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:

Answer

Provided	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

Expected	High School	Bachelors	Masters	Ph.d.	Total
Female	50.88607595	49.86835443	50.37721519	49.86835	201
Male	49.11392405	48.13164557	48.62278481	48.13165	194
Total	100	98	99	98	395

Chi-Square	High School	Bachelors	Masters	Ph.d.	Total
Female	1.632344606	0.342311177	0.380330924	1.577107	3.932093
Male	1.691243638	0.354662611	0.394054205	1.634012	4.073973
Total	3.323588244	0.696973789	0.774385129	3.211119	8.006066

Chi-Sq = 8.006, DF = 3, P-Value = 0.046

Critical Value for Chi-Square for 0.05 at DF - 3 is 7.815

As 8.006 greater than 7.815, we reject null hypothesis and can say education level depends on gender at a 5% level of significance.

Question

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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?

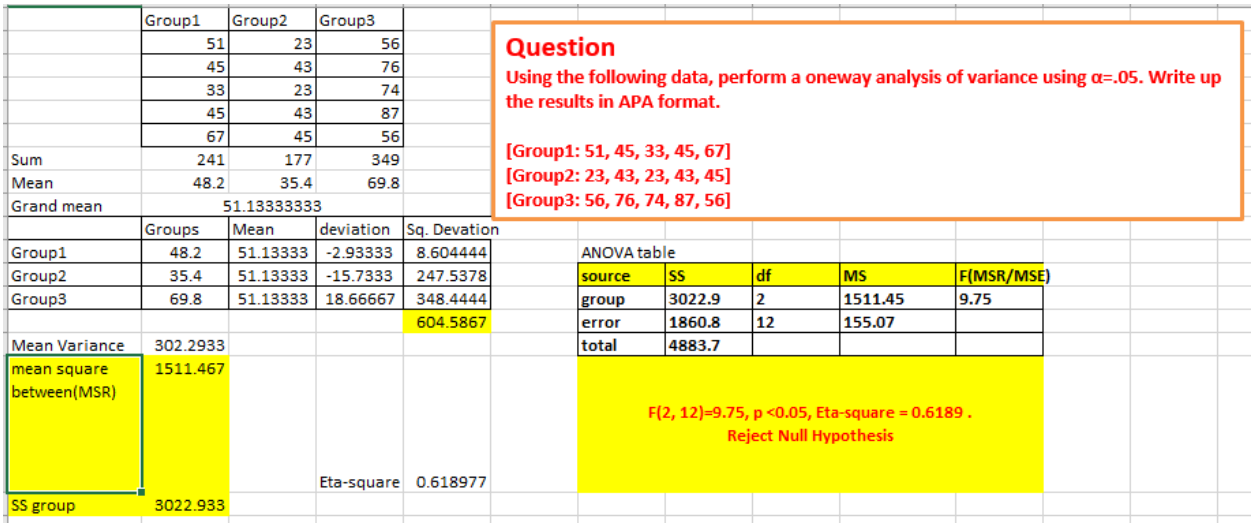
As chi-square of 8.006 greater than critical value of 7.815, we reject null hypothesis and can say education level depends on gender at a 5% level of significance.

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:



	Group1	Group2	Group3
	51	23	56
	45	43	76
	33	23	74
	45	43	87
	67	45	56
Sum	241	177	349
Mean	48.2	35.4	69.8
Grand mean	51.13333333		

Question
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]

	Groups	Mean	deviation	Sq. Devation
Group1	48.2	51.13333	-2.93333	8.604444
Group2	35.4	51.13333	-15.7333	247.5378
Group3	69.8	51.13333	18.66667	348.4444
				604.5867
Mean Variance	302.2933			
mean square between(MSR)	1511.467			
			Eta-square	0.618977
SS group	3022.933			

ANOVA table

source	SS	df	MS	F(MSR/MSE)
group	3022.9	2	1511.45	9.75
error	1860.8	12	155.07	
total	4883.7			

F(2, 12)=9.75, p <0.05, Eta-square = 0.6189 .
Reject Null Hypothesis

F(2, 12)=9.75, p <0.05, Eta-square = 0.6189 .
Reject Null Hypothesis

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:

Answer

	10
1st Set	20
Input	30
Values	40
	50
Sum	150
Mean	30
SD	15.8113883
Variance	250

	5
1st Set	10
Input	15
Values	20
	25
Sum	75
Mean	15
SD	7.905694
Variance	62.5

F Test = (variance of 1st Set / (variance of 2nd Set)
F Test = 250/62.5 = 4

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