LAB 07

PH142 Fall 2025

Announcements

- **Lab 7:** due 10/17 at 11:59pm

- **Quiz 6:** due 10/17 at 11:59pm

- **Group Project Part II:** due 10/24 at 11:59pm

  *Your group must meet with your assigned GSI before the due date.

Week 8 Lecture Review

Definitions

Parameter (µ): A fixed number that describes the population (usually unknown)

Statistic (x̄): A number calculated from the sample; used to estimate the parameter
- Different samples give different x̄, the statistic varies and is a random variable

Week 8 Lecture Review

Definitions

Sampling Distribution: The distribution of sample means, x̄, from all possible samples of size n.

- Centered at the true mean, μ
- Has a standard deviation of: $\dfrac{\sigma}{\sqrt{n}}$

Week 8 Lecture Review

Central Limit Theorem (CLT)

Definition: When n is large, the sampling distribution of the mean x̄ is approximately Normal. The shape of the original population distribution does not matter!

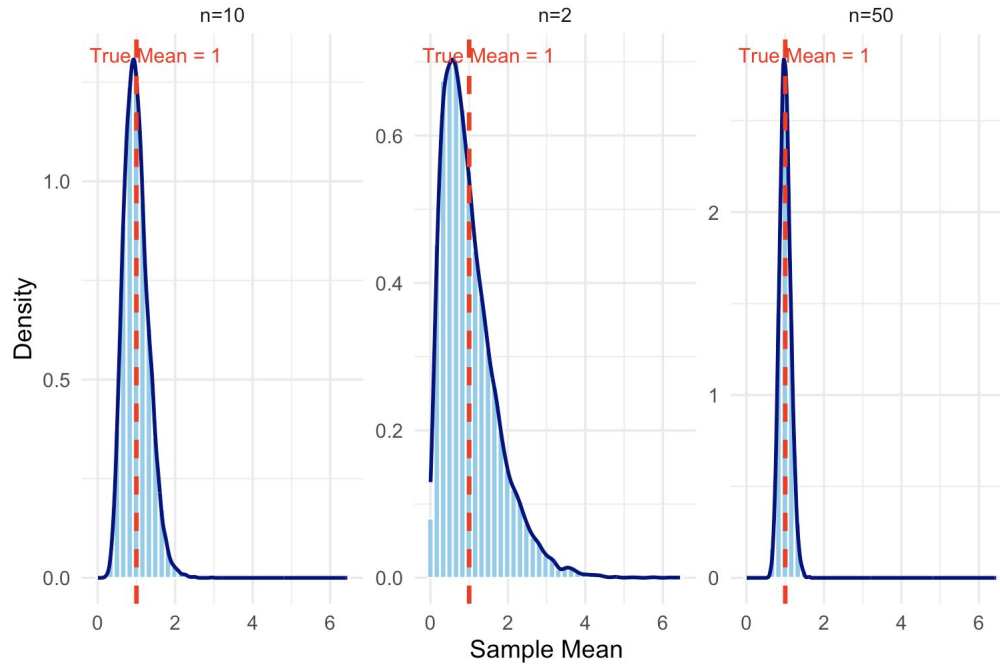As n increases…

- The variability of x̄ decreases
- The distribution of x̄ becomes more Normal

Week 8 Lecture Review

The Central Limit Theorem in Action
The sampling distribution becomes more Normal as n increases, even from a skewed

Week 8 Lecture Review

Confidence Intervals for a Mean

When we use the **sample mean ($\bar{x}$)** to estimate the true **population mean (μ)**, each sample will be slightly different.

A confidence interval provides a range of values that likely contain μ. The CI reflects our estimate with some uncertainty/variability, and is given by:

CI = Point estimate $\pm$ Margin of error

Week 8 Lecture Review

Confidence Intervals for a Mean

CI Formula: $\bar{x} \pm z^* \dfrac{\sigma}{\sqrt{n}}$

$\bar{x}$ = sample mean

z^* = critical value (1.96 for 95% CI)

$\dfrac{\sigma}{\sqrt{n}}$ = standard error of the mean

LAB 07 Walkthrough

Lab Submission

- Follow the directions on the LAB07 file
- Submit using the **Terminal Tab** (next to the console in the bottom left pane)
  - Copy and paste the given line into the terminal
  - Follow prompts (NOTE: the terminal will **not** show your password being typed out!)
- **<u>CHECK IN GRADESCOPE THAT ALL YOUR TESTS PASSED</u>**