

Choosing a Sample Size for Confidence Intervals

1. The Gallup Poll plans to ask a random sample of adults whether they attended a religious service in the last 7 days. How large a sample would be required to obtain a margin of error of at most 0.01 in a 99% confidence interval for the population proportion who would say that they attended a religious service? Show your work.
2. A lab supply company sells pieces of Douglas fir 4 inches long and 1.5 inches square for force experiments in science classes. From experience, the strength of these pieces of wood follows a Normal distribution with standard deviation 3000 pounds. You want to estimate the mean load needed to pull apart these pieces of wood to within 1000 pounds with 95% confidence. How large a sample is needed? Show your work.
3. The body mass index (BMI) of all American young women is believed to follow a Normal distribution with a standard deviation of about 7.5. How large a sample would be needed to estimate the mean BMI μ in this population to within ± 1 with 99% confidence? Show your work.