Statistics and data analysis - Practice test 1

16 questions | 41 marks | 55 minutes

A progressive review of summaries, displays, paired data and fair conclusions.

Equivalent correct methods earn the corresponding marks.

1. Find the mean of 3.4, 3.8, 4.2 and 4.6 minutes. [2 marks]

Total 16.0; $16.0 \div 4 = 4.0$.

Answer: 4.0 min

2. Find the median and range of 9.1, 8.2, 10.3, 8.8, 9.6 seconds. [3 marks]

Order 8.2, 8.8, 9.1, 9.6, 10.3.

$10.3 - 8.2 = 2.1$.

Answer: Median 9.1 s; range 2.1 s.

3. Use median-of-halves to give the five-number summary of 2, 5, 6, 7, 8, 9, 12, 15. [3 marks]

Median 7.5.

Lower median 5.5; upper median 10.5.

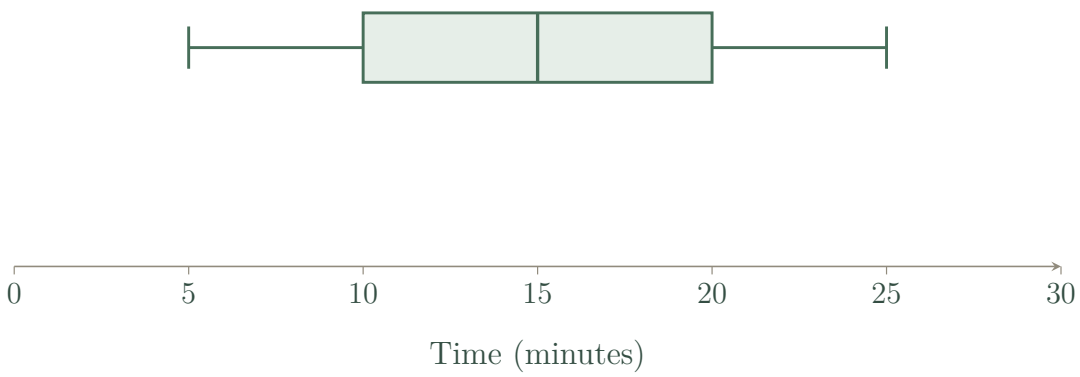
Answer: 2, 5.5, 7.5, 10.5, 15.

4. Calculate the IQR for the five-number summary in Question 3. [2 marks]

$10.5 - 5.5 = 5$.

Answer: 5

5. Read the median, IQR and range from this plot. [3 marks]



Box 10 to 20; median 15; whiskers 5 and 25.

Answer: Median 15 min; IQR 10 min; range 20 min.

6. Estimate the mean mass from the grouped table. [3 marks]

Masses

Mass(kg)	Frequency
$0 \le m < 4$	2
$4 \le m < 8$	5
$8 \le m < 12$	3

Midpoints 2, 6, 10.

$\frac{2\times2+6\times5+10\times3}{10} = \frac{64}{10} = 6.4$ kg.

Answer: Estimated mean 6.4 kg.

7. Find the cumulative frequencies for class counts 6, 9, 3, 2. [2 marks]

Add each class count to the running total.

Answer: 6, 15, 18, 20.

8. For ordered values 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, find P_{60} using nearest rank. [2 marks]

$\lceil 0.6 \times 10 \rceil = 6$; the sixth value is 11.

Answer: 11

9. Find the population SD of 1, 1, 5, 5. [3 marks]

Mean 3; squared deviations total 16.

Variance $16 \div 4 = 4$; SD 2.

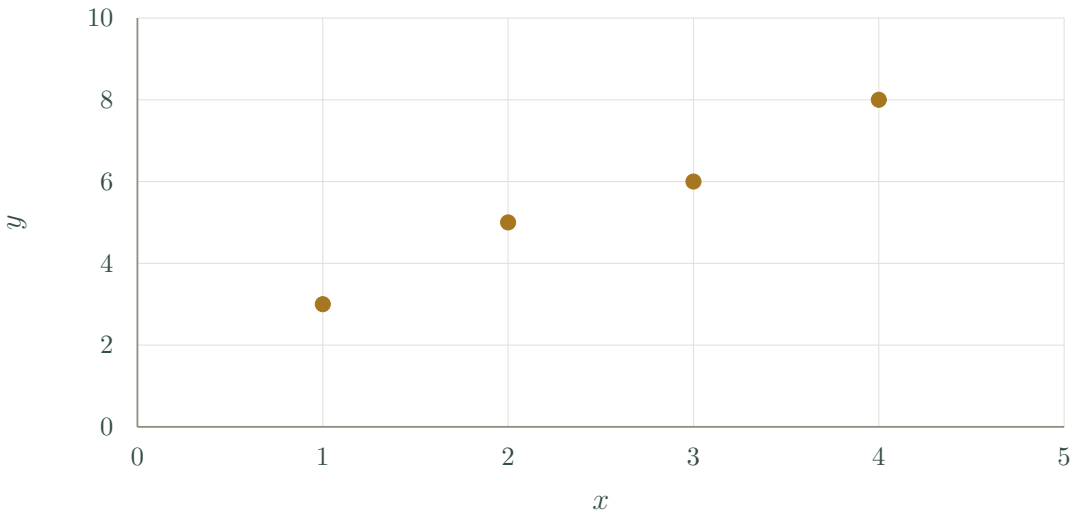
Answer: 2

10. Adding 5 to every observation changes the mean and SD how? [2 marks]

Every deviation from the new mean stays the same.

Answer: Mean increases 5; SD is unchanged.

11. Plot $(1, 3)$, $(2, 5)$, $(3, 6)$, $(4, 8)$. Describe the association. [3 marks]



Keep the four pairs together.

The values generally rise with small scatter about a line.

Answer: Positive, strong, approximately linear.

12. Why does a strong association not establish causation? [2 marks]

The pattern alone does not isolate one variable's effect.

Answer: Confounding, reverse influence or selection may explain it.

13. Find the Yes rate for each group and compare. [3 marks]

Responses

Group	Yes	No
A	12	18
B	18	42

A $\frac{12}{30} = 40\%$; B $\frac{18}{60} = 30\%$.

Answer: A 40%; B 30%; A has the higher rate.

14. A bar chart compares 48 and 50 with an axis starting at 47. Explain one presentation risk. [2 marks]

A truncated baseline changes the visual ratio of bar heights.

Answer: The small difference may look disproportionately large.

15. Compare samples with medians 16 and 19 minutes and IQRs 7 and 3 minutes. [3 marks]

Compare medians for centre and IQRs for spread.

Answer: First sample has a lower typical time; second has smaller central spread.

16. Plan one improvement to a survey of study hours/score that used only five volunteers from a tutoring club. [3 marks]

Club volunteers may be unrepresentative.

Standardise measurements and preserve pairs.

Answer: Sample across the target year group and increase the sample, using consistent questions and comparable tests.