

Lab 4

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Instructions

Complete the lab tutorial before completing this file. Use the R Markdown version of this file to complete and submit your homework. Items in **bold** require an answer. Make sure you change the author in the header to your own name.

The following three lines are taken from the lab tutorial:

```
Z <- (mean(x) - 2.5) / (sd(x)/sqrt(length(x)))  
2 * pnorm(abs(Z), mean = 0, sd = 1, lower.tail = FALSE)  
mean(x) - qnorm(0.975) * sd(x)/sqrt(length(x))
```

Consider the following six components seen in this code:

- `mean(x)`
- `2.5`
- `sd(x)`
- `length(x)`
- `qnorm(0.975)`
- `sd(x) / sqrt(length(x))`

For each of the six components, match it to the corresponding notation and description from the following lists.

Mathematical notation (these are written using LaTeX notation, you may need to Knit to preview them:

- $SE_{\bar{x}}$
- \bar{x}
- s
- $z_{\alpha/2}$ for $\alpha = 0.05$ level Z-test
- n
- μ_0

Description:

- population mean under the null hypothesis
- sample size
- critical value for an $\alpha = 0.05$ level Z-test
- sample standard deviation
- standard error of the mean

- sample average

Solution:

- standard error of the mean == $SE_{\bar{x}}$ == `sd(x) / sqrt(length(x))`
- sample average == \bar{x} == `mean(x)`
- sample standard deviation == s == `sd(x)`
- critical value for an $\alpha = 0.05$ level Z-test == $z_{\alpha/2}$ for $\alpha = 0.05$ == `qnorm(0.975)`
- sample size == n == `length(x)`
- population mean under the null hypothesis == μ_0 == 2.5