Name:

Collaborators:

Instructions:

You must submit your worksheet individually by end-of-class or end-of-day. Your name must exist in your worksheet and the names of your collaborators.

Worksheets are marked mostly on completion, and partially on correctness. It will be marked either pass or fail, there will no detailed feedback on worksheets, and no opportunities for revisions and make-up.

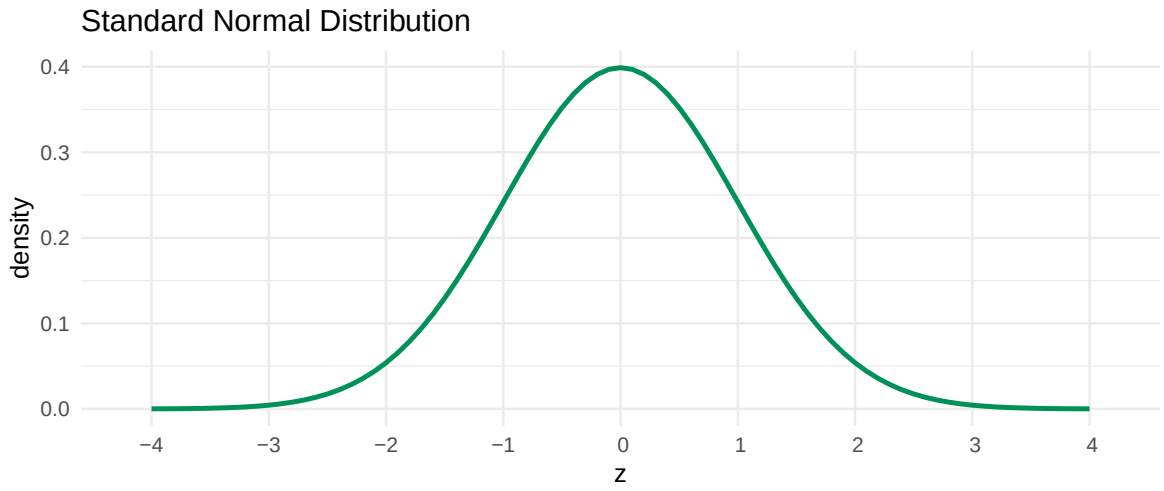
Determine and Interpret Confidence Intervals

1. Standard Normal Distribution and Probability Intervals

Suppose that we are given a 90% confidence interval of $(0.5945, 0.7055)$ with a point estimate of $\hat{p} = 0.65$ and margin of error $z^\star \times \text{SE} = 1.645 \times 0.0337$.

a. What is the $z^\star$? Explain your reasoning.

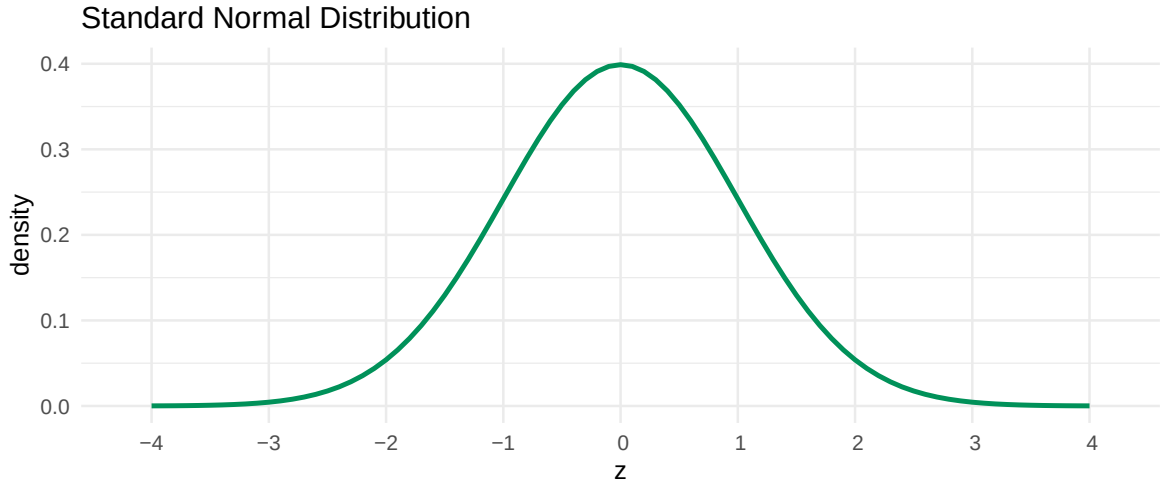
b. Locate and shade the middle 90% probability in the standard normal distribution shown below and label the end points.



2. Confidence Interval Width and Tail Probabilities

a. Based on the results from Problem 1, what is the probability of left and right tail of the distribution? Explain your reasoning.

b. Using the results of Part (a), shade the left and right tail of the distribution for a 90% confidence interval.



c. How do the left and right tails of the standard normal distribution influence the choice of the critical value $z^\star$?

d. If the confidence level were increased to 99%, what would happen to the left and right tail areas, and how would that affect the width of the confidence interval?

References

1. Speegle, Darrin and Clair, Bryan (2021) Probability, statistics, and data: A fresh approach using r, Chapman; Hall/CRC.
2. Diez DM, Barr CD, Çetinkaya-Rundel M (2012) OpenIntro statistics, OpenIntro.