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 - (22)

Q1 Moment About Mean - ? , Kustos?

$$\text{freq. dist} = 0, 60, -50, 8020$$

$$m_1 = 0$$

$$m_2 = m_2' - m_1' = 60 - (0) = 60$$

$$m_3 = m_3' - 3m_2'm_1' + m_1'^2 = (50) - 3(60)(0) + (0)^2 = 50$$

$$m_4 = m_4' - 4m_3'm_1' + 6m_2'm_1'^2 - 3m_1'^4 = 8020 - 4(-50)(0) + 6(60)(0)^2 - 3(0)^4 = 8020$$

$$\beta_1 = \frac{m_3^2}{m_2^3} = \frac{(50)^2}{(60)^3} = 0.0115$$

$$\beta_2 = \frac{m_4}{m_2^2} = \frac{8020}{60 \times 60} = 2.27$$

$$\beta_2 - 3 = 2.27 - 3 < 0 \rightarrow \text{Platykurtic}$$

\bar{x}_i	f_i	$\bar{x}_i f_i$	$\bar{x}_i - \bar{x}$	$f_i(\bar{x}_i - \bar{x})^1$	\bar{x}^2	\bar{x}^3	\bar{x}^4
1	1	01	-4	-4	16	-64	256
3	4	12	-2	-8	16	-32	64
5	6	30	0	0	0	0	0
7	4	28	2	8	16	32	64
9	1	09	9	4	16	64	256
		<u>80</u>		<u>0</u>	<u>64</u>	<u>0</u>	<u>640</u>

$$\bar{x} = \bar{x}_i f_i / f_i = 00 / 16 = 5$$

$$\begin{cases} \beta_2 = \frac{m_4}{m_2^2} = \frac{40}{16} = 2.5 \\ \beta_1 = \pm \sqrt{\beta_1} \\ 640 / 16 = 40 \end{cases}$$

$$\beta_1 = \frac{m_3^2}{m_2^3} = 0$$

$$\boxed{\beta_1 = 0}$$

D = 25

$$\begin{array}{l|l|l} \sum n = 125 & \sum n^2 = 650 & \sum xy = 588 \\ \sum y = 100 & \sum y^2 = 460 & \end{array}$$

<u>Figure</u>	x	y	<u>Figure</u>	x	y
	6	14		8	12
	8	6		6	8

Ch. 10. Comparing Values

$$n = 125 - (6+8) \cdot 2 + (8+6) = 125$$

$$y = 100 - (14+8) + (12+0) = 100$$

$$n^2 = 650 - (6^2 + 8^2) + (8^2 + 6^2) = 650$$

$$r^2 = 460 - (14^2 + 6^2) + (12^2 + 8^2) = 436$$

$$xy = 508 - (14 \times 6 + 8 \times 6) + (14 \times 8 + 8 \times 6) = 520$$

$$g(\text{may}) = n \sum my - \sum m \sum y$$

$$\sqrt{n \sum n^2 - (\sum n)^2} = \sqrt{n \sum y^2 - (\sum y)^2}$$

$$= \frac{(25)(520) - (125)(100)}{(25)(650) - (125)^2} \sqrt{(25)(436) - (100)^2} = 0.66$$

x	y	R(x)	R(y)	$(R(x) - R(y))^2 = d_i^2$
1	12	12	12	0
2	9	11	9	4
3	6	10	6	16
4	10	9	10	1
5	3	8	3	25
6	5	7	5	4
7	4	6	4	4
8	7	5	7	4
9	8	4	8	16
10	2	3	2	1
11	11	2	11	81
12	1	1	1	1
				$\frac{1}{157}$

Ques-6

Date / /

Page No.

Lamique

M	S	MS	M^2	S^2
25	00	200	625	64
30	10	300	900	100
32	15	480	1024	225
35	17	595	1225	289
37	20	740	1369	400
40	23	920	1600	529
42	24	1008	1764	576
45	25	1125	2025	625

$$\overline{206} \quad \overline{\cancel{5368}} \quad \overline{10532} \quad \overline{2008}$$

$$n \sum xy - \sum x \sum y$$

$$\sqrt{n \sum x^2 - (\sum x)^2} \quad \sqrt{n \sum y^2 - (\sum y)^2}$$

$$(8)(5368) - (206)(\cancel{5368})(142)$$

$$\sqrt{(8)(10532) - (206)^2} \quad \sqrt{(8)(2008) - (134)^2}$$

$$42944 - 30324$$

$$\sqrt{84256 - 01796} \quad \sqrt{22464 - 17956} \quad \frac{4620}{4908 \times 6}$$

$$d = 0.9804$$

$$= \underline{-30}$$

Ucp7

Variance of $\sigma = 9 \rightarrow \sigma^2 = 9$

$$\sum n - 10y + 66 = 0$$

$$40n - 10y = 214$$

Date _____

Page No. _____

$\sigma = 3$

Unique

Q1:

$$\textcircled{a} \quad \begin{aligned} \sum n - 10\bar{y} &= -66 & \bar{y} &= 13 \\ 40n - 10\bar{y} &= 214 & \bar{y} &= 17 \end{aligned} \quad] \text{ Mean}$$

$$\text{Let } y \text{ on } n = \sum n - 10y + 66 = 0$$

$$y = \frac{\sum n + 66}{10} = 0.8n + 6.6$$

$$\boxed{by_n = 0.8}$$

$$\sigma_{on} y = 0 \quad \cancel{40} \quad \frac{214 + 10y}{40} \rightarrow 0.45y + 5.35$$

$$\boxed{by_n = 0.45}$$

$$\text{Coeff. Co-relation} = \rho^2 = \sqrt{by_n \cdot by_n}$$

$$\rightarrow \sqrt{0.45 \times 0.8} = \underline{\underline{0.6}}$$

$$\sigma_y = ? \quad by_n = \sigma \bar{y}$$

$$\bar{y} = \frac{\sigma \bar{n} \cdot by_n}{\sigma n} \rightarrow \frac{0.8 \times 3}{0.6} = \underline{\underline{4}}$$

x	y	x^2	xy
6	40	2116	1040
2	38	1764	1596
4	36	1936	1504
5	35	1600	1400
3	39	1049	1677
7	16.81	1517	
41	2025	1045	
266	12971	11459	

$$by_n = \frac{n \sum xy - \sum n \sum y}{n \sum n^2 - (\sum n)^2}$$

$$= \frac{7 \times 11459 - 301 \times 266}{7(312971) - (301)^2}$$

$$= 0.75$$

$$\boxed{by_n = 0.75}$$

$$by_n(m - \bar{m}) = by_m(y - \bar{y})$$

$$y = \frac{n \sum xy - \sum x \sum y}{n \sum m^2 - (\sum m)^2}$$

$$\bar{m} = \frac{\sum m}{n} = \frac{310}{4} = 77.5 \quad \bar{y} = \frac{\sum y}{n} = \frac{264}{4} = 66$$

$$= 43$$

$$y - \bar{y} = 0.75(m - \bar{m}) \\ y - 66 = 0.75(m - 77.5)$$

$$y - 66 = 0.75m - 56.25 \\ y = 0.75m - 32 + 2.25$$

$$y = 0.75m - 32 + 2.25 + 30 \\ y = 0.75m + 5.75$$

$$for \quad m = 34 \\ y = (0.75)(34) + 5.75$$

$$y = 33.5$$

$$Ques-9 \quad \sum m = 510, \quad \sum y = 7140, \quad \sum m^2 = 4150, \quad \sum my = 54900, \quad \sum y^2 = 740200$$

$$\bar{m} = \frac{\sum m}{n} = \frac{510}{102} \Rightarrow \bar{m} = 5 \quad \bar{y} = \frac{\sum y}{n} = \frac{7140}{102} = 69.9$$

$$(y - \bar{y}) by_n = b y_n(m - \bar{m})$$

$$(y - \bar{y})(y - \bar{y}) =$$

$$by_n = \frac{n \sum my - \sum m \sum y}{n \sum m^2 - (\sum m)^2} \rightarrow$$

$$(102)(54900) - (510)(7140) \rightarrow 195040 \\ (102)(4150) - (510)^2 \rightarrow 163060$$

$$(102)(54900) - (510)(7140) \rightarrow 195040 \\ (102)(4150) - (510)^2 \rightarrow 163060$$

$$1950400 \rightarrow 6163060 \\ 24520600 \rightarrow 6163060$$

$$(m - \bar{m})^2 by_n (y - \bar{y}) \\ (m - \bar{m}) = 0.641(3 - 7.5) \\ m = 0.0794 - 0.51$$

$$y = 12m + 10 \\ y = 12 \times 7 + 10 = 82$$

	x	y	m^2	m
120	0	0	14400	
360	0	0	129600	
60	0	0	3600	
180	0	0	32400	
120	0	0	14400	
120	102400	6400	1630400	
1120	9600	6400	1254400	
1120	89600	6400	1254400	
760	60000	6400	60000	
5000	734400	25600		

$$y_m = \frac{n \sum my - \sum m \sum y}{n \sum m^2 - (\sum m)^2} =$$

$$0)(842400) - (400)(80000) \rightarrow 339200$$

$$\bar{x} = \frac{\sum x}{n} = \frac{320}{8} = 40$$

Date / /
Page No.
Unique

$$\bar{y} = \frac{\sum y}{n} = \frac{5000}{8} = 625$$

$$by \text{ } \bar{x} = \frac{1139200}{102400} = \underline{11.125}$$

$$(y - \bar{y}) = b_{xy} (x - \bar{x})$$

$$y - 625 = \frac{b_{xy}}{11.125} (x - 40)$$

$$\rightarrow y = 11.125 x + 180$$

If $x = 60$

$$y = (11.125)(60) + 180$$

$$y = \underline{847.5}$$

$$y = 5 + 2.8x$$

$$x = 3 - 0.5y$$

$$2.8x - y + 5 = 0$$
 ~~$x = 5$~~ $x + 0.5y - 3 = 0$

1s: NO; by x (+ve) Slope
by y (-ve) Slope

$$y = 2.8x + 5$$

$$x = -0.5y + 3$$

$$\text{by } x = +\text{ve}$$

$$\text{by } y = -\text{ve}$$

x	y	xy	x^2	y^2
10	12	600	2500	144
10	15	1050	4900	225
10	21	2100	10000	441
20	25	3000	14400	625
		<u>5005</u>	<u>31800</u>	<u>1465</u>
		<u>6750</u>		<u>6750</u>

$$\bar{xy} = \frac{n \sum xy - \sum x \sum y}{n \sum y^2 - (\sum y)^2} \rightarrow \frac{(4)(5005) - (340)(73)}{(1465)^4 - (73)^2}$$

$$\rightarrow \frac{23220 - 04080}{5060 - 5329} \rightarrow \frac{-1600}{531} \rightarrow -3.01$$

$$\bar{x} - \bar{y} = b_{xy} (y - \bar{y})$$

$$\bar{x} = \frac{\sum x}{n} \rightarrow \frac{340}{4} \quad \bar{y} = \frac{\sum y}{n} \rightarrow \frac{73}{4} = 18.25$$

$$= 0.5$$

$$(x - 0.5) = -3.01(y - 18.25)$$

$$x = -3.01y + 54.93 + 0.5$$

$$x = -3.01(150) + 139.9$$

Q-12

Date / /
Page No. _____

$$\bar{Y} = \frac{\sum f_i m_i}{n} = \frac{73}{4} = 18.2$$
$$\bar{x} = \frac{\sum x_i | n}{n} = \frac{340}{4} = 85$$

$$b_{ny} = \frac{4(6750) - 340 \times 73}{4 \times 31000 - 115600}$$

$$b_{ny} = \frac{2100}{11600} = 0.1879$$

$$x - \bar{x} = b_{ny}(y - \bar{y})$$

$$x - 18.25 = 0.1879(y - 85)$$

$$x = 0.1875 y + 2.2785$$

$$\text{when } y = 150$$

$$x = 30.463$$

$$(26.01 - p) 10.8 = (20 - d)$$

$$20 + EP + P^2 + p 10.8 = 26.01$$

$$P^2 + (0.29) 10.8 = 2.10$$

13

	x	y	
Mean	47.5	39.5	Regression eqn?
SD	16.8	10.8	$m = 3$ $y = ?$

$$\text{b}_{xy} = \frac{\sigma_y}{\sigma_x} = 0.95 \times 39.5 \rightarrow 0.79$$

$$\text{b}_{yx} = \frac{\sigma_x}{\sigma_y} \rightarrow 0.95 \times 47.5 \rightarrow 1.14$$

$$= \frac{\sigma_y - (0.95 \times 10.8)}{16.8} = 0.61$$

$$y = \frac{\sigma_y}{10.8} \rightarrow 0.95 \times 16.8 = 1.47$$

$$y - \bar{y} = b_{xy} (x - \bar{x})$$

$$y - 29.5 = 0.61 (x - 47.5)$$

$$y = 0.61 x + 0.52$$

$$\text{At } x = 30 \rightarrow y = 18.83$$

$$y = (0.61)(30) + 0.52 = 18.83$$

$$(x - \bar{x}) = b_{xy} (y - \bar{y})$$

$$x - 47.5 = 1.47 (y - 29.5)$$

$$x = 1.47 y - 4.135$$

$$14 \quad P = 4/10 = 0.4 = 21/100 = 21\%$$

$$Q = 1 - 0.4 = 0.6 (R^2 = 0.81) = 69\%$$

$$= n C_2 P^2 Q^{n-2}$$

$$0) \quad 3C_0 (0.4)^0 (0.6)^3 = 1 \times 1 \times 0.216 = 0.216$$

$$1) \quad 3C_1 (0.4)^1 (0.6)^2 = 0.4321$$

$$2) \quad 3C_2 (0.4)^2 (0.6)^1 = 0.288$$

$$3) \quad 3C_3 (0.4)^3 (0.6)^0 = 1.092$$

$$P = 114 \quad | \quad q = 3/4 = 0.75 \\ = 0.25$$

Date / /
Page No.
Unique

Q-15

$$P(n=4) = 6C_4 (0.25)^4 (0.75)^2$$

~~6C4~~

$$15 \times 0.0031 \times 0.5675 \\ = \underline{0.033}$$

$$P(n \geq 1) = 1 - P(n=0) \\ = 6C_0 (0.25)^0 (0.75)^1 \\ = 1 \times 1 \times 0.75 \\ = \underline{0.75}$$

Q-16

$$P = 0.1, q = 0.9$$

$$P(n=4) = 6C_4 (0.1)^4 (0.9)^2 \\ 15 \times 0.0001 \times 0.81 \\ = \underline{0.001215}$$

Ques-19

$$P: \text{Prob of error on 1 page} = \frac{40}{600}$$

$$n = 10$$

$$\lambda = NP$$

$$\lambda = 10 \times 1/15 = 0.67$$

$$PD = P(n=4) = \frac{e^{-0.67} (0.67)^4}{4!}$$

Q-20

$$x | 20 \times 1 \times 11 = 2 (0.3)^2 (4) = 0.38$$

$$f | 122 + 260 - 15(0.2)^2 (10.0), \Sigma = 4$$

$$mf | 0.8 \times 260 - 30(0.2)^2 (4.0), \Sigma = 3$$

$$sp | -^2 (0.0) ^2 (4.0) = 0.8$$

$$\text{mean} = \lambda = \frac{\sum f_i x_i}{\sum f_i} = \frac{300}{400} = 0.75$$

Date _____
Page No. _____

Unique

$$(2) = \frac{e^{-1} 1^0}{0!} = \frac{e^{-0.75} (0.75)^0}{0!}$$

Theoretical $\Rightarrow N P(3)$

$$(N)(e^{-1}) 1^2 \frac{400 \times e^{-0.75} \times 0.75^2}{2!}$$

$$0; 100.94 (0.75)^0 = 100.94$$

$$1; 100.94 \times \frac{(0.75)^1}{1!} = 141.70$$

$$2; 100.94 \times \frac{(0.75)^2}{2!} = 53.13$$

$$3; 100.94 \times \frac{(0.75)^3}{3!} = 13.20$$

$$4; 100.94 \times \frac{(0.75)^4}{4!} = 2.410$$

$$P(X \geq 0) = 1 - \sum_{k=0}^{2} 400. \text{ approx}$$

$$2) N = 729; n = 6 - (1) + (0) = 1$$

$$P = \text{getting } 2 \text{ or } 3 \text{ or } 2/6 = 1/3$$

$$q = \text{Not getting} = 1 - 1/3 = 2/3$$

$$n = 2) = {}^n C_2 * p^2 q^{n-2}$$

$$3) \Rightarrow P(3) + P(4) + P(5) + P(6)$$

$$\frac{1}{3^6} [20 \times 8 + 15 \times 4 + 6 \times 2 + 1]$$

$$\approx \underline{233}$$

Ans

$$\text{Mean} = \bar{x} = \frac{180}{60} = 3$$

Date / /
Page No.

四月廿二日晴天

二

$$P(\text{m}>5) = 1 - P(\text{m}\leq 5)$$

D
g
N
v
J
N
o
w
-
w
-
b
w
-
w
-
p
b
b
+
w
w
o
v
w
+

Academy of the Holy Angels: High School

1000 data points for this ratio

0.91

$$18.0 = 16.0 - 1$$

13-50

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$$NP(A) = S$$

$$P(S \vee T) = 1$$

$$P(0) + P(1) + P(2) + \dots$$

(o) 1250 e 5

10

19 D.O.B. 3-26

$b(1) \neq b(2)$

三

$$1 - [0.6143] = 0.3857$$

$$P(M > 5) = 0.3057 = 30.57\%$$

Hence vehicle should be provided.

Queso - 3 300 g. 300 g. 300 g. 300 g.

η_1	η_0	η_{10}	η_{11}	η_{12}	η_{13}	η_{14}
10.5	1	12.5	-120.1	-20.1	404.01	-8120.60
17.5	4	70	-15.1	-60.4	912.04	-13771.8
22.5	8	180	-10.1	-86.8	816.08	-2520.3
27.5	19	522.5	-5.1	-96.8	494.19	-60035
32.5	35	1137.5	-0.1	-3.5	0.35	2352.90
37.5	20	750	4.0	9.8	400.2	619.20093
42.5	7	297.5	9.0	69.3	686.07	8242.4
47.5	5	287.5	14.0	74.5	111.0.05	1653174.246442.20
52.5	1	52.5	19.0	19.0	396.01	900000.15684392
$\sum = 0$		$\sum = 5277$	$\eta_{14} =$			

$$\beta_2 = \frac{w_1}{w_2} = \frac{9493.1797}{(52.99)^2}$$

$$\therefore \beta_2 = 3.880 \text{ m/m}$$

$$\gamma_2 = \beta_2 - g = 0.38 \text{ (we)}$$

$\gamma_2 = r_2 \gamma (0.38)$ (depth of center)

Q-23

Z = 1

8-6-19

Date / /

Page No.

Unique
Recd.

cond	good	bad	Total
Rich	85	75	160
Poor	165	175	340
Total	250	250	500

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i} \rightarrow (8550)$$

$$= \frac{25}{80} + \frac{25}{80} + \frac{25}{170} + \frac{25}{170} = 0.9192$$

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

$\chi^2_{\text{Tabulated}} \approx 3.841$ at df = 1 & 5% level

$\chi^2_{\text{Calculated}}$ \rightarrow $\chi^2_{\text{Calculated}}$

3.041

0.919

at level 5% & N = 102

~~Rejected~~

Accepted,

$$2P \cdot 11 = 5$$

Rejected \rightarrow Accepted

prob to reject \rightarrow 0.108

$$P = 1/\omega = 2 \quad n = 5$$

(20)

O _i	E _i	(O _i - E _i) ² / E _i
10	10	0.4
5	5.2	0.72
11	10	1
0	1.8	1.8
4	5.2	2
8	10	0.4
<u>30</u>	<u>34.0</u>	<u>11.96</u>

$$df = V = 6 - 1 = 5$$

$$P(n) = 0.4^5 (1 - 0.4)^{10} \times N = 10^{-10}$$

$$P(n=1) = 50 \dots$$

$$P(n=2) = 100 \dots$$

$$P(n=3) = 100$$

$$P(n=4) = 50 \dots$$

$$P(n=5) = 10$$

$$\chi^2 = 11.96$$

$\chi^2_{\text{calculated}} > \chi^2_{\text{tabulated}}$.

So Reject binomial freq.

Ques-25

Date / /
Page No. _____ Unique

$$\text{Ratio} = 62 : 4 : 34$$

$$\text{Total} = 200 \text{ Tonsp.}$$

$$\text{NaCl} = \frac{62}{100} \times 200 = 124$$

$$\text{Mg} = \frac{4}{100} \times 200 = 8$$

$$\text{Others} = \frac{34}{100} \times 200 = 68$$

$$\frac{36}{124} + \frac{4}{8} + \frac{16}{68} = 1.025$$

$$Df = V = 3 - 1 = 2$$

χ^2_{calc} < χ^2_{Tabular}

Accepted