ASSIGNMENT 04

Pbm 1

Is gender independent of education level? A random sample of 395 people were surveyed and each person was 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

O	60	54	46	41	40	44	53	57
E	51	50	50	50	49	48	49	48
$\frac{(O-E)^2}{E}$	1.588	0.32	0.72	1.62	1.65	0.33	0.33	1.69

$$\chi^2 = \frac{\Sigma(O-E)^2}{E} = 8.248$$

$$\chi^2_{crit}(0.05) = 7.815$$

$$df = (R-1)(C-1)$$

$$= 3$$

Gender and education level are dependent at 0.05% significance level.

Pbm 2

Using the following data, perform a oneway analysis of variance using $\alpha = 0.05$. Write up the results in APA format

Group 1 : 51, 45, 33, 45, 67

Group 2 : 23, 43, 23, 43, 45

Group 3 : 56, 76, 74, 87, 56.

G1	G2	G3	$(G1 - M1)^2$	$(G2 - M2)^2$	$(G3 - M3)^2$
51	23	56	7.84	153.76	190.44
45	43	76	10.24	57.76	38.44
33	23	74	231.04	153.76	14.64
45	43	87	10.24	57.76	295.84
67	45	56	353.44	92.16	190.44.
T: 241	177	349	612.8	515.2	732.8
M: 48.2	35.4	69.8			
	M1	M2	M3		

Mean (g) = 51.13

Here k = 3

N = 15

$$SST = \sum_{i=1}^{N} n_i (S_{iM} - x_g)^2$$

$$= 5(48.2 - 51.13)^2 + 5(35.4 - 51.13)^2 + 5(69.8 - 51.13)^2$$

$$= 3022.9335 / 3011 = 1511.46875$$

$$MSST = \frac{3022.9335}{3-1}$$

$$= \underline{1511.46675}$$

$$SSE = \sum_{i=1}^{k} (S_i - S_M)^2$$

$$= 612.8 + 515.2 + 732.8$$

$$= 1860.8$$

$$MSSE = \frac{1860.8}{(N-k)} = \underline{155.0667}$$

$$\frac{15-3}{}$$

$$Fstat = \frac{MSST}{MSSE} = \frac{1511.46675}{155.0667}$$

$$= \underline{9.7472}$$

$F_{stat}(2,12)$ with 0.05% $\alpha = 3.89$

ANOVA TABLE

	Sum of squares	df	Mean square	F
Between groups	3022.9	2	1511.45	9.75
(Error) within group	1860.8	12	155.07	
Total	4883.7			

Pbm 3

Calculate F test for genes 10, 20, 30, 40, 50 and 5, 10, 15, 20, 25

$$\sigma^2 = \frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{N}$$

$$F_{test} = \frac{\text{Variance of the first set}}{\text{Variance of the second set}}$$

S_1	$(S1 - M)^2$	S_2	$(S_2 - M_2)^2$
10	400	5	100
20	100	10	25
30	0	15	0
40	100	20	25
50	400	25	100
T: 150	1000	T: 75	250

$M_1 : 30$

$$F_{stat} = \frac{1000/5}{250/5}$$

$$= 4$$