

**Task b.** Two research workers classified some people in income groups on the basis of sampling studies. Their results are as follow:

Investigators Income groups Total

Poor Middle Rich

A 160 30 10 200

B 140 120 40 300

Total 300 150 50 500

Show that the sampling technique of at least one research worker is defective.

**Answer**

Let us make the hypothesis that the techniques adopted by both the groups are similar and the data is similar also.

Expected frequencies are

investigator	Income groups			total
	poor	middle	rich	
A	120	60	20	200
B	180	90	30	300
Total	300	150	50	500

$$\lambda^2 = \sum \frac{(O-E)^2}{E} = \frac{(160-120)^2}{120} + \frac{(30-60)^2}{60} + \frac{(10-20)^2}{20} + \frac{(140-180)^2}{180} + \frac{(120-90)^2}{90} + \frac{(40-30)^2}{30} = 55.54$$

$$\text{Degree of freedom} = (3-1)(2-1)=2$$

Table value of  $2 \lambda^2$  for 2 degree of freedom at 5% level of significance is 5.991. Since the calculated value is bigger than the table value, we conclude the rejection of null hypothesis at 5% level of significance. Technique adopted by one of two groups in data collection is defective.