



MATH225

Confidence Intervals for the Mean (Population Standard Deviation Known)

DEFINITION

An **interval estimate** is an interval, or range of values, used to estimate a population parameter.

DEFINITION

The **level of confidence c** is the probability that the interval estimate contains the population parameter.

Population	Point Estimate
Mean = μ	Mean = $\bar{x}$
Population Proportion = p	Sample Proportion = $\hat{p}$

Review

Example: The average number of chips per bag from the potato chips available at a supermarket is unknown. A random sample of potato chip bags from the supermarket yields a sample mean of 250.6 chips. Assume the sample distribution of the mean has a standard deviation of 18.9.

Use the Empirical Rule to construct a 99.7% confidence interval for the true population mean number of potato chips.

**The _____ your confidence level...the _____ your confidence interval.



Example:

A researcher is trying to estimate the population mean for a certain set of data. The sample mean is 45, and the error bound for the mean is 9, at a 99.7% confidence level. (So, $\bar{x} = 45$ and EBM = 9.) Find and interpret the confidence interval estimate.

Select the correct answer below:

- ☐ We can estimate, with 99.7% confidence that the true value of the population mean is between 42 and 48.
- ☐ We can estimate, with 99.7% confidence that the true value of the population mean is between 36 and 54.
- ☐ We can estimate, with 99.7% confidence that the true value of the population mean is between 45 and 54.
- ☐ We can estimate, with 99.7% confidence that the true value of the population mean is between -36 and 54.
- ☐ We can estimate, with 99.7% confidence that the true value of the population mean is between 39 and 51.

Example: A random sample of registered voters were asked about an issue on the ballot of an upcoming election. The proportion of those surveyed who plan to vote "Yes" on the issue is 0.54, with a margin of error of 0.06.

Construct a confidence interval for the proportion of registered voters that plan to vote "Yes" on the issue.