Capstone verified answers

All reference values calculated from the stored synthetic CSV source.

Capstone 1: What is the target population?

Verified: 1,000 synthetic learners.

Interpretation and limitation: Population is defined by research scope, not by who was sampled.

Capstone 2: What is the selected sample size?

Verified: 100 learners, SRSWOR with fixed RNG seed 74074.

Interpretation and limitation: Each fixed-size subset is eligible under the idealized selection procedure.

Capstone 3: What are mean, median and mode?

Verified: Mean 66.953; median 67.95; mode 71.6 (rounded recorded scores).

Interpretation and limitation: Mode may be sensitive to score rounding.

Capstone 4: What are sample range and SD?

Verified: Range 52.2; sample SD 9.985; variance 99.704.

Interpretation and limitation: Sample variance denominator is n–1.

Capstone 5: What is the distribution of scores?

Verified: 0–39:1, 40–49:5, 50–59:19, 60–69:34, 70–79:35, 80–89:4, 90–100:2.

Interpretation and limitation: Bins are nonoverlapping; totals sum to 100.

Capstone 6: How does sample mean compare with population mean?

Verified: Sample 66.953; population 66.0142; difference 0.9388 points.

Interpretation and limitation: Population value is known only in this synthetic exercise.

Capstone 7: What is estimated standard error?

Verified: SE 0.9478 points; FPC 0.94916.

Interpretation and limitation: Approximate for SRSWOR; independence requires sampling-model care.

Capstone 8: What confidence interval is appropriate?

Verified: 95% CI: (65.07, 68.83) points, critical t 1.9842.

Interpretation and limitation: Design/normal approximation and response assumptions apply.

Capstone 9: What changes for another probability sample?

Verified: Alternate sample mean 65.157; current mean 66.953.

Interpretation and limitation: Different random samples yield different estimates.

Capstone 10: What should the final statistical report contain?

Verified: State 1,000 population; 100 SRS; mean 66.95; approximate 95% CI 65.07–68.83, and no causal claim.

Interpretation and limitation: Do not treat fictional values as real-world evidence.