Requirements

1. We have at least three independent simple random samples.
2. Each sample has at least five observations. (If samples have fewer than five observations, refer to special tables of critical values, such as *CRC Standard Probability and Statistics Tables and Formulae,* published by CRC Press.)

Note: There is *no* requirement that the populations have a normal distribution or any other particular distribution.

Test Statistic

$$H = \frac{12}{N(N+1)}\left(\frac{R_1^2}{n_1} + \frac{R_2^2}{n_2} + \cdots + \frac{R_k^2}{n_k}\right) - 3(N+1)$$

P-Values

P-values are often provided by technology.

Critical Values

1. The test is *right-tailed* and critical values can be found from technology or from the chi-square distribution in Table A-4.
2. $df = k - 1$ (where df is the number of degrees of freedom and k is the number of different samples)

Procedure for Finding the Value of the *H* Test Statistic To see how the following steps are applied, refer to the sample data in Table 13-6.

Step 1: Temporarily combine all samples into one big sample and assign a rank to each sample value. (Sort the values from lowest to highest, and in cases of ties, assign to each observation the mean of the ranks involved.)

EXAMPLE: In Table 13-6, the numbers in parentheses are the ranks of the combined data set. The rank of 1 is assigned to the lowest value of 64, the rank of 2 is assigned to the next lowest value of 78, and so on. In the case of ties, each of the tied values is assigned the mean of the ranks involved in the tie.

Step 2: For each sample, find the sum of the ranks and find the sample size.

EXAMPLE: In Table 13-6, the sum of the ranks from the first sample is 86, the sum of the ranks for the second sample is 50.5, and the sum of the ranks for the third sample is 53.5.

Step 3: Calculate H using the results of Step 2 and the notation and test statistic given in the preceding box.

EXAMPLE: The test statistic is computed in Example 1.

Table 13-6 Performance IQ Scores

Low Lead Level	Medium Lead Level	High Lead Level
85 (**6.5**)	78 (**2**)	93 (**10**)
90 (**8.5**)	97 (**12.5**)	100 (**15.5**)
107 (**18.5**)	107 (**18.5**)	97 (**12.5**)
85 (**6.5**)	80 (**4**)	79 (**3**)
100 (**15.5**)	90 (**8.5**)	97 (**12.5**)
97 (**12.5**)	83 (**5**)	
101 (**17**)		
64 (**1**)		
$n_1 = 8$	$n_2 = 6$	$n_3 = 5$
$R_1 = 86$	$R_2 = 50.5$	$R_3 = 53.5$