Problem Set 4

Assigned: Nov. 19
Due: Dec. 3

Problem 1

Using paper and pencil, but no computer, estimate confidence intervals for polls over sample sizes with \( N = 2500 \), and \( N = 160,000 \); \( \bar{f} = 0.4 \) and \( \bar{f} = 0.8 \); and confidence levels of 0.95 and 0.999. (Consider all combinations; thus your answer should have 8 parts.)

Problem 2

Using Monte Carlo sampling, estimate the volume of the three dimensional region

\[ |x|^{1/2} + 2|y|^{1/3} + 4|z|^{1/4} \leq 4 \]

with a 95% confidence interval of 1% of the computed value. That is, you are 95% sure that the difference between the computed value and the true value is less than 1% of the true value. Note that the region fits inside the box \([-16, 16] \times [-8, 8] \times [-1, 1] \). How many sample points do you need?