Assignment - 3

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10.2

Highways	1	2	3	4	Total
Num. of road accidents	50	42	32	82	206

$$\chi^2 = \sum \frac{a_i^2}{E_i} - n \qquad f_i = \frac{n}{k}$$

$$= \frac{1}{51.5} \times \left[(50^2 + 42^2 + 32^2 + 82^2)\right] - 206 \qquad = \frac{206}{4} = 51.5$$

$$= 27.29$$

$\therefore \quad \chi^2 > \chi^2_{3,1}$

It is not accepted

10.4

$$\chi^2 = \sum \frac{a_i^2}{f_i} - n \qquad \left| \quad f_i = \frac{n}{k} = 250 \right.$$

$$= \frac{(250^2 + 450^2 + 150^2 + 100^2)}{250} - 1000$$

$$= 240$$

$\chi^2 > \chi_3^2$

H_0 is not accepted.

10.5

$$\bar{x} = \frac{\Sigma x}{n}$$

$$= \frac{761.6}{36}$$

$$= 21.15$$

$$s^2 = \frac{1}{n-1}\left[\Sigma n^2 - \frac{(\Sigma n)^2}{n}\right]$$

$$= \frac{1}{35}\left[16125.5 - \frac{(761.6)^2}{36}\right]$$

$$= 0.383$$

$$s = \sqrt{0.383}$$

$$= 0.62.$$

$$\left| \quad z = \frac{21.15 - 21}{\frac{0.62}{\sqrt{36}}} = 1.95 \right.$$

H_0 is accepted

10.7

$$P = P_0 = 0.4$$

$$P = \frac{8}{25}$$

$$= 0.32$$

$$Q_0 = 1 - 0.4$$

$$= 0.6$$

$$Z = \frac{P - P_0}{\sqrt{\frac{P_0 Q_0}{n}}}$$

$$= \frac{0.32 \times 0.4}{\sqrt{\frac{0.4 \times 0.6}{25}}}$$

$$= -0.81 < 1.96$$

H_0 is accepted

10.11

$$\chi^2 = \frac{550[(150 \times 158) - (120 \times 122)]^2}{(270 \times 272 \times 278 \times 280)}$$

$$= 47.89$$

$\chi^2 > \chi_1^2$

$n = 550$
$a = 150$
$b = 120$
$c = 122$
$d = 158$

10.12

$$\chi^2 = \frac{350(130 \times 84 - 69 \times 69)^2}{(202 \times 202 \times 198 \times 198)}$$

$$= 22.00$$

$\chi^2 > \chi_1^2$

H_0 is no accepted.

$n = 350$
$a = 138$
$b = 69$
$c = 69$
$d = 84$