27. College Weights Use the September weights of males in Data Set 4 from Appendix B and test the claim that male college students have a mean weight that is less than the 83 kg mean weight of males in the general population. Use a 0.01 significance level.

28. Power Supply Data Set 18 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, test the claim that the mean is 120 volts. Use a 0.01 significance level.

8-4 Beyond the Basics

Hypothesis Tests with Known σ. ***In Exercises 29–32, conduct the hypothesis test using a known value of the population standard deviation σ.***

29. Repeat Exercise 9 assuming that the population standard deviation σ is known to be 3.8 chocolate chips.

30. Repeat Exercise 10 assuming that the population standard deviation σ is known to be 5.01 km.

31. Repeat Exercise 11 assuming that the population standard deviation σ is known to be 11.1 years.

32. Repeat Exercise 12 assuming that the population standard deviation σ is known to be 1.065 lb.

33. Finding Critical *t* Values When finding critical values, we sometimes need significance levels other than those available in Table A-3. Some computer programs approximate critical t values by calculating

$$t = \sqrt{\text{df} \cdot (e^{A^2/\text{df}} - 1)}$$

where $\text{df} = n - 1$, $e = 2.718$, $A = z(8 \cdot \text{df} + 3)/(8 \cdot \text{df} + 1)$ and z is the critical z score. Use this approximation to find the critical t score corresponding to $n = 150$ and a significance level of 0.05 in a right-tailed case. Compare the results to the critical t value of 1.655 found from STATDISK, Minitab, or a TI-83/84 Plus calculator.

34. Using the Wrong Distribution When testing a claim about a population mean with a simple random sample selected from a normally distributed population with unknown σ, the Student t distribution should be used for finding critical values and/or a P-value. If the standard normal distribution is incorrectly used instead, does that mistake make you more or less likely to reject the null hypothesis, or does it not make a difference? Explain.

35. Interpreting Power For Example 1 in this section, the hypothesis test has power of 0.4274 of supporting the claim that $\mu < 1.00$ W/kg when the actual population mean is 0.80 W/kg.

a. Interpret the given value of the power.

b. Identify the value of β and interpret that value.

8-5 Testing a Claim About a Standard Deviation or Variance

Key Concept This section presents methods for conducting a formal hypothesis test of a claim made about a population standard deviation σ or population variance σ^2. The methods of this section use the chi-square distribution that was first introduced in Section 7-4. The assumptions, test statistic, P-value, and critical values are summarized as follows.