§8.2–Confidence Intervals for One Population Mean When σ is Known

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Outline

A sample calculation

The following data is drawn from a normal population with mean μ and standard deviation $\sigma = 4$. Find a 75% confidence interval. In other words, find an interval such that the chance that the true mean falls outside of it has chance .25.

46.98	53.13	43.11	50.23	53.47	50.58	52.29	45.94
55.09	49.86	53.55	42.89	51.95	52.81	50.54	48.50
54.28	50.80	49.66	51.94	51.62	55.60	43.65	47.74
48.21							

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- calculate the mean, $\overline{x}$;
- find $z_{\alpha/2}$;
- identify the confidence interval,

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- interpret the confidence interval: with probability $1-\alpha$, the true mean, μ, lies within the given interval.

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- decrease your confidence level (say from 90% to 60%) or
- increase the size of your random sample.

Problem

You want to estimate the mean of a normal population with a standard deviation of $\sigma = 5$ using a confidence interval of length 1. What size of random sample should you collect in order to have 90% confidence that the true mean lands within this interval?