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(1)

Answer to the question no-(5)

Lay the data out in a table;

	Blue	Green	yellow
Boys	63	126	7
Girls	85	91	28

Add up rows and columns:

	Blue	Green	yellow	
Boys	63	126	7	196
Girls	85	91	28	204
	148	217	35	400

Calculate Expected value for each entry

	Blue	green	yellow	
Boys	$\frac{148\times196}{400}$	$\frac{217\times196}{400}$	$\frac{35\times196}{400}$	196
Girls	$\frac{148\times204}{400}$	$\frac{217\times204}{400}$	$\frac{35\times204}{400}$	204
	148	217	35	400

	Blue	green	yellow	
Boys	72.52	106.33	17.15	196
Girls	75.48	110.67	17.85	204
	148	217	35	400

subtract expected from, square it,

	Blue	green	yellow	
Boys	$\frac{(63-72.52)^2}{72.52}$	$\frac{(126-106.33)^2}{106.33}$	$\frac{(7-17.15)^2}{17.15}$	196
Girls	$\frac{(85-75.48)^2}{75.48}$	$\frac{(91-110.67)^2}{110.67}$	$\frac{(28-17.85)^2}{17.85}$	204
	148	217	35	400

	Blue	green	yellow	
Boys	1.24	3.63	6.00	196
Girls	1.20	~~1.80~~ 3.49	5.77	204
	148	217	35	400

now add up those values;

$1.24 + 3.63 + 6 + 1.20 + 3.49 + 5.77 = (21.33)$ Ans.

(1) Answer to the Question no - (1)

Step 1: Hypothesis for uniformity.

$H_0 : \rho_i = 0 \rightarrow$ No's Independent

$H_1 : \rho_i \neq 0 \rightarrow$ No's aren't independent

Step 2 :- .06, .02, 0.11, .56, .43, .15, .32, .82, 0.16, .39

Step 3 : + − + + − − + + − + $a = 7$, $N = 10$

Step 4: it is the total number of runs in truly random sequence.

The means and variance of a is given by

$$\Rightarrow \mu_a = \frac{2N-1}{3} = \frac{2 \times 10 - 1}{3}$$

$$= \frac{20-1}{3}$$

$$= \frac{19}{3}$$

$$= 6.333$$

and. $\sigma^2 = \frac{16N - 29}{90}$

$$= \frac{16 \times 10 - 29}{90}$$

$$= \frac{160 - 29}{90}$$

$$= \frac{131}{90}$$

$$= 1.461$$

$$\therefore \sigma = 1.20$$

Step 5:- $$Z_0 = \frac{a - \mu_a}{\sigma_a}$$

$$= \frac{a - [(2N-1)(3)}{\sqrt{(16N-29)/90}}$$

$$= \frac{7 - 6.333}{1.46}$$

$$= \frac{0.667}{1.46}$$

$$= 0.456$$

Step 6:- -1.96 — $+1.96$

Step 7:- $-1.96 <= 0.456 <= 1.96$

Ho is not rejected.

Answer to the Question no - 7

step 1: Hypothesis

$H_0 : \rho_i = 0 \rightarrow$ No's independent

$H_1 : \rho_i \neq 0 \rightarrow$ No's aren't independent

Step 2: $i = 3$, lag $m = 5$

Step 3: $i + (M+1) m \leq N$

$= 3 + (M+1) 5 \leq 30$

$= (M+1) \leq 27$

$= (M+1) \leq 5.4$

$= M \leq 4.4$ $[M = \max 4, 3, 2 \ldots 0]$

$M \leq 4$

$M = 4$

Step 4:- $P_{im} = \frac{1}{m+1}\left[\sum_{k=0}^{m} R^{i}+km \cdot R_{i}+[k+1]m\right]-0.25$

$= P_{35} = \frac{1}{4+1}\left[\sum_{k=0}^{4} R_3+5k \times R_3+5(k+1)\right]-0.25$

$= \frac{1}{5}\left[R_3 \cdot R_8 + R_8 \cdot R_{13} + R_{13} \times R_{18} + R_{18} \times R_{23} + R_{23} \times R_{28}\right] - 0.25$

$= \frac{1}{5}\left[(0.01 \times 0.64) + (0.64 \times 0.35) + (0.35 + 0.27)\right.$

$\left. \times (0.75 + 0.75) \times (0.69 + 0.69)\right] - 0.25$

$= \cancel{\frac{1}{5}[66.82] - 0.25} = \frac{1}{5}(0.9702) - .25$

$= \cancel{13.36 - 0.25} \quad = 0.19409 - 0.25$

$= 0.05596$

$= \cancel{13.14}$

Step 5:- $\sigma P_m = \sqrt{\frac{13(m)+7}{12(m+1)}}$

$= \frac{\sqrt{13\sqrt{4}+7}}{60}$

$= 0.128$

Step 6: $Z_0 = \frac{p_1 - m}{\sigma_{p-m}}$

$= \cancel{\frac{13.114}{0.128}} = \frac{-0.05598}{0.128}$

$= \cancel{102.45}$ $= -0.44$

Step 7: $Z_{0.025} = 1.96$

Step 8: $-Z_{\alpha/2} \leq Z_0 \leq +Z_{\alpha/2}$

$-1.96 \leq -0.44 \leq 1.96$

$\therefore H_0$ is accepted.

Answer to the question no-(6)

Step 1: Hypothesis

$H_0 : \rho_i = 0 \rightarrow$ No's independent

$H_1 : \rho_i \neq 0 \rightarrow$ no's are not Independent

Step 2: $0.05 \leq 0.14 \leq 0.44 \leq 0.81 \leq 0.93$

Step 3: compute D^+ & D^-

i	1	2	3	4	5
R_i	0.05	0.14	0.44	0.81	0.93
i/N	0.2	2.5	0.6	0.8	1
$D^+ = i/N - R_i$	–	2.36	0.16	–	0.07
$D^- = R_i - (i-1)/N$	0.05	-0.06	0.04	0.21	0.13

Step 4: Compute D max (D^+ and D^-)

$D^+ = (2.36; 0.16, 0.07)$

$D^- = (0.05, -0.06; 0.49, 0.21, 0.13)$

$D = max(2.36, 0.21) = 0.21$

Step 5: Here $\alpha = 0.05$, $D_\alpha = 0.521$

Step 6: $D > D_\alpha = 0.21 > 0.521$
(Not Rejected)

Answer to the Question no - (4)

i) Average number of patients in the clinic.

$L_s = \frac{\lambda}{\mu - \lambda}$

$= \frac{12}{\mu - 1}$

= 4 paitents

Average number of ~~patient~~ patients in the waiting time.

$$L_q = \frac{\lambda^2}{\mu(\mu-\lambda)} = 3.2 \text{ patients}$$

(ii) $$W_s = \frac{1}{\mu-\lambda} = 0.267 \text{ hours}$$

$$W_q = \frac{\lambda}{\mu(\mu-\lambda)}$$

$$= 0.333 \text{ hours}$$

Answer to the question no -