additional information that the responses are from Internet users who chose to answer the question posted on the *USA Today* web site?

Appendix B Data Sets. ***In Exercises 17–20, refer to the indicated data set in Appendix B and use the sign test for the claim about the median of a population.***

17. Testing for Median Weight of Quarters Refer to Data Set 21 in Appendix B for the weights (g) of randomly selected quarters that were minted after 1964. The quarters are supposed to have a median weight of 5.670 g. Use a 0.01 significance level to test the claim that the median is equal to 5.670 g. Do quarters appear to be minted according to specifications?

18. Earthquake Magnitudes Refer to Data Set 16 in Appendix B for the earthquake magnitudes. Use a 0.01 significance level to test the claim that the median is equal to 1.00.

19. Coke Contents Refer to Data Set 19 in Appendix B for the amounts (in oz) in cans of regular Coke. The cans are labeled to indicate that the contents are 12 oz of Coke. Use a 0.05 significance level to test the claim that cans of Coke are filled so that the median amount is 12 oz. If the median is not 12 oz, are consumers being cheated?

20. Ages of Best Actresses Refer to Data Set 11 in Appendix B for the ages of actresses at the time that they won Oscars in the category of Best Actress. Use a 0.05 significance level to test the claim that the median age of Oscar-winning actresses is equal to 30 years.

13-2 Beyond the Basics

21. Procedures for Handling Ties In the sign test procedure described in this section, we exclude ties (represented by 0 instead of a sign of + or −). A second approach is to treat half of the 0s as positive signs and half as negative signs. (If the number of 0s is odd, exclude one so that they can be divided equally.) With a third approach, in two-tailed tests make half of the 0s positive and half negative; in one-tailed tests make all 0s either positive or negative, whichever supports the null hypothesis. Repeat Example 4 using the second and third approaches to handling ties. Do the different approaches lead to very different results?

22. Finding Critical Values Table A-7 lists critical values for limited choices of α. Use Table A-1 to add a new column in Table A-7 (from $n = 1$ to $n = 8$) that represents a significance level of 0.03 in one tail or 0.06 in two tails. For any particular n, use $p = 0.5$, because the sign test requires the assumption that $P(\text{positive sign}) = P(\text{negative sign}) = 0.5$. The probability of x or fewer like signs is the sum of the probabilities for values up to and including x.

13-3 Wilcoxon Signed-Ranks Test for Matched Pairs

Key Concept This section introduces the *Wilcoxon signed-ranks test,* which involves the conversion of the sample data to ranks. This test can be used for the two different applications described in the following definition.

DEFINITION The **Wilcoxon signed-ranks test** is a nonparametric test that uses ranks for these applications:

1. Testing a claim that a population of matched pairs has the property that the matched pairs have differences with a median equal to zero
2. Testing a claim that a single population of individual values has a median equal to some claimed value