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Paper Bio Statistic

Submitted to
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Questions

Question No 3

(a) Un group:-

No of Children	No of women(F)	(C F)	Tally:-
0	1	1	I
1	4	5	IIII
2	8	13	~~IIII~~ III
3	11	24	~~IIII~~ ~~IIII~~ I
4	8	32	~~IIII~~
5	5	37	IIII
6	4	41	III
7	3	44	II
8	2	46	I
9	1	47	III
10	3	50	
Total	= 50		

B part

Group data

In this group we find out

1) frequency

2 C. freqvuancy.

3 boundries.

4) Class Mark

Solution:- finding Class interval

n= 50

x mini = 0

x max = 10

10 - 0 ÷ 5

10/5 = 2.

Class Interval = 2.

Classes	Enteirs	frequency	C. frequency	Class Boundries	Mid Mark
0 - 2	0, 1, 1, 1, 1, 2, 2, 2, 2 2, 2, 2, 2.	13	13	0.5 - 2.5	1
3 - 5	3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3 4, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5.	24	37	2.5 - 5.5	4
6 - 8	4, 4, 4, 4, 7, 7, 7, 8, 8	9	46	5.5 - 8.5	7
9 - 11	9, 10, 10, 10.	4	50	8.5 - 11.5	10
Total		50			

Pg 3

a) Question No 1

Calculate the Correlation b/w x & y.

x	3	4	5	6	7	8	9	10	11	13
y	25	24	20	20	19	17	16	13	10	8

Solution:-
Let us change the origin of x & y.

So Hence,
$u = x - 7$ & $v = y - 19$,

then
$$r_{xy} = r_{uv}$$

the calculation needed to find r are given below.

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

So Now,

We know that

$$r = \frac{\Sigma uv - (\Sigma u)(\Sigma v)/n}{\sqrt{\left[\Sigma u^2 - \frac{(\Sigma u)^2}{n}\right]\left[\Sigma v^2 - \frac{(\Sigma v)^2}{n}\right]}}$$

Putting the values.

$$r = \frac{-170 - \frac{(6)(-18)}{10}}{\sqrt{\left[96 - \frac{(6)^2}{10}\right]\left[314 - \frac{(-18)^2}{10}\right]}}$$

$$r = \frac{-170 + 108/10}{\sqrt{\left[96 - \frac{36}{10}\right]\left[314 - \frac{(324)}{10}\right]}}$$

$$r = \frac{-170 + 10.8}{\sqrt{(96 - 3.6)(314 - 32.4)}}$$

$$r = \frac{-159.2}{\sqrt{26019.84}}$$

$$r = \frac{-159.2}{161.30}$$

$\boxed{r = -0.98}$ Ans.

B part Given the following set of values.

x	20	11	15	10	17	18	21	25	28
Y	5	15	14	17	8	9	12	16	18

Part (a)

q) Determine the equation of least square regression.

Solution:-

The necessary calculation for determining the equation of least square regression line are given below.

x	y	x^2	y^2	xy
20	5	100	25	100
11	15	121	225	105
15	14	225	196	210
10	17	100	289	170
17	8	289	64	136
18	9	324	81	162
21	12	441	144	252
25	16	625	256	400
28	18	784	324	504.

The estimate linear regression line

Y on x is

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

Cont.... Q 1 part B (a).

where a and b are the least square estimate of the parameter α and β respectively & are given by

As we know that.

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

$$a = \bar{y} - b\bar{x}$$

Substituting the sum, we get

Putting value.

$$b = \frac{(9)(2099) - (165)(114)}{(9)(3309) - (27225)}$$

$$b = \frac{18891 - 18810}{29781 - 27225}$$

$b = 81/2556$

$b = 0.031.$

Hence we know that

$a = \bar{y} - b\bar{x}.$

putting values

$a = \frac{114}{9} \quad 0.031\ (165/9).$

$a = 12.66 - 0.568.$

$a = 12.09.$

$Y = \boxed{12.09 + 0.031}$

Answer

The estimate linear regression line
X on Y.

$x = a + b\bar{y}$

As we know that

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

putting the values.

$$b = \frac{(9)(2099) \div (165)(114)}{(9)\ (1604) - (114)^2}$$

$$b = \frac{18891 - 18810}{14436 - 12996}$$

$$b = 81/14410.$$

$$b = \boxed{0.056}$$

Heance

$$a = \bar{x}\ b\bar{y}$$

$$a = \frac{165}{9} - (0.056)(114/9)$$

$a = 18.33 - 0.709$

$a = \boxed{17.62}$ Answer

Part B:-

Solution:-

predicated value of

Y 20, 11, 15, 25, 28.

The predicated values of y are found by subtituted the value in the estimated equation.

Thus $x = \ldots$

As we know that.

$\bar{Y} = 12.09 + 0.031(20)$

$\bar{Y} = 12.09 + 0.62$

$\bar{Y}_1 = 12.71.$

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$\bar{Y} = 12.09 + 0.031(11)$

$\bar{Y} = 12.09 + 0.341$

$\bar{y}$ 12.43

$\bar{y} = 12.09 + 0.031(15).$

$\bar{y}$ 12.09 + 0.465

12.55.

$\bar{y} = 12.09 + 0.031(25)$

$\bar{y} = 12.09 + 0.775$

$\bar{y} = 12.86.$

$\bar{y} = 12.09 + 0.031(28)$

$\bar{y} = 12.09 + 0.86$

$\bar{y} = 12.95$

* predicated values.

X = 5, 15, 19, 12, 16, 18.

$\bar{x} = 17.62 + 0.056$

$\bar{x} = 17.62 + 0.28$

$\bar{x} = 17.9.$

~~$\bar{x}$ = 17.9.~~

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$\bar{x} = 17.62 + 0.056(15)$
$\bar{x} = 17.62 + 0.84.$
$\bar{x} = 18.46$

$\bar{x} = 17.62 + 0.056(9)$
$\bar{x} = 17.62 + 0.504$
$x = 18.124.$

$\bar{x} = 17.62 + 0.056(19)$
$\bar{x} = 17.62 + 0.50$
$\bar{x} = 18.1.$

Question :- 2

Part (a)

tossing of a Coin as an experiment we Know that

1) each toss of a coin has two possible outcomes (head & tails).

(ii) The mobality tosses of the Coin are independently.

(iii) The Successive tosses of the Coin are Independendent

(iv) The Coin is tossed 5 times

x denotes the number of the heads.

The possible value of x are 0, 1, 2, 3, 4, 5.

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Hence

$\Rightarrow$ $P = (\text{no head}) = P(x=0)$
$= (5/0)(1/2)(1/2) = 1(1/2)^2 = 1/32$

$\Rightarrow$ $P = (1 \text{ head}) = P(x=1) = (5/1)$
$(1/2)^2 (1/2)^{5-1} = 5 \times (1/2)^5 = 5/32$

$\Rightarrow$ $P = (2 \text{ head}) = P(x=2) = (5/2)$
$(1/2)^2 (1/2)^{5-2} = 10 \times (1/2)^5 = 10/32$

$\Rightarrow$ $P = (3 \text{ head}) = P(x=2) = (5/3)(1/2)^3 (1/2)^{5-3}$
$= 10 \times (1/2)^5 = 10/32$

$P = (4 \text{ head}) = P(x=2) (5/4)$
$(1/2)^4 (1/2)^{5-4} = 5 \times (1/2)^5 = 5/32$

$P = (5 \text{ head}) = (5/5)(1/2)^5 (1/2)^0$
$1 \times (1/2)^5 = 1/32.$

The ~~mobility~~ probability distribution for the number of heads obtained in 5 tosses of a fair coin is.

x	0	1	2	3	4	5
$f(x)$	$1/32$	$5/32$	$10/32$		$5/32$	$1/32$.

Question 2 Part B:-

There fore the bionomial probability distribution

$n = 10$

$p = 2/3$

$q = 1-p$

$q = 1-2/3$

x denote the number of won by A Then

(i) $P(x \geq 4) = 1 - P(x < 4)$

$$1 - \sum_{x=0}^{3} \binom{10}{x} (2/3)^{x} (1/3)^{9}$$

$$+ 45 (2/3)^2 (1/3)^8$$

$$+ 120 (2/3)^3 (1/3)^7]$$

$$1 - 1/59049 [1 + 20 + 180 + 960]$$

$$1 - 0.0197$$

$$\boxed{P(x > 4) = 0.9803}$$

(ii) $P(x = 4) = \binom{10}{4} (2/3)^4$

$(1/3)^6 = 210 (16/81) 1/789]$

$$\boxed{P(x = 4) = 6.056}$$

iii)

$P(x = 11) - f(0) =$ because

x take only value

0, 1, 2, 3, 4 ---- 10.

(iv) 6 or more games

$p(x=6) = \sum_{x=6} \binom{10}{n} \cdot (2/3)^n (1/3)^{10-n}$

$= \binom{10}{6} (2/3)^6 (1/3)^4 + \binom{10}{7} (2/3)^7 (1/3)^3 + \binom{10}{8} (2/3)^8 (1/3)^2 + \binom{10}{9} (2/3)^9 (1/3)^1 + \binom{10}{10} (2/3)^{10} (1/3)^0$

$= 0.228 + 0.261 + 0.196 + 0.087 + 0.018$

$\boxed{p(x \geq 6) = 0.79}$