**Chapter 10 Exercises**

1. *Hearing loss*

Are teenagers going deaf? In a study of 3000 randomly selected teenagers in 1988–1994, 15% showed some hearing loss. In a similar study of 1800 teenagers in 2005–2006, 19.5% showed some hearing loss. (These data are reported in *Arizona Daily Star*, August 18, 2010)

(a) Do these data give convincing evidence that the proportion of all teens with hearing loss has increased?

(b) Between the two studies, Apple introduced the iPod. If the results of the test are statistically significant, can we blame iPods for the increased hearing loss in teenagers?

Is it OK to use your calculator for the Do step? Are there any drawbacks?

1. *Gun Control*

Have opinions changed about gun control? Gallup regularly asks random samples of U.S. adults their opinion on a variety of issues. In a poll of 1011 U.S. adults in January 2013, 38% responded that they “were dissatisfied with the nation’s gun laws and policies, and want them to be stricter.” In a similar poll of 1011 adults in January 2012, only 25% agreed with this statement.

(a) Explain why we should use a confidence interval to estimate the change in opinion rather than just saying that the percentage increased by 13 percentage points.

(b) Use the results of these polls to construct and interpret a 90% confidence interval for the change in the proportion of U.S. adults who would agree with the statement about gun laws.

(c) Based on the interval, is there convincing evidence that opinions about gun control have changed?

1. *Cash for quitters*

In an effort to reduce health care costs, General Motors sponsored a study to help employees stop smoking. In the study, half of the subjects were randomly assigned to receive up to $750 for quitting smoking for a year while the other half were simply encouraged to use traditional methods to stop smoking. None of the 878 volunteers knew that there was a financial incentive when they signed up. At the end of one year, 15% of those in the financial rewards group had quit smoking while only 5% in the traditional group had quit smoking. Do the results of this study give convincing evidence that a financial incentive helps people quit smoking compared to traditional methods? (These data are reported in *Arizona Daily Star,* February 11, 2009)

1. *Leaking Helium*

After buying many helium balloons only to see them deflate within a couple of days, Erin and Jenna decided to test if helium-filled balloons deflate faster than air-filled balloons. To find out, they bought 60 balloons and randomly divided them into two piles of 30, filling the balloons in the first pile with helium and the balloons in the second pile with air. Then, they measured the circumference of each balloon immediately after being filled and again three days later. The average decrease in circumference of the helium-filled balloons was 26.5 cm with a standard deviation of 1.92 cm. The average decrease of the air-filled balloons was 2.1 cm with a standard deviation of 2.79 cm.

(a) Do these data provide convincing evidence that helium-filled balloons deflate faster than air-filled balloons?

1. *Chocolate Chips*

Ashtyn and Olivia wanted to know if generic chocolate chip cookies have as many chocolate chips as name-brand chocolate chip cookies, on average. To investigate, they randomly selected 10 bags of Chips Ahoy cookies and 10 bags of Great Value cookies and randomly selected 1 cookie from each bag. Then, they carefully broke apart each cookie and counted the number of chocolate chips in each. Here are their results:

Chips Ahoy: 17, 19, 21, 16, 17, 18, 20, 21, 17, 18

Great Value: 22, 20, 14, 17, 21, 22, 15, 19, 26, 18

(a) Construct and interpret a 99% confidence interval for the difference in the mean number of chocolate chips in Chips Ahoy and Great Value cookies.

(b) Does your interval provide convincing evidence that there is a difference in the mean number of chocolate chips?