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Subject Biostatictics -

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(1)

Q-1:. (a):.

Ans:- (a) calculate correlation.

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
Σx 76	$\Sigma y =$ 172	$\Sigma x = 670$	$\Sigma y^2 = 3240$	$\Sigma xy^2 = 1148$

$x = 14.$

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

$$r = \frac{14(1148) - (76)(172)}{\sqrt{[14(670) - (76)^2][14(3240) - (172)^2}}$$

(2)

$$r = \frac{3000}{\sqrt{(3604)(15776)}}$$

$$= \frac{3000}{7540}$$

$$\boxed{r = 0.39}$$

(3).

Q = 1 (b) Part

x	y	x^2	xy
20	5	400	100
11	15	121	165
15	14	225	210
10	17	100	170
17	8	289	136
18	9	324	162
21	12	441	252
25	16	625	400
28	18	784	504
$\Sigma x = 165$	$\Sigma y = 114$	$\Sigma x^2 = 3309$	$\Sigma xy = 2099$

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

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

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

$$b = \frac{18,891 - 18,810}{\sqrt{27,781 - (27,225)}}$$

(4):-

$$b = \frac{81}{\sqrt{556}} = \frac{81}{23}.$$

$$b = 3.52$$

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

$$= \frac{114}{9} - 3.52\left(\frac{165}{9}\right).$$

$$a = 12.66 - (3.52)(18.33.$$

$$a = -51.86.$$

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

$$= -51.86 + bx = -51.86 + 3.$$

$$x = 20,$$

$$y = -51.86 + 3.25 \times 20.$$

$$\hat{y} = 18.53$$

C_8 = ②·(a)

Ans:

(a) A Fair coin is tossed 5 times Find The probabilities of obtaining various Numbers of Head.

Lets us regard The tossing of a coin as an experiments then we observed That,

1): Each toss of coin his two possible outcomes, Head and tail.

2): The probabilities of a Head (success) is $p = 1/2$ and remain The same For successive tossess.

(3): The successive tossess of The coin are independent

(4): The coin is tossed 5 times

There fore The r-v x which denotes The Number of Heads (successes) has a binomial probabilities distribution with $p = 1/2$ and $n = 5$ The possible value of x are 0, 1, 2, 3, 4, and 5 hense.

(6).-

$P(\text{no head}) = p(x=0) = \begin{bmatrix} 5 \\ 0 \end{bmatrix} \left[\frac{1}{2}\right]^{0} \left[\frac{1}{2}\right]^{5} = 1 \times \left[\frac{1}{2}\right]^{5} = \frac{1}{32}$

$P(1 \text{ Head}) = p(x=1) = \begin{bmatrix} 5 \\ 1 \end{bmatrix} \left(\frac{1}{2}\right)^{1} \left[\frac{1}{2}\right]^{5-1} = 5 \times \left[\frac{1}{2}\right]^{5} = \frac{5}{32}$

$P(2 \text{ Heads}) = p(x=2) = \begin{bmatrix} 5 \\ 2 \end{bmatrix} \left(\frac{1}{2}\right)^{2} \left[\frac{1}{2}\right]^{5-2} = 10 \times \left[\frac{1}{2}\right]^{5} = \frac{10}{32}.$

$P(3 \text{ Heads}) = p(x=3) = \begin{bmatrix} 5 \\ 3 \end{bmatrix} \left[\frac{1}{2}\right]^{3} \left[\frac{1}{2}\right]^{5-3} = 10 \times \left[\frac{1}{2}\right]^{5} = \frac{10}{32}.$

$P(4 \text{ Heads}) = p(x=4) = \begin{bmatrix} 5 \\ 4 \end{bmatrix} \left[\frac{1}{2}\right]^{4} \left[\frac{1}{2}\right]^{5-4} = 5 \times \left[\frac{1}{2}\right]^{5} = \frac{5}{32}.$

$P(5 \text{ Heads}) = p(x=5) = \begin{bmatrix} 5 \\ 5 \end{bmatrix} \left(\frac{1}{2}\right)^{5} \left[\frac{1}{2}\right]^{0} = 1 \times \left[\frac{1}{2}\right]^{5} = \frac{1}{32}.$

These probabilities can also be obtained by expanding The binomial $\left(\frac{1}{2} + \frac{1}{2}\right)^{5}$. The binomial probabilities distribution For the number of Heads obtained in 5 tossess of Fair coin is,

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

Q = (2) - (b)

Part (B):

Ans: We observe that

There are two possible outcomes,
i-e
A will win or will not win the gam

The probabilities of A's winning in each games is $p = 2/3$;

The successive games are independently won or lost, and

There are 10 games.

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

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

→ Therefore the binomial probability distribution with $n = 10$.

$p = 2/3$

$q = 1 - p$

$q = 1 - 2/3$

$q = 1/3$

Lets x denotes the number of won by A than.

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

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

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

$\left.\left(\frac{2}{3}\right)\left(\frac{1}{3}^8\right) + 120\left(\frac{2}{3}\right)^3\left(\frac{1}{3}\right)^9\right.$

$= 1 - \frac{1}{54049}\left[1 + 20 + 180 + 960\right.$

$1 - 00197$

$P(x \geq 4) = 0.9803$

(9):-

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

$$= 216\left(\frac{16}{81}\right)\left(\frac{1}{729}\right).$$

$$= \frac{3360}{59044}$$

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

(iii):- 6 or more games.

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

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

$$+ \binom{10}{8}\left(\frac{2}{3}\right)^8\left(\frac{1}{3}\right)^2 + \binom{10}{9}\left(\frac{2}{3}\right)^9\left(\frac{1}{3}\right)^3.$$

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

$$= 0.228 + 0.261 + 6.196 + 0.087 + 0.018$$

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

Q= (3):-

Ans:- (a):-

ungrouped Frequency distribution.

ungrouped women	Tally	Frequency.
0	/	1
1	////	4
2	~~////~~ ///	8
3	~~////~~ ~~////~~ /	11
4	~~////~~ ///	8
5	~~////~~	5
6	////	4
7	///	3
8	//	2
9	/	1
10	///	3
	total	50

Qs = (3). (b)

(b)

For grouped Frequeny distribution.

Grouped.	tally.	Frequency.
0-1.	卌	5
2-3	卌 卌 卌 ||||	19
4-5	卌 卌 |||	13
6-7	卌 |||	07
8-9	|||	03
10-11	|||	03.
total.		50