**1. Sitting Height** A student of the author measured the sitting heights of 36 male classmate friends, and she obtained a mean of 92.8 cm. The population of males has sitting heights with a mean of 91.4 cm and a standard deviation of 3.6 cm (based on anthropometric survey data from Gordon, Churchill, et al.). Use a 0.05 significance level to test the claim that males at her college have a mean sitting height different from 91.4 cm. Is there anything about the sample data suggesting that the methods of this section should not be used?

**2. Cans of Coke** A simple random sample of 36 cans of regular Coke has a mean volume of 12.19 oz (based on Data Set 17 in Appendix B). Assume that the standard deviation of all cans of regular Coke is 0.11 oz. Use a 0.01 significance level to test the claim that cans of regular Coke have volumes with a mean of 12 oz, as stated on the label. If there is a difference, is it substantial?

**3. Garbage** The totals of the individual weights of garbage discarded by 62 households in one week have a mean of 27.443 lb (based on Data Set 22 in Appendix B). Assume that the standard deviation of the weights is 12.458 lb. Use a 0.05 significance level to test the claim that the population of households has a mean less than 30 lb, which is the maximum amount that can be handled by the current waste removal system. Is there any cause for concern?

**4. FICO Credit Scores** A simple random sample of FICO credit rating scores is obtained, and the scores are listed below. As of this writing, the mean FICO score was reported to be 678. Assuming the the standard deviation of all FICO scores is known to be 58.3, use a 0.05 significance level to test the claim that these sample FICO scores come from a population

with a mean equal to 678.

714 751 664 789 818 779 698 836 753 834 693 802

**5. Do the Screws Have a Length of 3/4 in.?** A simple random sample of 50 stainless steel sheet metal screws is obtained from those suppled by Crown Bolt, Inc., and the length of each screw is measured using a vernier caliper. The lengths are listed in Data Set 19 of Appendix B. Assume that the standard deviation of all such lengths is 0.012 in., and use a 0.05 significance level

to test the claim that the screws have a mean length equal to 3/4 in. (or 0.75 in.), as indicated on the package labels. Do the screw lengths appear to be consistent with the package label?

**6. Power Supply** Data Set 13 in Appendix B lists measured voltage amounts supplied directly to the author’s home. The Central Hudson power supply company states that it has a target power supply of 120 volts. Using those home voltage amounts and assuming that the standard deviation of all such voltage amounts is 0.24 V, test the claim that the mean is 120 volts. Use a 0.01 significance level.

Beyond the

**7.** The high school athletic director is asked if football players are doing as well academically as the other student athletes. We know from a previous study that the average GPA for the student athletes is 3.10. After an initiative to help improve the GPA of student athletes, the athletic director randomly samples 20 football players and finds that the average GPA of the sample is 3.18 with a sample standard deviation of 0.54. Is there a significant improvement? Use a 0.05 significance level.

**8.** Duracell manufactures batteries that the CEO claims will last an average of 300 hours under normal use. A researcher randomly selected 20 batteries from the production line and tested these batteries. The tested batteries had a mean life span of 270 hours with a standard deviation of 50 hours. Do we have enough evidence to suggest that the claim of an average lifetime of 300 hours is false?

**9.** You have just taken ownership of a pizza shop. The previous owner told you that you would save money if you bought the mozzarella cheese in a 4.5 pound slab. Each time you purchase a slab of cheese, you weigh it to ensure that you are receiving 72 ounces of cheese. The results of 7 random measurements are 70, 69, 73, 68, 71, 69 and 71 ounces. Are these differences due to chance or is the distributor giving you less cheese than you deserve?

1. State the hypotheses.

b. Calculate the test statistic.

c. Would the null hypothesis be rejected at the 10% level? The 5% level? The 1% level?

**10.** In hypothesis testing, when we know the population standard deviation it is appropriate to use the \_\_\_\_\_- distribution. When we do not know the population standard deviation, we should use the \_\_\_\_\_ distribution.

**11.** True or False: When we fail to reject the null hypothesis, we are saying that the difference between the observed sample mean and the hypothesized population mean is probable if the null hypothesis is true.

**12.** The dean from UCLA is concerned that the student’s grade point averages have changed dramatically in recent years. The graduating seniors’ mean GPA over the last five years is 2.75. The dean randomly samples 256 seniors from the last graduating class and finds that their mean GPA is 2.85, with a sample standard deviation of 0.65.

**13.** For each of the following scenarios, state which one is more likely to lead to the rejection of the null hypothesis?

a. A one-tailed or two-tailed test

b. 0.05 or 0.01 level of significance

c. A sample size of *n* = 144 or *n* = 444