Name Hazrat Bilal
id = 13717
program = B.S (DT)
Mid term Assignment.
Biostatistics.
instructer = Anwar Shamim Sir.

Date:..........................

Q 1 (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
$\Sigma x = 76$	$\Sigma y = 172$	$\Sigma x^2 = 670$	$\Sigma y^2 = 3240$	$\Sigma xy = 1148$

$, x = 14$

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

$$r = \frac{14\ (1148) - (76)\ (172)}{\sqrt{[14\ (640) - (76)^2]\ 14\ (3240) - (172)^2}}$$

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$$= \frac{16077 - 13077}{\sqrt{(9380 - 5770)(45,360 - 29,584)}}$$

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

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

$$\boxed{r = 0.39}$$

Q 2 part (B)

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

Let as regard the tossing of a Coin as an experiment. Then we observe that.

(i) each toss of a Coin (i.e. each trial) has two possible outcomes heads (Success) and tails (failure)

(ii) the probability of a head (success) is $p = \frac{1}{2}$ and remain the same for successive tosses.

(iii) the successive of the Coin are independent and.

(iv) The Coin is tossed 5 times. Therefore the r.v. X which denotes the of heads (success) has a binomial probability distribution with $p = \frac{1}{}$

$p = 1/2$ and $n = 5$ the possible value of x are, 0, 1, 2, 3, 4 and 5 Here.

$$p\text{ (no head)} = p(x=0)\binom{5}{0}\left(\frac{1}{2}\right)^0\left(\frac{1}{2}\right)^5$$

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

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

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

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

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

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

$$= 20 \times \left(\frac{1}{2}\right)^5 = \frac{10}{32}$$

4 head

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

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

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

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

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 head obtained in 5 toss of a fair coin wil.

Q 2 part (b)

There fore the binormial probability with $x = 10$

$p = 2/3$

$q = 1 - p$

$q = 1 - 2/3$

$q = 1/3$

Let x denotes the number of non by l then.

(1) $p(x>4) = 1 - p(x<4)$

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

$= 1 - \frac{1}{59048} \left[1 + 20 + 130 + 960\right]$

$1 - 0.0197$

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

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

$= 210\left(\frac{16}{81}\right)\left(\frac{1}{729}\right)$

$= \frac{3360}{59049}$

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

(iii) $P(X=11) = 0$ because X can take only value $0, 1, 2, 3 \ldots 10$.

(iv) 6 or more games.

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

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

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

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

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

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Q3 part (A)

ungraped frequency Distribution

ungraped Women	Tally	Frequency
0	I	1
1	IIII	4
2	~~IIII~~ III	8
3	~~IIII~~ ~~IIII~~ I	11
4	~~IIII~~ III	8
5	~~IIII~~	5
6	IIII	4
7	III	3
8	II	2
9	I	1
10	II	3

Total $\boxed{50}$

Q3 par(B)

for Graped Frequency Distribution.

Graps	Tally	Frequency
0-1	~~||||~~	5
2-3	~~||||~~ ~~||||~~ ~~||||~~ ||||	19
4-5	~~||||~~ ~~||||~~ |||	13
6-7	~~||||~~ |||	07
8-9	|||	03
10-11	|||	03

Total $\boxed{50}$