SOLUTIONS

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Department of Mathematics & Statistics
STAT-212-Term063-Quiz4

Name: ID: Serial:

A study was recently conducted in which people were asked to indicate which new medium was their preferred choice for national news. The following data were observed:

Age	The Medium			
	Radio	Television	Newspaper	Total
Under 21	45 **39**	65 **48.75**	20 **42.25**	130
21-40	31 **36**	41 **45**	48 **39**	120
41 and Over	44 **45**	44 **56.25**	62 **48.75**	150
Total	120	150	130	400

Given this data, test whether the preferred news source is independent of age. Use $\alpha = 0.05$

1. The hypothesis are:

H_0: **The preferred news source is independent of age.**

H_A: **The preferred news source is NOT independent of age.**

2. The test statistic value:

$$\chi_C^2 = \sum\sum \frac{(o_{ij} - e_{ij})^2}{e_{ij}}$$

$$= \frac{(45-39)^2}{39} + \frac{(65-48.75)^2}{48.75} + \cdots + \frac{(62-48.75)^2}{48.75} = 27.4755$$

3. The critical value is:

$$\chi^2_{\alpha,(r-1).(c-1)} = \chi^2_{0.05,4} = 9.4877$$

4. Decision Rule & decision :

$$\text{Reject } H_0 \text{ if } \chi_C^2 > \chi^2_{\alpha,(r-1).(c-1)} \Rightarrow 27.4755 > 9.4877$$

Reject H_0

5. conclusion:

The preferred news source is NOT independent of age.