

1. Suppose that a student measuring the boiling temperature of a certain liquid observes readings (in degrees Celsius) of 102.5, 101.7, 103.1, 100.9, and 102.2 on six different samples of the liquid. He calculates the sample mean to be 101.82. If he knows that the population standard deviation for this procedure is 1.2 degrees, what is the confidence interval for the population mean at a 95% confidence level?
2. Suppose we want to estimate the average weight of an adult male in Dekalb County, Georgia. We draw a random sample of 1,000 men from a population of 1,000,000 men and weigh them. We find that the average man in our sample weighs 180 pounds with a standard deviation of 30 pounds. What is the 95% confidence interval for the true weight of the population of men in Dekalb County, Georgia?
3. The cure rate for the standard treatment of a disease is 45%. Dr. Snyder has perfected a primitive treatment which he claims is much better. As evidence, he says that he has used his new treatment on 50 patients with the disease and cured 25 of them. What do you think? Is this new treatment better? Use a 95% confidence interval to answer the question.
4. *Have recent price increases in gasoline caused any financial hardship for you or your household?* In the United States, 1025 residents aged 18 or older were surveyed and 646 replied "yes". Construct the 90% confidence interval estimate of all US residents who report that the price increases in gasoline have caused some financial hardship for themselves or their household.
5. A sample of Alzheimer's patients is tested to assess the amount of time in stage IV sleep. It has been hypothesized that individuals suffering from Alzheimer's Disease may spend less time per night in the deeper stages of sleep. The number of minutes in Stage IV sleep is recorded for 61 patients. The sample produced a mean of 48 minutes with a standard deviation of 14 minutes of Stage IV sleep over a 24 hour period. Compute a 95% confidence interval for this data. What does this information tell you about a particular individual (an Alzheimer's patient) stage IV sleep?
6. From a random study of 1500 adults, 600 said that they fear going out at night. Construct a 92% confidence interval for the population proportion of adults who fear going out at night.
7. Radiation of microwave ovens has a normal distribution with $\sigma = 0.6$. A sample of 25 microwave ovens produced a mean radiation amount of 0.11.
 - A) Determine a 95% confidence interval for the mean radiation.
 - B) Suppose you mistakenly use a t-value instead of a z value. What would the confidence interval be?
 - C) Would the wrong (t) confidence interval be smaller or larger than the correct (z) interval?
8. An insurance company is trying to estimate the average number of sick days that full-time food service workers use per year. A pilot study found the standard deviation to be 2.5 sick days. How large a sample must be selected if the company wants to be 95% confident of getting an interval that contains the true mean with a maximum error of 1 day?
9. A consumer agency wants to estimate the proportion of all drivers who wear seat belts while driving. Assume that a preliminary study has shown that 76% of drivers wear seat belts.
 - a) How large should the sample size be so that the 99% confidence interval for the population proportion has a margin of error of 0.03?
 - b) What is the most conservative estimate of the sample size that would limit the margin of error to within 0.03 of the population proportion for a 99% confidence interval?