Confidence intervals for a population mean

Learn and practise | Free preview

A sample from this topic. The complete topic collection contains three different resources and worked solutions.

Read the worked example, then show each step in the practice questions. A scientific, statistical or financial calculator, or suitable spreadsheet, can support these calculations. Record the formula, inputs and interpretation.

What you will practise

• Confidence intervals for the population mean

Useful starting skills: Specialist and Methods Units 1–2; concurrent or completed Mathematical Methods Units 3–4.

A normal-based interval for a population mean has the form xbar±zσ/√n when population SD σ is known and the normal sampling model is justified. For sufficiently large random samples, s may replace σ to form the study-design approximation.

A 95% confidence procedure captures the fixed population mean in about 95% of repeated samples under its assumptions. The confidence level describes the procedure, rather than assigning a probability to a fixed mean after one particular interval has been calculated.

Worked example

A random sample has n=64, xbar=50 and known population SD σ=8. Use z=1.96 to calculate a 95% interval.

Standard error=8/√64=1

margin=1.96

subtract and add the margin to 50.

Answer: (48.04, 51.96).

Try it yourself

Name: _____ Date: _____

1. For xbar=100, σ=10, n=100 and z=1.96, find the interval.

2. A large random sample has xbar=30, s=6, n=36. Use the approximate z=1.96 interval.

Answers and explanations

Check the method as well as the final answer. An alternative correct method is also valid.

1. (98.04, 101.96).

The standard error is 1, so the margin is 1.96.

2. (28.04, 31.96).

Estimated standard error is 6/6=1; use the large-sample approximation.

Curriculum reference: Specialist Mathematics Units 3–4 — Confidence intervals for the population mean

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