**Problem Statement 1:**

Is gender independent of education level? A random sample of 395 people were

surveyed and each person was asked to report the highest education level they

obtained. The data that resulted from the survey is summarized in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | High School | Bachelors | Masters | Ph.d | Total |
| Female | 60 | 54 | 46 | 41 | 201 |
| Male | 40 | 44 | 53 | 57 | 194 |
| Total | 100 | 98 | 99 | 98 | 395 |

Question: Are gender and education level dependent at 5% level of significance? In

other words, given the data collected above, is there a relationship between the gender

of an individual and the level of education that they have obtained?

**Solution:**

gender and education level dependent at 5% level of significance

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | High School | Bachelors | Masters | Ph.d | Total |
| Female | 50.886 | 49.868 | 50.377 | 49.868 | 201 |
| Male | 49.114 | 48.132 | 48.623 | 48.132 | 194 |
| Total | 100 | 98 | 99 | 98 | 395 |

χ2=(60−50.886) 2/50.886+(54-49.868) 2/49.868+(46-50.377) 2/50.377+(41-49.868) 2/49.868

(40-49.114) 2/49.114+(44-48.132) 2/48.132+(53-48.623) 2/48.623+(57−48.132)2/48.132

χ2=8.006

The critical value of χ2 with 3 degree of freedom is 7.815. Since 8.006 > 7.815, therefore we reject the null hypothesis and conclude that the education level depends on gender at a 5% level of significance