

Answer on Question #61378 – Math – Statistics and Probability

Question

A researcher is examining preferences among four new flavors of ice-cream. A sample of $n = 80$ people is obtained. Each person tastes all four flavors and then picks a favorite. The distribution of preferences is as follows:

Ice Cream Flavor	
A	12
B	18
C	28
D	22

Do these data indicate any significance preferences among the four flavors? Test at the 0.05 level of significance.

Solution

We shall use the Chi-square test. Let

H_0 : the numbers of people preferring the new flavors of ice-cream are equal for all the four types;

H_1 : there is significance difference between the numbers of people preferring the new flavors of ice-cream.

The expected number of people preferring the one type of flavor (assuming that the H_0 is true) is equal to $\frac{n}{4} = \frac{80}{4} = 20$.

Now we calculate the next value of test statistics:

$$\chi^2 = \frac{(12-20)^2}{20} + \frac{(18-20)^2}{20} + \frac{(28-20)^2}{20} + \frac{(22-20)^2}{20} = 6.8.$$

Using the table of Chi-square distribution we find the critical value

$$\chi^2(k = 4 - 1, \alpha = 0.05) = \chi^2(k = 3, \alpha = 0.05) = 7.8.$$

Since $6.8 < 7.8$ we have no reasons to reject H_0 and we conclude that these data do not indicate any significance preferences among the four flavors at the 0.05 level of significance.

Answer. These data do not indicate any significance preferences among the four flavors.