Section 6.3 Confidence Intervals

Name:

1. A hardware manufacturer produces bolts used to assemble various machines. Assume that the diameter of bolts produced by this manufacturer has an unknown population mean μ and the standard deviation is 0.1 mm. The average diameter of a simple random sample of 50 bolts is 5.11 mm. Calculate the 90% confidence interval.

2. If the sample of 50 bolts from problem #1 had a mean diameter of 5.08, calculate the 95% confidence interval.

3. You want to rent an unfurnished one-bedroom apartment in Boston next year. The mean monthly rent for a simple random sample of 32 apartments advertised in the local newspaper is \$1,400. Assume that the standard deviation is known to be \$220. Find a 92% confidence interval for the mean monthly rent for unfurnished one-bedroom apartments available for rent in this community.

4. Suppose you were to change the confidence level in problem #3 to 95% using the same sample. Describe how the confidence interval would change?

5. What does a 95% confidence interval mean?

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A publisher wants to estimate the mean length of time (in minutes) all adults spend reading newspapers. To determine this estimate, the publisher takes a random sample of 15 people and obtains the following results: 11, 9, 8, 10, 10, 9, 7, 11, 11, 7, 6, 9, 10, 8, 10

Assume that the population of times is normally distributed.

- a. Find the point estimate of the population mean (i.e. the sample mean).
- b. Construct the 95% confidence interval for the mean population length reading time.
- c. What is the margin of error?
- d. How can we reduce the margin of error?

- 7. Based on a sample of 100 employees a 95% confidence interval is calculated for the mean age of all employees at a large firm. The interval is (34.5 years, 47.2 years).
 - a. What was the sample mean?
 - b. Find the margin of error.