

LESSON
6.4**Challenge Practice***For use with the lesson "Select and Draw Conclusions from Samples"*

1. Sometimes polling agencies ask people to call a telephone number or go to a website to respond to a survey. Identify the type of sample described. List any advantages and disadvantages of a survey conducted in this manner.
2. In a political poll it is stated that 65% of the voters in a local township are planning on voting for candidate A for township supervisor. The poll was conducted by using a list of phone numbers in the local phone directory. Calls were placed during the evening hours. Of the 850 numbers dialed, 491 were answered. Of the calls answered, 124 agreed to take the survey. Why is this sampling method biased? Give several reasons.

In Exercises 3–6, use the following information.

When finding the mean of a sample, most likely the mean of that sample is not the actual mean, it is just an estimate. A *confidence interval* represents a range of values around the sample mean that include the true mean. A 95% confidence interval means that for 95 out of 100 samples, the range of values produced by the confidence interval procedure would contain the true mean. A 95% confidence interval for the true mean μ (the Greek letter mu) is represented as

$$\bar{x} - E < \mu < \bar{x} + E$$

where \bar{x} is the estimated mean and E is the margin of error and can be found using the

formula $E = 1.96 \frac{\sigma}{\sqrt{n}}$. This confidence interval is for normal distributions.

3. From a random sample of 45 days last year, the closing stock prices for a company had a mean of \$21.15 and a standard deviation of \$2.32. Find a 95% confidence interval for the true mean. Interpret your answer. (Assume a normal distribution.)
4. From a random sample of 100 newspaper readers, the mean length of time (in minutes) spent reading the newspaper is 12 minutes with a standard deviation of 1.5 minutes. Find a 95% confidence interval for the true mean. Interpret your answer. (Assume a normal distribution.)
5. Find a formula that can be used to determine the minimum sample size needed to guarantee a 95% level of confidence in estimating the true mean μ . Show your work.
6. The admissions director at a college wants to estimate the mean age of all enrolled students. The estimate must be within 1 year of the true mean and assume the standard deviation is 1.3 years. Use your formula from Exercise 5 to determine the minimum sample size needed to construct a 95% confidence interval. (Assume a normal distribution.)