LAW OF LARGE NUMBERS

LLN and CLT, side by side

Both average large samples, and both are about the sample mean; they answer different questions about it.

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COMPARED

	LAW OF LARGE NUMBERS	CENTRAL LIMIT THEOREM
THE QUESTION	where does the sample mean go?	how are sample means spread around that value?
STATEMENT	$\bar{X}_n \xrightarrow{P} \mu$	$\frac{\bar{X}_n - \mu}{\sigma/\sqrt{n}} \xrightarrow{d} \mathcal{N}(0,1)$
THE LIMIT IS	a number, the population mean μ	a distribution, the standard normal

One is deterministic behavior emerging from randomness; the other is probabilistic structure revealed by aggregation.

	LAW OF LARGE NUMBERS	CENTRAL LIMIT THEOREM
IT DESCRIBES	one sequence converging	many sample means forming a bell curve
IT REQUIRES	a finite mean	a finite variance

The CLT asks for more: a finite variance, not just a finite mean.

The LLN tells **where** the mean goes; the CLT tells **the shape of the path**.