

NAME :- ADIL MUHAMMAD.

SUBJECT :- STATISTIC.

ID 13659.

BS MLT.

SEMESTER 6TH.

SUBMITTED TO SIR SHAMIM.

Q1 :-

Part A

Page 1.

$$\Rightarrow \text{lets } U = x - n/2 \quad \Rightarrow U = x - 7.$$

$$V = y - n/2 \quad \Rightarrow V = y - 19.$$

| x | y | U | V | U ² | V ² | UV |
|----|-----|----|-----|----------------|----------------|------|
| 3 | 25 | -4 | 6 | 16 | 36 | -24 |
| 4 | 24 | -3 | 5 | 9 | 25 | -15 |
| 5 | 20 | -2 | 1 | 4 | 1 | -2 |
| 6 | 20 | -1 | 1 | 1 | 1 | -1 |
| 7 | 19 | 0 | 0 | 0 | 0 | 0 |
| 8 | 17 | 1 | -2 | 1 | 4 | -2 |
| 9 | 16 | 2 | -3 | 4 | 9 | -6 |
| 10 | 13 | 3 | -6 | 9 | 36 | -18 |
| 11 | 10 | 4 | -9 | 16 | 81 | -36 |
| 13 | 8 | 6 | -11 | 36 | 121 | -66 |
| 76 | 172 | 6 | -18 | 96 | 314 | -170 |

-> Formula
= Finding r

Now :-

$$r = \frac{\sum UV - (\sum U)(\sum V)/n}{\sqrt{[\sum U^2 - (\frac{\sum U}{n})^2][\sum V^2 - (\frac{\sum V}{n})^2]}}$$

Putting the value of table in formula.

$$r = \frac{-170 - 6x - 8}{10}$$

$$\sqrt{\left[96 - \frac{96}{10}\right] \left[314 - \frac{314}{10}\right]}$$

$$r = \frac{-1700 + 108}{10}$$

$$\sqrt{\left[\frac{960 - 96}{10}\right] \left[\frac{3140 - 314}{10}\right]}$$

$$r = \frac{-1592}{10}$$

$$\sqrt{\left[\frac{864}{10}\right] \left[\frac{2826}{10}\right]}$$

$$r = \frac{-1592}{10}$$

$$\sqrt{\frac{2441664}{100}}$$

$$r = \frac{-1592}{10} = \frac{1592 \times 10}{1562.58}$$

Answer Q1. Part A.

$$r = \frac{-15,920}{15625.8} = 1.01 \text{ Ans}$$

| X | Y | xy | x ² | y ² |
|-----|-----|------|----------------|----------------|
| 20 | 5 | 100 | 400 | 25 |
| 11 | 15 | 165 | 121 | 225 |
| 15 | 14 | 210 | 225 | 196 |
| 10 | 17 | 170 | 100 | 289 |
| 17 | 8 | 136 | 289 | 64 |
| 18 | 9 | 162 | 324 | 81 |
| 21 | 12 | 252 | 441 | 144 |
| 25 | 16 | 400 | 625 | 256 |
| 28 | 18 | 504 | 784 | 324 |
| 165 | 114 | 2269 | 3309 | 1604 |

The Regression equation of y on x is

$$y = a + bx$$

$$\Rightarrow b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2}$$
$$= \frac{9(2269) - (165)(114)}{9(3309) - (165)^2}$$

$$\Rightarrow b = \frac{20421 - 18810}{29781 - 27225} = \frac{1611}{2556}$$

$$\Rightarrow \boxed{b = 0.63} \rightarrow A$$

$$a = \frac{\sum y}{n} - b \left(\frac{\sum x}{n} \right)$$

$$a = \frac{114}{9} - 0.63 \left(\frac{165}{9} \right)$$

$$a = 12.66 - 0.63(18.33)$$

$$a = 12.66 - 11.55$$

$$a = 1.11$$

∴ Thus Regression $\sum v$ x on y

$$x = a + b \cdot y$$

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

$$b = \frac{9(2269) - (165)(114)}{9(1604) - (114)^2}$$

$$b = \frac{20421 - 18810}{14436 - 12396}$$

$$b = \frac{1611}{1440} \quad \boxed{b = 1.12} \rightarrow B$$

Thus calculate Regression

n of x on y

$$\hat{x} = a + by$$

$$\hat{x} = 4.15 + 1.12 y$$

$$x = 5.27 \text{ pasta}$$

1 part B

Q1

(Part B)

B part.

$$\bar{x} = \frac{\sum x}{n} = \frac{165}{9} = 18.33$$

$$\bar{y} = \frac{\sum y}{n} = \frac{114}{9} = 12.66$$

$$b = 12.66 - 0.0316 \times 18.33$$

$$a = 12.66 - 0.579$$

$$a = 12.081$$

The estimation regression

$$\bar{y} = a + bx$$

$$\bar{y} = 12.8 + 0.0316x$$

prediction of \bar{y} when $x = 20 + 11 + 15 + 35 + 28 + 18$

$$\text{of } x \quad 12.81 + 0.0316(121)$$

$$\bar{y} = 12.081 + 3.8238$$

$$\bar{y} = 15.9048$$

Q NO 2 B part (B)

page 6

predicated values of y for $x = 20, 11, 15, 25, 28$

$$\hat{y} = a + bx$$

$$= 1.11 + 0.63(20) \quad x = 20$$

$$\hat{y} = 1.11 + 12.6$$

$$\boxed{\hat{y} = 13.71} \rightarrow \textcircled{i}$$

$$\hat{y}^A = 1.11 + 0.63(21)$$
$$\boxed{\hat{y} = 10.56} \rightarrow \textcircled{ii}$$

$$\hat{y}^A = 1.11 + 0.63(15)$$

$$\boxed{\hat{y} = 10.56} \rightarrow \textcircled{iii}$$

$$\hat{y}^A = 1.11 + 0.63(25)$$

$$\boxed{\hat{y} = 16.86} \rightarrow \textcircled{iv}$$

$$\hat{y}^A = 1.11 + 0.63(28)$$

$$\boxed{\hat{y} = 18.75} \rightarrow \textcircled{v}$$

predicated value of x for y

$$y = 5, 15, 9, 12, 16, 18$$

$$\bar{x} = 4 \cdot 15 + 1 \cdot 12 (5)$$

$$\boxed{\bar{x} = 9.75} \rightarrow \textcircled{i} \quad y = 5$$

$$\bar{x} = 4 \cdot 15 + 1 \cdot 12 (15) \quad y = 15$$

$$\boxed{\bar{x} = 20.95} \rightarrow \textcircled{ii}$$

$$\bar{x} = 4 \cdot 15 + 1 \cdot 12 (9) \quad y = 15$$

$$\boxed{\bar{x} = 17.59} \rightarrow \textcircled{iii}$$

$$\bar{x} = 4 \cdot 15 + 1 \cdot 12 (12) \quad y = 9$$

$$\boxed{\bar{x} = 17.59} \rightarrow \textcircled{iv}$$

$$\bar{x} = 4 \cdot 15 + 1 \cdot 12 (16) \quad y = 12$$

$$\boxed{\bar{x} = 22.09} \rightarrow \textcircled{v}$$

$$\bar{x} = 4 \cdot 15 + 1 \cdot 12 (18) \quad y = 16$$

$$\boxed{\bar{x} = 24.31}$$

QNO 2 part A

$$n = 5$$

Let x denote number of heads

$$x = 0, 1, 2, 3, 4, 5$$

$$P(x=x) = C_x^n p^x q^{n-x}$$

$$p = 2/3, q = 1-p$$

$$q = 1 - 2/3$$

$$q = 1/3 - 2/3$$

$$q = \frac{3-2}{3} = 1/3$$

$$q = 1/3$$

$$P(x=0) = C_0^5 \times \left(\frac{2}{3}\right)^0 \left(\frac{1}{3}\right)^{5-0}$$

$$P(x=0) = 1/32$$

Ans.

~~x~~ p

$$P(X=1) = {}^5C_1 \left(\frac{2}{3}\right)^1 \left(\frac{1}{3}\right)^{5-1} \quad (9) \quad \textcircled{9}$$

$$= {}^5C_1 \left(\frac{2}{3}\right) \left(\frac{1}{3}\right)^4$$

$$P(X=1) = \frac{5}{3^2}$$

$$P(X=2) = {}^5C_2 \left(\frac{2}{3}\right)^2 \left(\frac{1}{3}\right)^{5-2}$$

$$= \left(\frac{5!}{2!}\right) \left(\frac{2}{3}\right)^2 \left(\frac{1}{3}\right)^3$$

$$P(X=2) = \frac{10}{3^2}$$

$$P(X=3) = {}^5C_3 \left(\frac{2}{3}\right)^3 \left(\frac{1}{3}\right)^{5-3}$$

$$= \left(\frac{5!}{3!}\right) \left(\frac{2}{3}\right)^3 \left(\frac{1}{3}\right)^2$$

$$P(X=3) = \frac{10}{3}$$

$$P(X=4) = \left(\frac{5!}{4!}\right) \left(\frac{2}{3}\right)^4 \left(\frac{1}{3}\right)^{5-4}$$

$$= \left(\frac{5!}{4!}\right) \left(\frac{2}{3}\right)^4 \left(\frac{1}{3}\right)^1$$

$$P(X=4) = \frac{5}{3^2}$$

$$P(X=5) = \binom{5}{5} \left(\frac{2}{3}\right)^5 \left(\frac{1}{3}\right)^{5-5}$$
$$= \binom{5}{5} \left(\frac{2}{3}\right)^5 \left(\frac{1}{3}\right)^0$$

10



$$P(X=5) = \frac{1}{32}$$

Hence : probability of various heads

| | | | | | | |
|------|----------------|----------------|-----------------|-----------------|----------------|----------------|
| X | 0 | 1 | 2 | 3 | 4 | 5 |
| P(X) | $\frac{1}{32}$ | $\frac{5}{32}$ | $\frac{10}{32}$ | $\frac{10}{32}$ | $\frac{5}{32}$ | $\frac{1}{32}$ |

Ans

Q3:-

Part A.

Page 1.

| | | | | | | | | | |
|---|---|---|---|---|---|---|----|----|---|
| 2 | 6 | 1 | 5 | 4 | 3 | 3 | 8 | 10 | 1 |
| 4 | 3 | 3 | 0 | 5 | 2 | 1 | 11 | 10 | 3 |
| 5 | 3 | 3 | 6 | 3 | 3 | 2 | 2 | 7 | 4 |
| 1 | 4 | 1 | 4 | 4 | 4 | 6 | 8 | 10 | 7 |
| 7 | 5 | 0 | 5 | 1 | 2 | 3 | 19 | 27 | 2 |

Uncomplet frequency distribution.

| No | Tollymarks | frequency | contitue frequency. |
|----|------------|-----------|---------------------|
| 0 | 1 | 1 | 1 |
| 1 | | 4 | 5 |
| 2 | | 8 | 13 |
| 3 | 1 | 11 | 24 |
| 4 | | 8 | 32 |
| 5 | | 5 | 37 |
| 6 | | 4 | 41 |
| 7 | | 3 | 44 |
| 8 | | 2 | 46 |
| 9 | | 1 | 47 |
| 10 | | 3 | 50 |

Give information of children of 70 women.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|----|---|
| 2 | 6 | 1 | 5 | 4 | 3 | 3 | 8 | 10 | 1 |
| 4 | 3 | 3 | 0 | 5 | 2 | 1 | 4 | 10 | 3 |
| 5 | 3 | 3 | 6 | 3 | 3 | 2 | 2 | 7 | 4 |
| 1 | 4 | 2 | 4 | 4 | 4 | 6 | 8 | 10 | 7 |
| 7 | 5 | 6 | 5 | 3 | 2 | 3 | 9 | 2 | 2 |

Grouping frequency for given data.

$N = 50$ data.

$$N = 50 \quad X_0 = 1 \quad X_n = 10$$

$$\text{Range} = X_m - X_0$$

$$R = 10 - 1 \quad [9]$$

$$K = 1 + 3.3 \log N$$

$$= 1 + 3.3 \log(50)$$

$$1 + 3.3 (1.698)$$

$$= 1 + 5.6066$$

Q3

Part B

pg 3.

$$k = 6.606 = \boxed{6}$$

$$h = \text{class interval} = \frac{\text{Rang}}{k}$$

$$h = \frac{9}{7} = 1.285 = \boxed{2}$$

We find out the information from data.

$$N = 50 \quad R = 9, \quad k = 6, \quad h = 2.$$

| Class | Frequency | class boundary | Mainpoint. |
|-------|-----------|----------------|------------|
| 0-1 | 5 | 0.5 - 1.5 | |
| 2-3 | 19 | 1.5 - 3.5 | |
| 4-5 | 13 | 3.5 - 5.5 | |
| 6-7 | 7 | 5.5 - 7.5 | |
| 8-9 | 3 | 7.5 - 9.5 | |
| 10-11 | 3 | 10.5 - 11.5 | |

Total 50

Q3

Part B

Page 4.

| R. frequency | R. frequency | C.f. | R.c.f. |
|--------------|-------------------------|------|----------------|
| 5/50 | $5/50 \times 100 = 10$ | 5 | $5/50 = 0.1$ |
| 19/50 | $19/50 \times 100 = 38$ | 24 | $24/50 = 0.48$ |
| 13/50 | $13/50 \times 100 = 26$ | 37 | $37/50 = 0.74$ |
| 7/50 | $7/50 \times 100 = 14$ | 44 | $44/50 = 0.88$ |
| 3/50 | $3/50 \times 100 = 6$ | 47 | $47/50 = 0.94$ |
| 3/50 | $3/50 \times 100 = 6$ | 50 | $50/50 = 1.0$ |

Q3 End part B.