



Sample Size Calculation

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Different industries may have different rule of thumb strategies for sample size selection.

Sample Size Calculation *the Statistics behind it*

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- the *Population Mean*
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... and we build confidence intervals for these unknown quantities

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... and we build confidence intervals for these unknown quantities

The pollster may want to have a ***margin of error*** +/- 3% with a ***confidence level*** of 95%

The quality control manager may want to assess the average number of defectives in a box with a ***margin of error*** of plus minus 0.3 batteries and a ***confidence level*** of 95%

Sample Size Calculation

A quality control manager at a battery manufacturer wants to estimate the average number of defective batteries contained in a box shipped by the company.

How many boxes does she need to open to figure out the average number of defective batteries contained in a box?

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Confidence level: **95%**

Population std deviation: **?**

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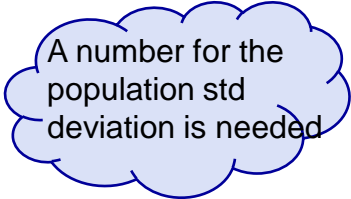
A quality control manager at a battery manufacturer wants to estimate the average number of defective batteries contained in a box shipped by the company.

How many boxes does she need to open to figure out the average number of defective batteries contained in a box?

Margin of error: **+/- 0.3 batteries**

Confidence level: **95%**

Population std deviation: **?**



A number for the population std deviation is needed

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A quality control manager at a battery manufacturer wants to estimate the average number of defective batteries contained in a box shipped by the company.

How many boxes does she need to open to figure out the average number of defective batteries contained in a box?


Margin of error: **+/- 0.3 batteries**

Confidence level: **95%**

Population std deviation: **0.9 batteries**



Sample Size Calculation

$$\bar{x} - \left| z_{\alpha/2} \right| \frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + \left| z_{\alpha/2} \right| \frac{\sigma}{\sqrt{n}}$$
A blue arrow pointing downwards from the term $\left| z_{\alpha/2} \right| \frac{\sigma}{\sqrt{n}}$ in the equation above to the text "Margin of error = 0.3".

Margin of error = 0.3



Sample Size Calculation

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↓

Margin of error = 0.3 = $\left| z_{\alpha/2} \right| \frac{\sigma}{\sqrt{n}}$

$0.3 = \left| \text{NORM.INV}(0.05/2, 0, 1) \right| \times \frac{\sigma}{\sqrt{n}}$



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$$n = (5.88)^2 = 34.6 \approx 35$$