and one of the data values is zero, add some convenient constant to all of the sample values so that no zeros are present.)

STATCRUNCH Click on **Open StatCrunch.** First enter columns of data or open a data set. Click on **Stat,** select **Nonparametrics,** then select **Kruskal-Wallis.** Identify the columns to be used, then click on **Calculate** and the display will include the test statistic and *P*-value.

13-5 Basic Skills and Concepts

Statistical Literacy and Critical Thinking

1. Effect of Lead on IQ Score Listed below are full IQ scores from simple random samples of subjects with low lead exposure, medium lead exposure, and high lead exposure (from Data Set 5 in Appendix B). In using the Kruskal-Wallis test, we must rank all of the data combined, then we must find the sum of the ranks for each sample. Find the sum of the ranks for each of the three samples.

Low Lead Level	Medium Lead Level	High Lead Level
70	72	82
85	90	93
86	92	85
76	71	75
84	86	85
	79	

2. Requirements Assume that we want to use the data from Exercise 1 with the Kruskal-Wallis test. Are the requirements satisfied? Explain.

3. Notation For the data given in Exercise 1, identify the values of n_1, n_2, n_3, and N.

4. Efficiency Refer to Table 13-2 in Section 13-1 and identify the efficiency of the Kruskal-Wallis test. What does that value tell us about the test?

Using the Kruskal-Wallis Test. ***In Exercises 5–8, use the Kruskal-Wallis test.***

5. Triathlon Times Jeff Parent is a statistics instructor who participates in triathlons. Listed below are times (in minutes and seconds) he recorded while riding a bicycle for five laps through each mile of a 3-mile loop. Use a 0.05 significance level to test the claim that the samples are from populations with the same median. What do the data suggest?

Mile 1	3:15	3:24	3:23	3:22	3:21
Mile 2	3:19	3:22	3:21	3:17	3:19
Mile 3	3:34	3:31	3:29	3:31	3:29

6. Clancy, Rowling, Tolstoy Readability Pages were randomly selected by the author from *The Bear and the Dragon* by Tom Clancy, *Harry Potter and the Sorcerer's Stone* by J. K. Rowling, and *War and Peace* by Leo Tolstoy. The Flesch Reading Ease scores are listed on the next page. Use a 0.05 significance level to test the claim that the three samples are from populations with the same median. Do the books appear to have different reading levels of difficulty?