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15.3.7 Confidence Intervals for Mean Estimation

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The following video discusses confidence intervals. As shown in that video, for large N, we can prove that for 95% of all possible samples, the population mean will be found in the *confidence interval*:

$$\overline{x} - 1.96\frac{\sigma_x}{\sqrt{N}} < \mu_x < \overline{x} + 1.96\frac{\sigma_x}{\sqrt{N}} \tag{15.22}$$

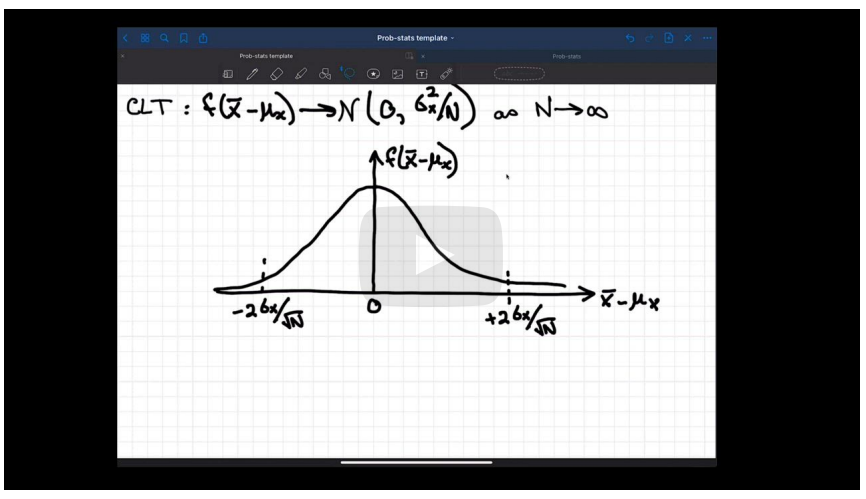
A higher confidence can be achieved, with a wider confidence interval. For example, 99% of all possible samples will satisfy,

$$\overline{x} - 2.576\frac{\sigma_x}{\sqrt{N}} < \mu_x < \overline{x} + 2.576\frac{\sigma_x}{\sqrt{N}} \tag{15.23}$$

Note that in practice: σ_x is not known and so is estimated from the sample, i.e. $\sigma_x \approx s_x$.

The Python script used in this video (and several others) is available here.

Video on confidence intervals for means



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PROFESSOR: Now we're going to discuss

the implications of the central limit theorem, or CLT.

And this is one of the classic results

and plays a key role in probability

and statistics and, in this case,

Video

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