Assessing claims and limitations

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. A 95% mean interval is $(21, 25)$. Is target mean 23 compatible? Is it proved? [2 marks]

23 lies inside a range containing other plausible means.

Answer: Compatible, not proved.

2. A 95% proportion interval is $(0.56, 0.64)$. Give a cautious majority statement. [2 marks]

Every interval value is above 0.5; do not claim certainty.

Answer: It supports a population proportion above 0.5 under the study assumptions.

3. A researcher reports only the narrowest interval from 20 post-hoc exclusions. What is wrong? [2 marks]

The final selection is not the same as a pre-specified repeated procedure.

Answer: Selective analysis can undermine the advertised coverage.

4. Two group mean intervals overlap. Why is “the means are equal” unjustified? [2 marks]

Separate intervals estimate separate parameters, not their difference directly.

Answer: Overlap does not establish equality; a difference needs its own model.

5. A mean difference is precisely estimated at 0.02 mm. What else matters in an engineering decision? [2 marks]

Statistical precision is not practical importance.

Answer: Whether that difference matters relative to tolerances, risk and cost.

6. A 2024 survey is used to claim a 2026 preference. Give a limitation. [2 marks]

Define the original population and time; later generalisation needs justification.

Answer: The population preference may have changed.