

Chapter 10: chi-square (χ^2) exercises

- 1) For the following table, please go through chi-square process to analyze its null hypothesis etc.

Presidential vote	White	Blacks	Others	RM
Republican	596 ($\frac{760 \times 974}{1390} = 532.5$)	97 (152.5)	67 (74.9)	760
Democrat	378 (441.5)	182 (126.5)	70 (62.1)	630
CM	974	279	137	N = 1,390

- 1) Null hypothesis: race voters has nothing to do with their presidential vote.
- 2) Calculating the expected frequency

$$F_E = \frac{RM \times CM}{N}$$

3) Calculating chi-square

$$\chi^2 = \sum \frac{(F_o - F_E)^2}{F_E}$$

$$\chi^2 = \frac{(596 - 532.5)^2}{532.5} + \frac{(97 - 152.5)^2}{152.5} + \frac{(67 - 74.9)^2}{74.9} + \frac{(378 - 441.5)^2}{441.5} + \frac{(182 - 126.5)^2}{126.5} + \frac{(70 - 62.1)^2}{62.1}$$

$$\chi^2 = 63.1$$

4) Calculating the degree of freedom (df)

$$df = (R - 1) (C - 1) = (2 - 1) (3 - 1) = 2$$

5) Determine the p level

$$P < .001$$

6) Decision regarding the null hypothesis, type of error committed

Reject the null hypothesis, committing type I error