A simple random sample of 50 items from a population with population standard deviation is 6 resulted in a sample mean of 32. Provide a 95% confidence interval for the population mean.

Perform Chi Square test on the given data:

Qualification/Marital Status	Middle School	High School	Bachelors	Masters	PhD	Total
Unmarried	18	36	21	9	6	90
Married	12	36	45	36	21	150
Divorced	6	9	9	3	3	30
Widowed	3	9	9	6	3	30
Total	39	90	84	54	33	300

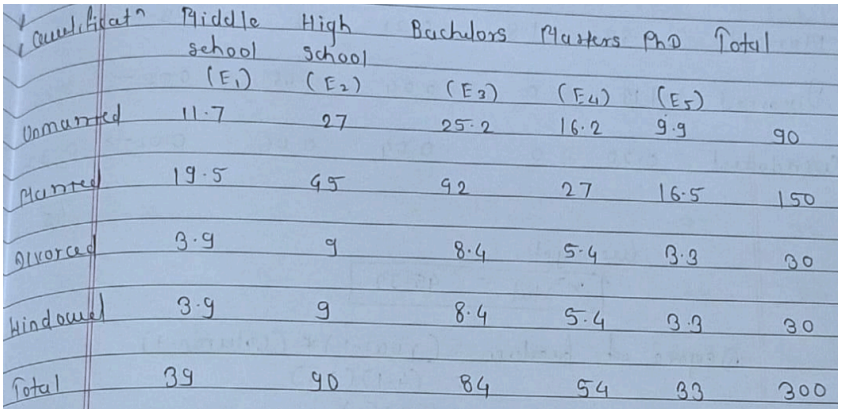
Ho: There is no link between married status and degree.

H1: there is link between them.

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Now, for the expected value(E) we get,

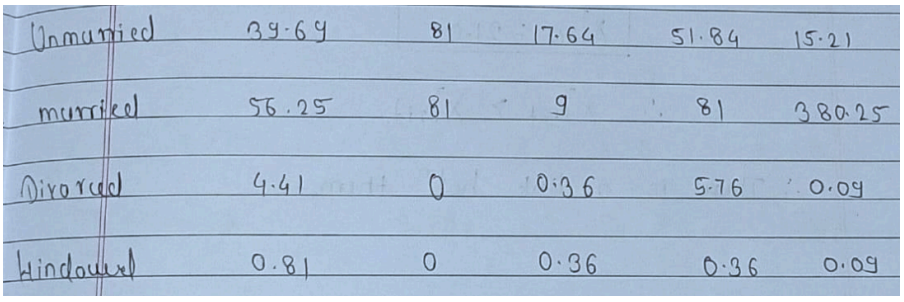
$$\text{expected count} = \frac{\text{row total} \cdot \text{column total}}{\text{table total}}$$



Qualificat^n	Middle school (E_1)	High school (E_2)	Bachelors (E_3)	Masters (E_4)	PhD (E_5)	Total
Unmarried	11.7	27	25.2	16.2	9.9	90
Married	19.5	45	42	27	16.5	150
Divorced	3.9	9	8.4	5.4	3.3	30
Windowed	3.9	9	8.4	5.4	3.3	30
Total	39	90	84	54	33	300

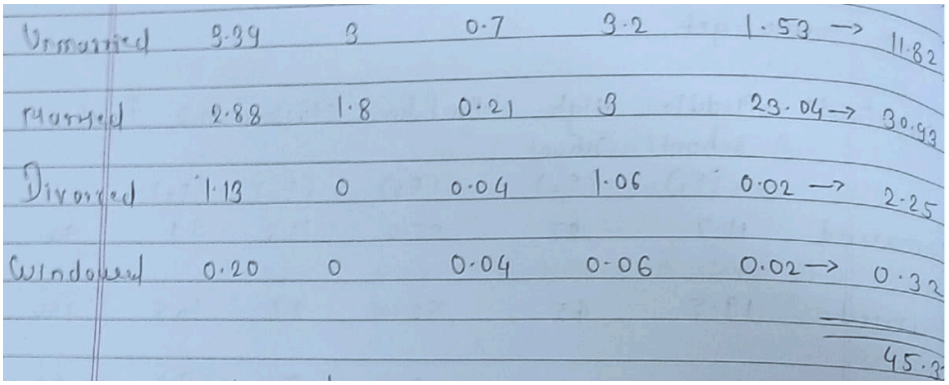
Now we have to calculate the term $(O-E)^2$

Hence we get,



Unmarried	39.69	81	17.64	51.84	15.21
married	56.25	81	9	81	380.25
Divorced	4.41	0	0.36	5.76	0.09
Windowed	0.81	0	0.36	0.36	0.09

∴ As per, $X^2 = \sum \frac{(O-E)^2}{E}$, we get following table:



∴ We get, χ^2 stat = 45.32

Now,

Degree of Freedom = (Row-1)*(Column-1)

= (4-1)*(5-1)

= 12

∴ We get, χ^2 critical = 21.02 ……..(after referring Chi Square Table, with DF= 12 and α =0.95)

∴ χ^2 stat > χ^2 critical

∴ There is a link between them.