Confidence intervals for a population mean

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. A normal population has known SD 12. A sample of 36 has mean 80. Find a 95% interval. [2 marks]

Standard error = 2; margin = 3.92.

Answer: (76.08, 83.92).

2. For mean 18.5, known SD 4 and n = 64, use 1.645 for a 90% interval. [2 marks]

Standard error = 0.5; margin = 0.8225.

Answer: (17.6775, 19.3225).

3. An interval is (12.2, 15.8). Recover its centre and margin. [2 marks]

Take the midpoint and half-width.

Answer: Centre 14; margin 1.8.

4. A known-spread normal interval uses n = 6 from a strongly skewed population. What is the concern? [2 marks]

Known spread alone does not justify normality with a small skewed sample.

Answer: The mean distribution need not be approximately normal.

5. A mean estimate is 250 with standard error 2.5. Use 2.576 for a 99% interval. [2 marks]

Margin = 2.576 × 2.5 = 6.44.

Answer: (243.56, 256.44).

6. A large independent random sample has n = 144, mean 48.2 and sample standard deviation 12. Population spread is unknown. Use an approximate 95% normal interval for the mean. [3 marks]

Estimate standard error as 12/√144 = 1.

Use the approximate margin 1.96 × 1 = 1.96.

The interval uses sample spread and a large-sample normal approximation, not an exact known-spread model.

Answer: Approximately (46.24, 50.16).