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?

ANS:

Here's the table of expected counts:

|  | **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 |

Now X2= (60-50.886)^2/50.886 + … i.e: (act – exp)^2 / exp.

X2 = 8.006

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

# Problem Statement 2:

Using the following data, perform a oneway analysis of variance using α=.05. Write up the results in APA format.

[Group1: 51, 45, 33, 45, 67]

[Group2: 23, 43, 23, 43, 45]

[Group3: 56, 76, 74, 87, 56]

ANS:



# Problem Statement 3:

Calculate F Test for given 10, 20, 30, 40, 50 and 5,10,15, 20, 25.

For 10, 20, 30, 40, 50:

ANS:

**Calculate Variance of first set**   
  
Total Inputs (N) =(10,20,30,40,50)   
Total Inputs (N)=5   
Means(xm)= 30   
SD=15.8114   
Variance=SD^2   
Variance=250   
  
**Calculate Variance of second set**   
Total Inputs(N) =(5,10,15,20,25)   
Total Inputs(N)=5   
Means (xm)= 15   
SD= 7.9057   
Variance=SD2   
Variance=62.5   
  
**To calculate F Test**   
F Test = (variance of 10, 20,30,40,50) / (variance of 5, 10, 15, 20, 25)   
= 250/62.5   
= 4.   
  
The F Test value is 4.