Refer to the Explanation file of your Chi Squared Tests page of your Statistics Notebook for the following questions.

In the following table, the factor for the rows would be called Class and the factor for the columns would be called Survival .

	No	Yes
1st	122	203
2nd	167	118
3rd	528	178
Crew	673	212

Select the correct null and alternative hypotheses for a chi squared test of independence.

1 H_a 2 H_0

1. The row variable and column variable are associated.
2. The row variable and column variable are independent.

The two things needed to obtain a p-value for the chi-squared test of independence are 1) the test statistic $\chi^2 = \sum_{i=1}^{m} \frac{(O_i - E_i)^2}{E_i}$ and 2) the distribution of the test statistic that is calculated under the assumption that the null hypothesis is true.

The E_i in the χ^2 test statistic formula are called the expected counts and are obtained by multiplying the row total with the column total and dividing by the total total . These values show us what values we would expect to observe if the null hypothesis was true. In other words, they provide the counts we would expect if the row variable and column variable were independent .

The χ^2 test statistic can be assumed to follow a chi-squared distribution with degrees of freedom $p = ($ r - 1 $) \times (c - 1)$

The chi-squared distribution is a parametric distribution because is has a single parameter known as the degrees of freedom, p.

Pearson Residuals are useful for interpreting the results of a chi-squared test when the alternative hypothesis can be concluded to be the truth. They show a relative measurement of how much the observed counts differ from the expected counts.