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Program :- BS DT 6th semester
Subject :- Biostatistic

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Q. 1 (a)

Sr. no	x	y	$x_i - \bar{x}^2$	$(y_i - y)^2$	$(zx)_i$	$(zy)_i$	$(zx)_i (zy)_i$
1	3	25	2.46	60.84	-1.44	1.39	-2.00
2	4	24	12.96	46.24	~~-843~~ -1.13	1.21	-1.36
3	5	20	6.76	2.84	-081	0.5	-0.40
4	6	20	2.56	7.84	-0.5	.05	-0.25
5	7	19	0.36	3.24	-0.19	032	-0.06
6	8	17	0.16	0.04	0.1)	-0.03	-0.003
7	9	16	1.96	1.44	0.44	-0.21	-0.009
8	10	13	5.76	17.64	0.75	-0.75	0.56
9	11	10	11.56	51.84	1.06	-1.29	-1.36
10	13	8	29.16	84.64	1.67	-164	-2.73
	$\bar{x}=7$	~~77.4~~	$Sx=3.21$	$Sy=56$		$\Sigma = -881$	

$$Sx = \sqrt{\frac{(x-\bar{x})^2}{n-1}} = \sqrt{10.2} = 3.2$$

$$Sy = \sqrt{\frac{(y_i-\bar{y})^2}{n-1}} = \sqrt{31.29} = 5.6$$

$$(zx) = \frac{(x_i - \bar{x})}{Sx}$$

$$(zy)_i = \frac{(y_i - \bar{y})}{Sy}$$

$$r = \frac{\Sigma (zx)_i (zy)_i}{n-1} = \frac{-881}{9}$$

$$\boxed{r = 0.978}$$

Part B Question no 1

S.No	x	y	xi^2	xy
1	20	5	400	100
2	11	16	121	165
3	15	14	225	210
4	10	17	100	170
5	17	8	289	136
6	18	9	324	162
7	21	12	441	252
8	25	16	625	400
9	28	18	784	504
10	$\Sigma x =$			
	$\Sigma x = 165$	$\Sigma y = 114$	$\Sigma x^2 = 2699$	$\Sigma xy = 2099$

a) For y on x

$y = mx + b \rightarrow (A)$ $\quad m = \frac{N\Sigma(xy) - \Sigma x \Sigma y}{N\Sigma(x^2) - (\Sigma x)^2}$

$\Rightarrow \frac{9 \times 2099 - 165 \times 114}{9 \times 2699 - 27225} = \frac{18891 - 19810}{42291 - 27225}$

$m = \frac{81}{-2934} = -0.027$

For b

$b = \frac{\Sigma y - m\Sigma x}{N} = \frac{114 - (-0.027)(165)}{9}$

$b = 118.45$

Now eq A becomes

$y = mx + 3$

$y = 0.027x + 118.45$

For (x) on (y)

$y = mx + b$

$x = \frac{y - b}{m}$

$x = \frac{y - 118.45}{-0.027}$

Q.No 24 (Part-A)

A fair coin is tossed 5 times. Find the probabilities of obtaining various numbers of heads.

Ans: Let us regard the tossing of coin as an experiment. Then we observe that.

i) Each toss can has two possible outcomes head and tail.

ii) The probability of a head Succes is $p = 1/2$

iii) The sucesive insser of the coin are Independent.

iv) The coin is inssed for (5) times.

Therefore the r.v x, which donet the number of heads (successes) has a binomial probability distribution with $p = 1/2$ and $n = 5$ the possible value of x are 0, 1, 2, 3, 4 and 5 hence.

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

$P(1 \text{ head}) = P(x=1) = \binom{5}{1}\left[\frac{1}{2}\right]^2\left[\frac{1}{2}\right]^{5-1} = 5 \times \left[\frac{1}{2}\right]^5 = 5/32$

$P(2 \text{ head}) = P(x=2) = \binom{5}{2}\left[\frac{1}{2}\right]^2\left[\frac{1}{2}\right]^{5-2} = 10 \times \left[\frac{1}{2}\right] = 10/32$

$P[3 \text{ head}] = P(x=3) = \binom{5}{3}\left[\frac{1}{2}\right]^3\left[\frac{2}{2}\right]^{5-3} = 10 \times \left[\frac{1}{2}\right]^5 = 10/32$

$P(4 \text{ head}) = P(x=4) = \binom{5}{4}\left[\frac{1}{2}\right]^4\left[\frac{1}{2}\right]^{5-4} = 5 \times \left[\frac{1}{2}\right]^5 = 5/32$

$P(5 \text{ head}) = P(x=5) = \binom{5}{5}\left[\frac{1}{2}\right]^5\left[\frac{1}{6}\right]^0 = 1 \times \left[\frac{1}{2}\right]^5 = 1/32$

These probabilities can also be obtained by expanding the binomial $[(1/2)+(1/2)]^5 \cdot (1/2 + 1/2)^5$ the binomial p.d for the number of head obtained in 5 toses of fair coin is.

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

Part B | Question no 2 |

Therefore the binomial probability list with $n = 10$

$p = 2/3$

$q = 1 - p$

$q = 1 - 2/3$

$q = 1/3$

Let x denote the number of A by then

i) $P(x > 4) = 1 - P(x < 4)$

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

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

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

$1 - 0.0197$

$P(x \geq 4) = 0.9803$

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

$= 210 (1/3^{6}) (1/729)$

$= \frac{3360}{59049}$ $\Rightarrow$ $P(x = 4) = 0.056$

iii) $P(x = 11) = 0$ because x can only take values $0, 1, 2, 3 \cdots 9, 10$

iv) 6 or more

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

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

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

$P(x \geq 6) = 0.79$

b) Predictive values

y for $x = 20, 11, 15, 25, 28$

$x = 20$

$y = mx + 9 \quad = 0.027(20) + (118.45) = 117.9$

$x = 11$

$y = (0.027)(11) + 118.45 = 118.15$

$x = 15 \qquad y = 118.04$

$x = 25 \qquad y = 117.77$

$x = 28 \qquad y = 117.69$

Q No 3 Part A

Given data

1	6	1	5	4	3	3	8	10	1	
4	5	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	3	3	2	3	9	2	2	

Ungrouped frequency distribution

un-grouped women	Tally	Frequency	No
0	1	1	0
1	1111	4	1
2	1111 111	8	2
3	1111 1111 1	11	3
4	1111 111	8	4
5	1111	5	5
6	1111	4	6
7	111	3	7
8	11	2	8
9	1	1	9
10	111	3	10
		50	

Question No 5 Part B

2	6	1	5	4	3	3	8	10	1
4	5	3	0	5	2	1	4	3	3
5	3	3	6	3	3	2	2	10	4
1	4	2	4	4	4	6	8	7	7
7	5	6	5	3	2	3	9	10	2

Ungrouped frequency distribution for given data

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

$R = x_m - x_0$

$R = 10 - 1 = 9$

$K = 1 + 3.3 \log N = 1 + 3.3 \log(50) = 1 + 3.3(1.68)$

$K \doteq 1 + 5.6066 = 6.606 = 6$

n = class interval = Range / K

$n = 9/7 = 1.285 = \boxed{2}$

we find out the information from data

classes	frequency	class boundry	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	9.5-10.5	11