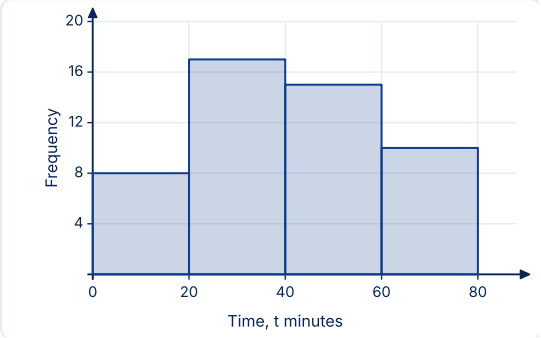
The times, t minutes, that 50 students spent on homework one evening are shown.

Time, t	$0 \leq t < 20$	$20 \leq t < 40$	$40 \leq t < 60$	$60 \leq t < 80$
Frequency	8	17	15	10

(a) Write down the modal class. **[1]**

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

(c) Estimate the standard deviation. **[1]**



Homework times: four classes of 20 minutes

8. **4 marks · Paper 1 style · calculator allowed**

The number of pets owned by 30 families is shown.

Pets	0	1	2	3	4
Frequency	6	11	8	3	2

(a) Find the mean number of pets. **[2]**

(b) Write down the median. **[1]**

(c) Find the standard deviation. **[1]**

9. **5 marks · Paper 2 style · calculator allowed**

The number of text messages sent by 12 students in one day was:

$$5,\ 8,\ 9,\ 11,\ 12,\ 14,\ 15,\ 15,\ 17,\ 19,\ 21,\ 38$$

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

(b) Show that 38 is an outlier. **[2]**

10. **6 marks · Paper 2 style · calculator allowed**

The mean of five distinct positive integers is 8.4.

1. Find the sum of these five integers.
2. A sixth integer, x, is added to the data set. The new mean of all six integers is exactly 9. Find the value of x.
3. Two different classes took a mathematics test. Class A has 20 students and achieved a mean score of 65 marks. Class B has 30 students and achieved a mean score of 80 marks. Calculate the combined mean score for all 50 students.

Answers and worked solutions

Question 1 — 2 marks

Answer: 36

Adding 4 does not change the spread; multiplying by 2 doubles the standard deviation:

$\sigma_{\text{new}} = 2 \times 3 = 6$ **M1**

Variance is the square of the standard deviation:

$\sigma^2_{\text{new}} = 6^2 = 36$ **A1**

Question 2 — 2 marks

Answer: 29 minutes

$\dfrac{16 \times 26 + 24 \times 31}{40}$ **(M1)**

29 minutes **A1**

Question 3 — 4 marks

Answer: 14

Original sum $= 8 \times 14 = 112$.

$M1$**A1**

Sum of removed numbers $= 10 + 18 = 28$.

New sum $= 112 - 28 = 84$. **M1**

New mean $= \frac{84}{6} = 14$. **A1**

Question 4 — 4 marks

Answer: (a) 8; (b) 6; (c) 9

1. The data are in order and $n = 7$, so the median is the 4th value: median $= 8$ **A1**
2. 6 occurs most often, so mode $= 6$ **A1**
3. Add the values and divide by 7: $\frac{4+6+6+8+11+12+16}{7} = \frac{63}{7}$ **(M1)**
   Mean $= 9$ **A1**

Question 5 — 3 marks

Answer: (a) 27; (b) 12.5%

(a)

$48 - 21 = 27$ **A1**

(b)

$\dfrac{80 - 70}{80} \times 100$ **(M1)**

12.5% **A1**

Question 6 — 4 marks

Answer: (a) 15; (b) Q_1) 8; (b) Q_3) 22; (c) 14

1. With 7 values the median is the 4th value: 15 **A1**
2. Q_1 is the median of the lower half $5, 8, 12$: $Q_1 = 8$ **A1**
   Q_3 is the median of the upper half $18, 22, 25$: $Q_3 = 22$ **A1**
3. $IQR = 22 - 8 = 14$ **A1**

Question 7 — 4 marks

Answer: (a) $20 \le t < 40$; (b) 40.8 minutes; (c) 19.7 minutes

(a)

$20 \le t < 40$ **A1**

(b)

mid-values $10, 30, 50, 70$ **(M1)**

40.8 minutes **A1**

(c)

19.7 minutes **A1**

Question 8 — 4 marks

Answer: (a) 1.47; (b) 1; (c) 1.12

(a)

$\dfrac{0 + 11 + 16 + 9 + 8}{30}$ **(M1)**

1.47 **A1**

(b)

1 **A1**

(c)

1.12 **A1**

Question 9 — 5 marks

Answer: (a) median 14.5, IQR 8

(a)

median 14.5 **A1**

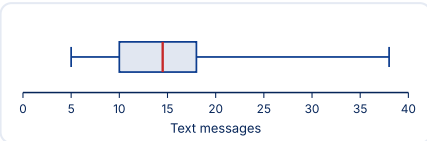
$Q_1 = 10$, $Q_3 = 18$ **A1**

$\text{IQR} = 8$ **A1**

(b)

$Q_3 + 1.5 \times \text{IQR} = 18 + 12 = 30$ **M1**

$38 > 30$ **R1 AG**



Median 14.5; IQR $18 - 10 = 8$

Question 10 — 6 marks

Answer: (a) 42; (b) 12; (c) 74

1. Sum $= 5 \times 8.4$ **(M1)**
   $= 42$ **A1**
2. New total $= 6 \times 9 = 54$ **(M1)**
   $x = 54 - 42 = 12$ **A1**
3. Combined total $= 20(65) + 30(80) = 1300 + 2400 = 3700$ **M1**
   Combined mean $= \frac{3700}{50} = 74$ **A1**

Every solution is also on ibmathrevision.com/slai/descriptive-statistics-exam-practice
Our own original questions, written and checked by IB Math Revision. IB Math Revision is independent and is not affiliated with, endorsed by or connected to the International Baccalaureate Organization. This work/product/service has been developed independently from and is not endorsed by the International Baccalaureate Organization. International Baccalaureate, Baccalauréat International, Bachillerato Internacional and IB are registered trademarks owned by the International Baccalaureate Organization.