

Appendix B Data Sets. In Exercises 9–12, refer to the indicated data set in Appendix B and use the Wilcoxon rank-sum test.

9. IQ and Lead Exposure Data Set 5 in Appendix B lists full IQ scores for a random sample of subjects with medium lead levels in their blood and another random sample of subjects with high lead levels in their blood. Use a 0.05 significance level to test the claim that subjects with medium lead levels have full IQ scores with a higher median than the median full IQ score for subjects with high lead levels. Does lead level appear to affect full IQ scores?

10. IQ and Lead Exposure Data Set 5 in Appendix B lists performance IQ scores for a random sample of subjects with low lead levels in their blood and another random sample of subjects with high lead levels in their blood. Use a 0.05 significance level to test the claim that subjects with low lead levels have a higher median performance IQ score than those with high lead levels. Does lead exposure appear to have an adverse effect?

11. Weights of Quarters Data Set 21 in Appendix B lists weights (g) of pre-1964 quarters and post-1964 quarters. Use a 0.05 significance level to test the claim that the samples are from populations with the same median. Does it appear that the design of quarters changed in 1964?

12. Weights of Coke Data Set 19 in Appendix B lists weights (lb) of the cola in cans of regular Coke and diet Coke. Use a 0.05 significance level to test the claim that the samples are from populations with the same median. If there appears to be a difference, try to explain it.

13-4 Beyond the Basics

13. Using the Mann-Whitney U Test The Mann-Whitney U test is equivalent to the Wilcoxon rank-sum test for independent samples in the sense that they both apply to the same situations and always lead to the same conclusions. In the Mann-Whitney U test we calculate

$$z = \frac{U - \frac{n_1 n_2}{2}}{\sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}}$$

where

$$U = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R$$

Use the pulse rates listed in Table 13-5 in this section to find the z test statistic for the Mann-Whitney U test. Compare this value to the z test statistic found using the Wilcoxon rank-sum test.

14. Finding Critical Values Assume that we have two treatments (A and B) that produce quantitative results, and we have only two observations for treatment A and two observations for treatment B. We cannot use the test statistic given in this section because both sample sizes do not exceed 10.

Rank				Rank Sum for Treatment A
1	2	3	4	
A	A	B	B	3

a. Complete the accompanying table by listing the five rows corresponding to the other five cases, and enter the corresponding rank sums for treatment A.

b. List the possible values of R and their corresponding probabilities. (Assume that the rows of the table from part (a) are equally likely.)

c. Is it possible, at the 0.10 significance level, to reject the null hypothesis that there is no difference between treatments A and B? Explain.