Data Projects

1. **Business and Finance** Use 30 stocks classified as the Dow Jones industrials as the sample. Note the amount each stock has gained or lost in the last quarter. Compute the mean and standard deviation for the data set. Compute the 95% confidence interval for the mean and the 95% confidence interval for the standard deviation. Compute the percentage of stocks that had a gain in the last quarter. Find a 95% confidence interval for the percentage of stocks with a gain.

2. **Sports and Leisure** Use the top home run hitter from each major league baseball team as the data set. Find the mean and the standard deviation for the number of home runs hit by the top hitter on each team. Find a 95% confidence interval for the mean number of home runs hit.

3. **Technology** Use the data collected in data project 3 of Chapter 2 regarding song lengths. Select a specific genre, and compute the percentage of songs in the sample that are of that genre. Create a 95% confidence interval for the true percentage. Use the entire music library, and find the population percentage of the library with that genre. Does the population percentage fall within the confidence interval?

4. **Health and Wellness** Use your class as the sample. Have each student take her or his temperature on a day when he or she is healthy. Compute the mean and standard deviation for the sample. Create a 95% confidence interval for the mean temperature. Does the confidence interval obtained support the long-held belief that the average body temperature is 98.6°F?

5. **Politics and Economics** Select five political polls and note the margin of error, sample size, and percentage favoring the candidate for each. For each poll, determine the level of confidence that must have been used to obtain the margin of error given, knowing the percentage favoring the candidate and number of participants. Is there a pattern that emerges?

6. **Your Class** Have each student compute his or her body mass index (BMI) (703 times weight in pounds, divided by the square of the height in inches). Find the mean and standard deviation for the data set. Compute a 95% confidence interval for the mean BMI of a student. A BMI score over 30 is considered obese. Does the confidence interval indicate that the mean for BMI could be in the obese range?

Answers to Applying the Concepts

Section 7–1 Making Decisions with Confidence Intervals

1. Answers will vary. One possible answer is to find out the average number of Kleenexes that a group of randomly selected individuals use in a 2-week period.

2. People usually need Kleenexes when they have colds or when their allergies are acting up.

3. If we want to concentrate on the number of Kleenexes used when people have colds, we select a random sample of people with colds and have them keep a record of how many Kleenexes they use during their colds.

4. Answers may vary. I will use a 95% confidence interval:

$$\bar{x} \pm 1.96\frac{\sigma}{\sqrt{n}} = 57 \pm 1.96\frac{15}{\sqrt{85}} = 57 \pm 3$$

I am 95% confident that the interval 54–60 contains the true mean number of Kleenexes used by people when they have colds. It seems reasonable to put 60 Kleenexes in the new automobile glove compartment boxes.

5. Answers will vary. Since I am 95% confident that the interval contains the true average, any number of Kleenexes between 54 and 60 would be reasonable. Sixty seemed to be the most reasonable answer, since it is close to 2 standard deviations above the sample mean.

Section 7–2 Sport Drink Decision

1. Answers will vary. One possible answer is that this is a small sample since I am only looking at seven popular sport drinks.

2. The mean cost per container is \$1.25, with standard deviation of \$0.39. The 90% confidence interval is

$$\bar{X} \pm t_{\alpha/2}\frac{s}{\sqrt{n}} = 1.25 \pm 1.943\frac{0.39}{\sqrt{7}} = 1.25 \pm 0.29$$

or $0.96 < \mu < 1.54$

The 10-K, All Sport, Exceed, and Hydra Fuel all fall outside of the confidence interval.

3. None of the values appear to be outliers.

4. There are $7 - 1 = 6$ degrees of freedom.

5. Cost per serving would impact my decision on purchasing a sport drink, since this would allow me to compare the costs on an equal scale.

6. Answers will vary.

Section 7–3 Contracting Influenza

1. (95% CI) means that these are the 95% confidence intervals constructed from the data.

2. The margin of error for men reporting influenza is $(50.5 - 47.1)/2 = 1.7\%$.