

20. Radiation in Baby Teeth Listed below are amounts of strontium-90 (in millibecquerels, or mBq, per gram of calcium) in a simple random sample of baby teeth obtained from Pennsylvania residents and New York residents born after 1979 (based on data from “An Unexpected Rise in Strontium-90 in U.S. Deciduous Teeth in the 1990s,” by Mangano, et al., *Science of the Total Environment*, Vol. 317). Use a 0.05 significance level to test the claim that the mean amount of strontium-90 from Pennsylvania residents is greater than the mean amount from New York residents.

Pennsylvania: 155 142 149 130 151 163 151 142 156 133 138 161
 New York: 133 140 142 131 134 129 128 140 140 140 137 143

Large Data Sets. In Exercises 21–24, use the indicated Data Sets from Appendix B. Assume that the two samples are independent simple random samples selected from normally distributed populations. Do not assume that the population standard deviations are equal.

21. Weights of Quarters Vending machines reject coins based on weight. Refer to Data Set 21 in Appendix B and use a 0.05 significance level to test the claim that the mean weight of pre-1964 quarters is equal to the mean weight of post-1964 quarters. Given the relatively small sample sizes from the large populations of millions of quarters, can we really conclude that the mean weights are different?

22. Baseline Characteristics Reports of results from clinical trials often include statistics about “baseline characteristics,” so we can see that different groups have the same basic characteristics. Refer to Data Set 1 in Appendix B and construct a 95% confidence interval estimate of the difference between the mean age of men and the mean age of women. Based on the result, does it appear that the sample of men and the sample of women are from populations with the same mean?

23. Weights of Pepsi Refer to Data Set 19 in Appendix B and construct a 95% confidence interval estimate of the difference between the mean weight of the cola in cans of regular Pepsi and the mean weight of cola in cans of Diet Pepsi. Does there appear to be a difference between those two means? If there is a difference in the mean weights, identify the most likely explanation for that difference.

24. Weights of Coke Refer to Data Set 19 in Appendix B and use a 0.05 significance level to test the claim that because they contain the same amount of cola, the mean weight of cola in cans of regular Coke is the same as the mean weight of cola in cans of Diet Coke. If there is a difference in the mean weights, identify the most likely explanation for that difference.

9-3 Beyond the Basics

Pooling. In Exercises 25 and 26, assume that the two samples are independent simple random samples selected from normally distributed populations. Also assume that the population standard deviations are equal ($\sigma_1 = \sigma_2$), so that the standard error of the differences between means is obtained by pooling the sample variances as described in Part 2 of this section.

25. Do Men Have a Higher Mean Body Temperature? Repeat Exercise 9 with the additional assumption that $\sigma_1 = \sigma_2$. How are the results affected by this additional assumption?

26. Do Men Talk Less Than Women? Repeat Exercise 8 with the additional assumption that $\sigma_1 = \sigma_2$. How are the results affected by this additional assumption?

27. No Variation in a Sample An experiment was conducted to test the effects of alcohol. Researchers measured the breath alcohol levels for a treatment group of people who drank