

28. Facebook Time You want to estimate the mean amount of time Internet users spend on Facebook each month. How many Internet users must be surveyed in order to be 95% confident that your sample mean is within 15 minutes of the population mean? Based on results from a prior Nielsen survey, assume that the standard deviation of the population of monthly times spent on Facebook is 210 min. What is a major obstacle to getting a good estimate of the population mean?

29. Sample Size Using Range Rule of Thumb You want to estimate the mean SAT score of all college applicants. First use the range rule of thumb to make a rough estimate of the standard deviation of those scores. Possible SAT scores range from 600 to 2400. Use the estimated standard deviation to determine the sample size corresponding to a 98% confidence level and a margin of error of 100 points. What isn't quite right with this exercise?

30. Sample Size Using Range Rule of Thumb You want to estimate the mean amount of annual tuition being paid by current full-time college students in the United States. First use the range rule of thumb to make a rough estimate of the standard deviation of the amounts spent. It is reasonable to assume that tuition amounts range from \$0 to about \$45,000. Then use that estimated standard deviation to determine the sample size corresponding to 99% confidence and a \$100 margin of error. Does the resulting sample size seem practical?

31. Sample Size Using Sample Data Refer to Data Set 1 in Appendix B and find the maximum and minimum pulse rates for males, then use those values with the range rule of thumb to estimate σ . How many adult males must you randomly select and test if you want to be 95% confident that the sample mean pulse rate is within 2 beats (per minute) of the true population mean μ . The standard deviation of the 40 pulse rates of males in Data Set 1 is 10.3 beats per minute. If, instead of using the range rule of thumb, the standard deviation of the sample is used as an estimate of σ , is the required sample size very different? Which result is likely to be closer to the correct sample size?

32. Sample Size Using Sample Data Refer to Data Set 16 in Appendix B and find the maximum and minimum earthquake magnitudes, then use those values with the range rule of thumb to estimate σ . How many earthquakes must you randomly select if you want to be 95% confident that the sample mean magnitude is within 0.2 of the true population mean μ ? The standard deviation of the 50 earthquake magnitudes in Data Set 16 is 0.587. Find the required sample size by using the standard deviation of the sample as an estimate of σ . Which of the two results is likely to be better?

Appendix B Data Sets. In Exercises 33 and 34, use the data sets from Appendix B.

33. Earthquake Magnitudes Use the earthquake magnitudes listed in Data Set 16 from Appendix B and construct a 99% confidence interval estimate of the mean of all such magnitudes.

34. Second-Hand Smoke Figure 7-6 from Example 5 shows a graph of three different confidence intervals. Use the cotinine levels of smokers listed in Data Set 9 from Appendix B and construct the 95% confidence interval estimate of the population mean μ .

7-3 Beyond the Basics

Confidence Interval with Known σ . In Exercises 35–38, find the confidence interval using the known value of σ .

35. Construct the confidence interval for Exercise 9 assuming that σ is known to be 5.013 km.

36. Construct the confidence interval for Exercise 10 assuming that σ is known to be 0.366 ppm.

37. Construct the confidence interval for Exercise 11 assuming that σ is known to be 7718.8 thousand dollars.