Comparing distributions

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

1. Group A has median 18 and IQR 6. Group B has median 22 and IQR 4. Compare both features. [2 marks]

B is typically higher and its central half is less spread out.

Answer: B has a 4-unit higher median and a 2-unit smaller IQR.

2. Two groups have equal means but standard deviations 2 and 7. What differs? [2 marks]

Equal centres do not imply equal variation.

Answer: The second group has greater spread around its mean.

3. Why is a common horizontal scale essential for two box plots? [2 marks]

Compare numerical positions and lengths on one consistent unit scale.

Answer: Different scales can make equal spreads appear unequal or reverse a visual comparison.

4. Compare 1,2,2,3,12 with 4,4,5,5,6 using medians. Mention a reason not to rely only on means. [3 marks]

The 12 in the first group is an outlier that pulls its mean upwards.

Answer: Medians 2 and 5, so the second group has a higher central value.

5. A study samples 12 volunteers in A and 100 randomly selected people in B. Give two cautions about comparing the results. [3 marks]

A observed difference may reflect selection rather than the groups themselves.

Answer: The different sample sizes affect stability; volunteers in A may differ systematically from non-volunteers.

6. Class A's score range is 40 and Class B's is 25. A student says every A score is more variable than every B score. Explain the error. [3 marks]

A larger range only describes the two endpoints.

It does not determine IQR, standard deviation or all observations.

Answer: Variation describes a distribution, not each individual value.