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program = Bs (MIT)

Semister = 6th

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x	x^2	y	y^2	xy
3	9	25	625	75
4	16	24	576	96
5	25	20	400	100
6	36	20	400	120
7	49	19	361	133
8	64	17	289	136
9	81	16	256	144
10	100	13	169	130
11	121	10	100	110
13	169	8	64	104

Q NO 1

(b)

x	y	xy	x^2
20	5	100	121
11	15	165	225
15	14	210	100
10	17	170	289
17	8	136	324
18	9	162	441
21	12	252	625
25	16	400	784
28	18	504	
$\Sigma x = 165$	$\Sigma y = 114$	$\Sigma xy = 2099$	$\Sigma x^2 = 330$

(a) Y on x

$$y = a + bx$$

$$\Sigma y = na + b\Sigma x$$

P

P-T-O

$\Sigma xy = a\Sigma x + b\Sigma x^2$

Now

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

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

Now to find b

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

$= 9(2099) - (165)(114)$

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

$a = 12.66 - 0.00645(18.33)$

$a = 12.66 - 0.11$

$\boxed{a = 12.55}$

$\boxed{\hat{Y} = 12.55 + 0.0064x}$

x on y

$\hat{x} = a + by$

$\hat{x} = 12.55 + 0.0064y$

$\boxed{\hat{x} = 12.55 + 0.0064y}$

Q No 2

(a) A fair is tossed 5 time. Find the probalities of obtaining various Number of heads.

Answer

~~A fair Coin is tossed 5 time~~

→ Let us regard the tossing of a Coin as an experement then we observe that

- Each toss of Coin has possible outcome head and tail
- The probability of head (success) is $p = 1/2$ and remain some for Successive tosses
- the Successive tosses of the Coin are independant
- The Coin is tossed five times

There fore The rvx which denote the no of head (succes) has a binomial Probability distribution with

P-T-O

$P = 1/2$ and $n = 5$ The possible value of X are 0, 1, 2, 3, 4,

$P(\text{no head}) = P(X=0) = \binom{5}{0}(1/2)^0(1/2)^5 =$

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

$= \frac{1}{32}$

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

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

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

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

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

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

$P(5\ \text{head}) = P(x=5) = \binom{5}{4}\left(\frac{1}{2}\right)^5\left(\frac{1}{2}\right)^0 =$

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

There Probability in table form

x	0	1	2	3	4	5

Q.2

part b

Solution

There fore the Binomial probability dist with $n = 10$

$p = 2/3$

$q = 1 - p$

$q = 1 - 2/3$

$q = 1/3$

Let x donote the number of won by A then

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

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

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

$\left. + 120 \left(\frac{2}{3}\right)^3 \left(\frac{1}{3}\right)^7 \right]$

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$1 - \frac{1}{59049}[1+20+180+960)$

$1 - 0.0197$

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

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

$= 210 \left(\frac{16}{81}\right) \left(\frac{1}{7n}\right)$

$\frac{3360}{59049}$

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

(iii) $P(x=11) = f(0) =$ beacuse x can take only value

$0, 1, 2, 3, \dots 10.$

(v) 6 or more games

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

P-9

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

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

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

X —— X

Q No 3

2	6	1	5	4	3	3	3	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

(a) Construct The ungrouped frequency distribution of the data

(b) Construct the Grouped frequency distribution of these data

Solution: Given data

(1) X_0 (minimum value) = 0
X_m (maximum value) = 10

(2) range = ~~$X_m - X_0$~~ $X_m - X_0$
= 10 − 0
= 10

Children Born x_i	f
0	1
1	4
2	8
3	11
5	5
6	4
7	3
8	2
9	1
10	3

$P = 12$

Now (b) The Grouped frequency data.

Children born Group	f
0 – 1	5
2 – 3	19
4 – 5	13
6 – 7	7
8 – 9	3
10 – 11	3
	50