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Date / /

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Program BS (IT)

Sem = 6th

Subm to
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Q No. 1.

A:

x	y	x^2	y^2	xy
3	25	9	625	75
4	24	16	576	96
5	20	25	400	100
6	20	36	400	120
7	19	49	361	133
8	17	64	289	136
9	16	81	256	144
10	13	100	169	130
11	10	121	100	110
12	8	144	64	96
75	72	645	3246	1140

$n = 10$, $\Sigma x = 75$, $\Sigma y = 172$, $\Sigma x^2 = 645$

$\Sigma y^2 = 3246$, $\Sigma xy = 1140$

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Substitutes to the Compiling formula for r given

$$r = \frac{\Sigma xy - \{(\Sigma x)(\Sigma y)\}/n}{\sqrt{\{\Sigma x^2 - (\Sigma x)^2/n\}\{\Sigma y^2 - (\Sigma y)^2/n\}}}$$

$$r = \frac{1140 - \{(75)(172)\}/10}{\sqrt{\{645 - (75)^2/10\}\{3246 - (172)^2/10\}}}$$

$$r = \frac{1140 - 1290}{\sqrt{\{645 - 5625/10\}\{3246 - 2958.4\}}}$$

$$= \frac{-150}{(82.5)(287.6)}$$

$$= \frac{150}{23727}$$

$$= -0.07$$

Ans.

B

Q, Determine the equation of the least square regression line of y on x and x on y

x	y	x^2	y^2	xy
20	5	400	25	100
11	15	121	225	165
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
165	124	3309	1604	2099

Regression line y on x

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

$$b = \frac{9(2099) - (165)(124)}{9(3309) - (165)^2}$$

$$b = \frac{18891 - 20460}{29781 - 27225}$$

P. T. O

$$b = -\frac{1569}{2556}$$

$$\boxed{b = -0.6}$$

$$a = \frac{\Sigma y - b \Sigma x}{n}$$

$$a = \frac{124 - (-0.6)(165)}{9}$$

$$\frac{124 - (-99)}{9}$$

$$\boxed{a = 24.7}$$

Hence the required regression line is given by

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

$$\boxed{\Rightarrow \hat{y} = 24.7 - 0.6x}$$

Regression line x on y

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

$$b = \frac{9(2099) - (165)(124)}{9(1604) - (124)^2}$$

$$b = \frac{18891 - 20460}{14436 - 15376}$$

$$b = \frac{-1569}{-940}$$

$$\boxed{b = 1.7}$$

$$a = \frac{\sum x - b\sum y}{n} = \frac{165 - (1.7)(124)}{9}$$

(b)

$$a = \frac{165 - 210.8}{9}$$

$$a = \frac{45.8}{9}$$

$$\boxed{a = -5.1}$$

Hence the required regression line is given by

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

$$\boxed{\hat{x} = -5.1 + 1.7y}$$

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(7)

B

Find the Predicted value of y for x = 20, 11, 15, 25, 28 and

x for y = 5, 15, 9, 12, 16, 18

$\hat{y} = 24.7 - 0.6x$

$\hat{x} = -5.1 + 1.7y$

x	y	$\hat{y} = 24.7 - 0.6x$	$\hat{x} = -5.1 + 1.7y$
20	5	12.7	3.4
11	15	18.1	20.4
15	9	15.7	10.2
25	12	9.7	15.2
28	16	7.9	15.3
	18		22.1
			25.5

this is the regression Predicted value

Q No 2 = A

A fair Coin is tossed 5 times. Find the Probability of obtaining various number of heads.

Ans:- $P(\text{no head}) = P(x=0) = \binom{5}{0}\left(\frac{1}{2}\right)^0 \left(\frac{1}{2}\right)^5 = 1 \times \left(\frac{1}{2}\right)^5 = \frac{1}{32}$

$P(1\ \text{head}) - P(x=1) = \binom{5}{1}\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)^{5-1}$

$= 5 \times \left(\frac{1}{2}\right)^5 = \frac{5}{32}$

$P(2\ \text{heads}) - P(x-2) - \binom{5}{2}\left(\frac{1}{2}\right)^2\left(\frac{1}{2}\right)^{5-2}$

$= 10 \times \left(\frac{1}{2}\right)^5 = \frac{10}{32}$

$P(3\ \text{heads}) = P(x=3) = \binom{5}{3}\left(\frac{1}{2}\right)^3\left(\frac{1}{2}\right)^{5-3}$

$= 10 \times \left(\frac{1}{2}\right)^5 = \frac{10}{32}$

$P(4\ \text{heads}) - P(x=4) = \binom{5}{4}\left(\frac{1}{2}\right)^4\left(\frac{1}{2}\right)^{5-4}$

$= 5 \times \left(\frac{1}{2}\right)^5 = \frac{5}{32}$ and

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

$= 1 \times \left(\frac{1}{2}\right)^5 = \frac{1}{32}$.

these Probabilities can also be obtained by expanding the binomial $(\frac{1}{2}+\frac{1}{2})^5$. the binomial P.d. for number of heads obtained in 5 tosses of fair Coin is.

x	0	1	2	3	4	5
$f(x)$	$\frac{1}{32}$	$\frac{5}{32}$	$\frac{10}{32}$	$\frac{10}{32}$	$\frac{5}{32}$	$\frac{1}{32}$

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Q2 = B

$P(x \geq 4) = ?$

$= 1 - P(x < 4)$

$= 1 - \left[\sum_{x/0} \binom{10}{x} \left(\frac{2}{3}\right)^{x} \left(\frac{1}{3}\right)^{8-x} \right]$

$= 1 - \left\{ \binom{10}{0} \left(\frac{2}{3}\right)^{0} \left(\frac{1}{3}\right)^{100} + \binom{10}{1} \frac{2}{3} \left(\frac{1}{3}\right)^{10-1} \right.$

$+ \binom{10}{2} \left(\frac{2}{3}\right)^{2} \left(\frac{1}{3}\right)^{10-2}$

$\left. + \binom{10}{3} \left(\frac{2}{3}\right)^{3} \left(\frac{1}{3}\right)^{10-3} \right]$

$= 1 - \left[10 \left(\frac{1}{3}\right)^{10} + 10 \left(\frac{2}{3}\right)\left(\frac{1}{3}\right)^{9} + 45 \left(\frac{2}{3}\right)^{2} \left(\frac{1}{3}\right)^{8} + 120 \left(\frac{2}{3}\right)^{3} \left(\frac{1}{3}\right)^{7} \right]$

$= 1 - \left[0.0002 + 0.0003 + 45 (0.44)(0.0002) + 120 (0.296)(0.0005) \right]$

$1 - \{ 0.0002 + 0.0003 + 0.004 + 0.017 \}$

$\boxed{0.0215}$

$P(x \geq 4) = 0.97$

(ii) $P(x = 4/10) = ?$

$P(x = 4/10) = \delta(4/10) = 0$: because

r.v x with a binomial distribution take only one of the integer values. $0, 1, 2, \ldots n$.

(iii) $P(x = 11) = ?$

$P(x = 11) = ?$

$P(x = 11) = \delta(6) = 0$ because x

can take only value $0, 1, 2, 3, \ldots$

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(iv)

$$P(x \geq 6) = ?$$

$$= \sum_{x=6}^{10} \binom{10}{x} \left(\frac{2}{3}\right)^{x} \left(\frac{1}{3}\right)^{10-x}$$

$$= \binom{10}{6}\left(\frac{2}{3}\right)^{6}\left(\frac{1}{3}\right)^{10-6} + \binom{10}{7}\left(\frac{2}{3}\right)^{7}\left(\frac{1}{3}\right)^{10-7} + \binom{10}{8}\left(\frac{2}{3}\right)^{8}\left(\frac{1}{3}\right)^{10-8}$$

$$+ \binom{10}{9}\left(\frac{2}{3}\right)^{9}\left(\frac{1}{3}\right)^{10-9} + \binom{10}{10}\left(\frac{2}{3}\right)^{10}\left(\frac{1}{3}\right)^{10-10}$$

$$= \Big\{ 210(0.087)(0.012) + 80(0.058)(0.037) + 45(0.039)(0.111) + 10(0.026)(0.333) + 1(0.017)\,1 \Big\}$$

$$\{ 0.21924 + 0.17168 + 0.195 + 0.08658 + 0.017 \}$$

$$P(x \geq 6) = 0.6728$$

this is the required solution of the probability.

Q No (3)

A)

Given information of children born to 50 woman

2	6	1	5	4	8	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

Grouped frequency distribution for given data.

$N = 50 \quad x_0 = 1 \quad x_m = 10$

$\text{Range} = x_m - x_0 =$

$R = 10 - 1 = \boxed{9}$

$K = 1 + 3.3 \log n$

$= 1 + 3.3 \log(50)$

$= 1 + 3.3\,(1.698)$

$= 1 + 5.6066$

$K = 6.606 = \boxed{6}$

$h = \text{class interval } \dfrac{\text{Range}}{K}$

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

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we find out the information from data.

N = 50 , R = 9 , k = 6 , h = 2

class	frequency	class boundary	mid point
0-1	5	-0.5 - 1.5	1
2-3	19	1.5 - 3.5	2.5
4-5	13	3.5 - 5.5	4.5
6-7	7	5.5 - 7.5	6.5
8-9	3	7.5 - 9.5	8.5
10-11	3	10.5 - 11.5	11
Total	50		

R. frequency	R. frequency %	c.f	R.C.f
5/50	5/50 × 100 = 10	5	5/50 = 0
19/50	19/50 × 100 = 38	24	24/50 = 0.
13/50	13/50 × 100 = 26	37	37/50 = 0
7/50	7/50 × 100 = 14	44	44/50 = 0
3/50	3/50 × 100 = 6	47	47/50 = 0
3/50	3/50 × 100 = 6	50	50/50 = 0

(B)

Give data

2	8	1	8	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	8	6	5	3	2	3	9	2	2

ungroped frequency distribution

No	Tally marks	frequency	complete frequen
0	I	1	1
1	IIII	4	5
2	~~IIII~~ III	8	13
3	~~IIII~~ ~~IIII~~ I	11	24
4	~~IIII~~ III	8	32
5	~~IIII~~	5	37
6	IIII	4	41
7	III	3	44
8	II	2	46
9	I	1	47
10	III	3	50