

MS&E 125 Lecture 4 Worksheet

 Draw and label a picture explaining the concept of a sampling distribution.

 Why does the sampling distribution get tighter as we increase the sample size? Justify with both plain-language intuition and a mathematical statement.

 What is the value of $\Phi^{-1}(0.025)$? Draw a picture to support your answer.

 Suppose $\hat{p}_n \approx N(p, \hat{s}e^2)$ by the Central Limit Theorem. Construct a 95% confidence interval for p . Recall the general formula for a normally-approximated confidence interval:

$$C_n = (\hat{\theta}_n - z_{\alpha/2}\hat{s}e, \hat{\theta}_n + z_{\alpha/2}\hat{s}e)$$

 41% of registered voters in the April 5 – April 9 poll said they would vote for Biden, compared with 37% who picked Trump. Responses were from 833 registered voters surveyed online. The poll had a margin of error of 4% with 95% confidence. What is the maximum possible margin of error for estimating any proportion with $n=833$ and 95% confidence?