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S M T W T F S

Date:

Q No 1:-(b)

X	Y	xy	x^2	y^2
20	5	100	400	25
11	15	165	121	225
15	14	210	225	225
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	2099	3309	1604

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

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

$$b_{yx} = \frac{9 \times 2099 - 165 \times 114}{9 \times 3309 - (165)^2}$$

$$b_{yx} = \frac{81}{2556} = 0.0316$$

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

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

$$\bar{Y} = \frac{\Sigma Y}{n} = \frac{114}{9} = 12.66$$

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

$$a = 12.081$$

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

$\hat{y} = 12.081 + 0.0316x$

$x = a + by$

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

$$b_{xy} = \frac{9 \times 2099 - (165)(114)}{9 \times 1604 - (114)^2}$$

$$b_{xy} = \frac{81}{1440} = 0.05625$$

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

$a = 12.66 - 0.05625 \times 18.33$

$a = 11.62$

$x = a + by$

$x = 11.62 + 0.05625y$

$x = 20, 11\ 15, 25, 28, = 99$

$y = 5, 15, 9, 12, 16, 18, = 75$

x =	20	11	15	10	10	17	18	21	25	29
y =	5	15	14	14	17	8	9	12	16	18

y	x	xy	x^2
5	20	100	400
15	11	165	121
14	15	210	225
17	10	170	100
8	17	136	289
12	21	162	324
16	25	252	441
18	28	400	625
114	165	504	784
		2099	3309

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

$$(b) = \frac{9 \times 2099 - 165 \times 114}{9 \times 3309 - (165)^2}$$

$$b = \frac{81}{2556} = 0.0316$$

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

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

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

$$a = 12.66 - 0.579$$

$$a = 12.081$$

To estimated regerrsion model

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

$$\hat{y} = 12.08 + 0.0316x$$

Prediction of y when $x = 20 + 11 + 15 + 25 + 28 = 99$

$$\hat{y} = 12.081 + 0.0316\,(99)$$

$$\hat{y} = 12.081 + 3.128$$

$$\hat{y} = 15.209 \text{ A}$$

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Part (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
13	8	169	64	104
$\Sigma=76$	$\Sigma=172$	$\Sigma=670$	$\Sigma=3240$	$\Sigma=1148$

Formula for Correlation Coefficient

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

For $n = 10$

$$r = \frac{(10)(1148) - (76)(172)}{\sqrt{\{(10)(670) - (76)^2\}\{(10)(3240) - (172)^2\}}}$$

$$r = \frac{11480 - 13072}{\sqrt{(6700 - 5776)(32400 - 29584)}}$$

$$r = \frac{-1592}{\sqrt{(924)(2816)}}$$

$$r = \frac{-1592}{\sqrt{2601984}}$$

$$r = \frac{-1592}{1613.06}$$

$r = -0.98$

Ans.

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Q No:-3

Part (A)

Given Data:-

2	4	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

ungrouped frequancy distrubution.

No	Tally Mark	frequancy	comulative frequancy
0	|	1	1
1	||||	4	5
2	卌 卌	8	13
3	卌 卌 |	11	24
4	卌 |||	8	32
5	卌	5	37
6	||||	4	41
7	|||	3	44
8	||	2	46
9	|	1	47
10	|||	3	50

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Part (b)

Given frequancy of Children born to 50 women

2	6	1	5	4	3	3	8	10	1
4	3	3	0	5	7	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 frequancy distribution For given data.

$NO = 50 \qquad x_0 = 1 \qquad x_m\ 10$

$\text{Range} = x_m - x_0$

$R = 10 - 1 = 9$

$k = 1 + 3.3 \log N$

$= 1 + 3.3 \log(50)$

$= 1 + 3.3\ (1.698)$

$= 1 + 5.6066$

$k = 6.606 = 6$

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

$h = 9/7 = 1.285 = 2$

we find out The information from data.

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

Class	Frequancy	Classboundry	Midpoint
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

R-Frequancy	R-Frequancy o/o	C.f	R.Cf
5/50	5/50×100 = 10	5	5/50 = 0.1
19/50	19/50×100 = 38	24	24/50 = 0.48
13/50	13/50×100 = 26	37	37/50 = 0.74
7/50	7/50×100 = 14	44	44/50 = 0.88
3/50	3/50×100 = 6	47	47/50 = 0.94
3/50	3/50×100 = 6	50	50/50 = 1

Q.No2:- (A) A fair Coin is tossed 5 times. Find the Probabilities of obtaining various numbers of heads.

(B) A and B Play a game in which A,s Probability of winning is $2/3$. In ~~a~~ Series of 10 game what is the probability that will win (i) at least 4 games (ii) Exactly equal to 4/10 games (iii) Exactey equaels to 11 games (iv) 6 or more games

Ans:- (A) Let us regard tossing of a Coin as an experiment. Then we observe that

i) each toss of a Coin has two Possible outcomes, heads and tails

(ii) The probability of a head (success) is $p = \frac{1}{2}$ and remains the same for Successive tosses;

(iii) The Successive tosses of the Coin are independent; and

(iv) The Coin is tossed 5 times.

Therefore the r.v. X which denotes the number of head (Successes) has a binomial probability distribution with $p = \frac{1}{2}$ and $n = 5$, The possible value of X are 0, 1, 2, 3, 4 and 5.

Hence.

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$P(\text{no head}) = P(X=0) = \binom{5}{0}\left[\frac{1}{2}\right]^0\left[\frac{1}{2}\right]^5 =$

$1 \times \left[\frac{1}{2}\right]^5 = \frac{1}{32}$

$P(1\ \text{head}) = P(X=1) = \binom{5}{1}\left[\frac{1}{2}\right]^1\left[\frac{1}{2}\right]^{5-1} = 5 \times \left[\frac{1}{2}\right]^5$

$= \frac{5}{32}$

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

$= 10 \times \left[\frac{1}{2}\right]^5 = \frac{10}{32}$

$P(3\ \text{head}) = P(X=3)\ \binom{5}{3}\left[\frac{1}{2}\right]^3\left[\frac{1}{2}\right]^{5-3}$

$= 10 \times \left[\frac{1}{2}\right]^5 = \frac{10}{32}$

$P(4\ \text{head}) = P(X=4) = \binom{5}{4}\left[\frac{1}{2}\right]^4\left[\frac{1}{2}\right]^{5-4}$

$= 5 \times \left[\frac{1}{2}\right]^5 = \frac{5}{32}$, and

$P(5\ \text{head}) = \binom{5}{5}\left[\frac{1}{2}\right]^5\left(\frac{1}{2}\right)^0 = 1 \times \left[\frac{1}{2}\right]^5$

$= \frac{1}{32}$

These probabilities can also be obtained by expanding the binomial $\left[\frac{1}{2} + \frac{1}{2}\right]^5$. The binomial probability distribution for the number of heads obtained in 5 tosses of a fair coin is

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

(B)

we observe that

(a) There are two possible outcomes, i.e. A will win or will not win the game.

(b) The probability of A.s winning in each games is $p = 2/3$

(c) The successive game are independentely won or lost; and

(d) There are 10 games.

Therefore the Binomial probility distribution with $n = 10$ and $p = 2/3$ is appropriate

Let X denote the number of games won by A. Then

~~(i) $P(X=4) = \binom{10}{4} \left(\frac{2}{3}\right)^4 \left(\frac{1}{3}\right)^6 =$~~

There fore the binemial probility dixt with $n=10$

$p = 2/3$

$q = 1-p$

$q = 1-2/3$

$q = 1/3$

Let X denete the number of won by A then.

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

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

$= 1 - \{ (\frac{1}{3})^{10} + 10 (\frac{2}{3})^1 (\frac{1}{3})^9 + 45 (\frac{2}{3}) (\frac{1}{3})^8 + 120 (\frac{2}{3})^3 (\frac{1}{3})^9 \}$

$= 1 - \frac{1}{59049} \{ 1 + 20 + 130 + 960 \}$

$1 - 0.0197$

$P(x \geq 4) = 0.9803$

(ii) $P(x=4)\ \binom{10}{4} \left(\frac{2}{3}\right)^4 \left(\frac{1}{3}\right)^6$

$= 216 \left(\frac{16}{31}\right) \left(\frac{1}{729}\right)$

$= \frac{3360}{59049}$

$\boxed{P(x=4) = 0.056}$

(iii) $P(x=11) = 7(6) =$ beacuse x can take only value $0, 1, 2, 3 ---- 10$

(iv) 6 or more games

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

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

$= 0.228 + 0.261 + 0.196 + 0.037 + 0.013$

$\boxed{P(x \geq 6) = 0.723}$

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