

## Review Exercises

**Using Nonparametric Tests.** In Exercises 1–10, use a 0.05 significance level with the indicated test. If no particular test is specified, use the appropriate nonparametric test from this chapter.

**1. World Series** The last 106 baseball seasons (as of this writing) ended with 62 World Series wins by American League teams, compared to 44 wins by National League teams. Use the sign test with a 0.05 significance level to test the claim that in each World Series, the American League team has a 0.5 probability of winning.

**2. Airline Fares** Listed below are the costs (in dollars) of flights from New York (JFK) to San Francisco for US Air, Virgin America, Delta, American, Continental, United, and Alaska. Use the sign test with a 0.05 significance level to test the claim that there is no difference in cost between flights scheduled 1 day in advance and those scheduled 30 days in advance. What appears to be a wise scheduling strategy?

Flight scheduled one day in advance	475	438	882	474	475	540	2909
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Flight scheduled 30 days in advance	236	157	166	182	166	166	240
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**3. Airline Fares** Refer to the same data from Exercise 2. Use a 0.05 significance level with the Wilcoxon signed-ranks test to test the claim that differences between fares for flights scheduled 1 day in advance and those scheduled 30 days in advance have a median equal to 0. What do the results suggest?

**4. Randomness** Refer to the following ages at inauguration of the elected presidents of the United States (from Data Set 12 in Appendix B). Test for randomness above and below the mean. Do the results suggest an upward trend or a downward trend?

57	61	57	57	58	57	61	54	68	49	64	48	65	52	46	54	49	47
55	54	42	51	56	55	51	54	51	60	62	43	55	56	52	69	64	46
54	47																

**5. Student and U.S. News and World Report Rankings of Colleges** Each year, *U.S. News and World Report* publishes rankings of colleges based on statistics such as admission rates, graduation rates, class size, faculty–student ratio, faculty salaries, and peer ratings of administrators. Economists Christopher Avery, Mark Glickman, Caroline Minter Hoxby, and Andrew Metrick took an alternative approach of analyzing the college choices of 3240 high-achieving school seniors. They examined the colleges that offered admission along with the colleges that the students chose to attend. The table below lists rankings for a small sample of colleges. Find the value of the rank correlation coefficient and use it to determine whether there is a correlation between the student rankings and the rankings of the magazine.

Student ranks	1	2	3	4	5	6	7	8
<i>U.S. News and World Report</i> ranks	1	2	5	4	7	6	3	8

**6. Accuracy of Weather Forecasts** The author conducted a study of the accuracy of weather forecasts by recording the actual high temperatures along with the high temperatures that were forecast 5 days earlier. Differences (actual minus forecast) for 35 days are listed below. Use a 0.05 significance level with the sign test to test the claim that the population of differences has a median of zero. What do the results suggest about the accuracy of the forecasts?

0	-3	2	5	-6	-9	4	-1	6	-2	-2	-1	6	-4	-3	0	-1	-12
-14	-1	3	9	6	-3	3	5	4	-7	-6	-7	1	0	-1	10	-6	