

# Assignment 2

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Section : 09

Stat201

Stat 201

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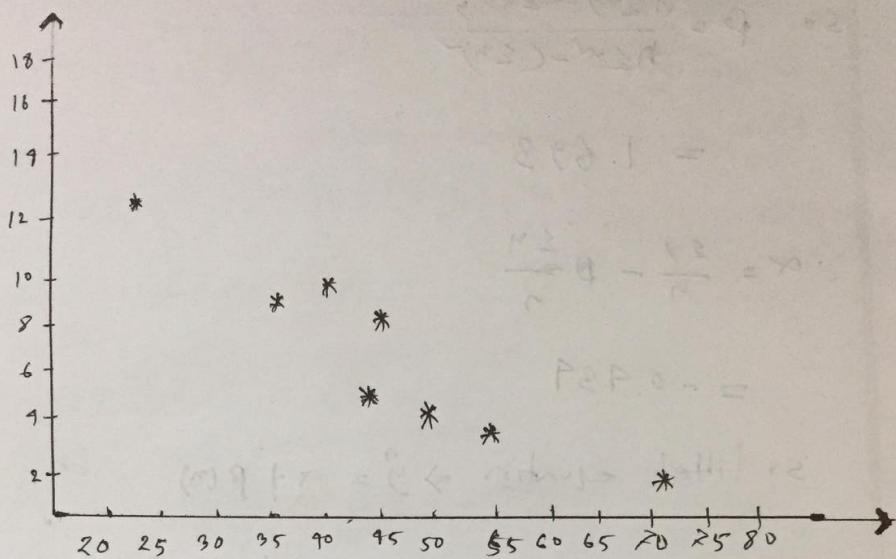
01

Assignment 2  
Tenzim Salib Apon

Date: / /

□ Sat □ Sun □ Mon □ Tue □ wed □ Thu □ Fri

1. (a)



(b)

Price (Tk) X	Demand (kg) Y	$X^2$	$X \cdot Y$	$y^2$
23	12.5	529	287.5	156.25
35	8.6	1225	301	73.96
40	9.4	1600	376	88.36
45	7.5	2025	337.5	56.25
49	5	1936	220	25
50	4.5	2500	225	20.25
55	4	3025	220	16
72	2	5184	144	4

$$\sum x = 364 \Rightarrow 53.5 \quad \sum y = 180.29 \quad \sum xy = 1842.24 \quad \sum y^2 = 490.62$$

$$n = 8$$

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Theme:

$\therefore \text{Coefficient} = \frac{n \sum xy - \sum x \sum y}{\sqrt{(n \sum x^2 - (\sum x)^2)(n \sum y^2 - (\sum y)^2)}}$

$$= \frac{8 \times 2111 - 364 \times 53.5}{\sqrt{(18024 - 132496)(440.02 - 2862.25)}}$$

$$= \frac{2586 - 2586}{-0.931951}$$

$\therefore$  There is a strong negative correlation between price and demand. As the price rises, demand falls.

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

$$= \frac{8 \times 2111 - 364 \times 53.5}{\sqrt{18024 - 132496}}$$

$$= -0.2211$$

$$\therefore a = \frac{\sum y}{n} - \rho \frac{\sum x}{n}$$

$$= \frac{53.5}{8} - (-0.2211) \frac{364}{8} \Rightarrow 16.2476$$

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Theme:

Here  $\alpha = 16.2426$  means demand will be 16.2426 kg when price is zero  
 $B = -0.2211$  means that demand will decrease by 0.2211 kg when price increases by 1 rupee. [Ans]

$$\therefore \hat{y} = \text{at } P^u$$

$$\text{For } 38 \\ \hat{y} = 16.2426 + (-0.2211) 38 \\ = 8.3458$$

For 15

$$\hat{y} = 16.2426 + (-0.2211) 15 \\ = 13.431$$

[Ans]

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~~R<sup>v</sup>~~

$$\text{Coefficient} = -0.931159$$

$$\text{so, } R^v = (-0.931159)^n$$

$$= 0.86218$$

$$= 86.21\%$$

A S D

09

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Theme:

∴ we can say that almost 82% of the variation  
of demand can be explained due to price.

$\Sigma$	$x$	$y$	$x^2$	$xy$	$y^2$
	4	7	16	28	49
	2	1	4	2	1
	5	8	25	40	64
	3	4	9	12	16
	7	13	49	91	169
	12	19	144	228	361
	2	3	4	6	9
	5	11	25	55	121
	4	9	16	36	81
	9	15	81	135	225
$\Sigma x = 49$	$\Sigma y = 105$	$\Sigma x^2 = 386$	$\Sigma xy = 400$	$\Sigma y^2 = 1000$	
53	90	383	633	1096	

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

$$= 0.9611$$

8.00

A S D F

05

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Theme:

$$\text{so } \beta = \frac{n \sum xy - \bar{x} \bar{y}}{n \sum x^2 - (\sum x)^2}$$

$$= 1.693$$

$$\therefore \alpha = \frac{\bar{y}}{n} - \beta \frac{\bar{x}}{n}$$

$$= -0.439$$

$$\text{so fitted equation } \Rightarrow \hat{y} = \alpha + \beta x$$

$$= -0.439 + 1.693x$$

(b) For 6 years,

$$\hat{y} = \alpha + \beta(6)$$

$$= -0.439 + 1.69(6)$$

$$= 9.228$$

$$= 10. offors$$

[Ans]

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06

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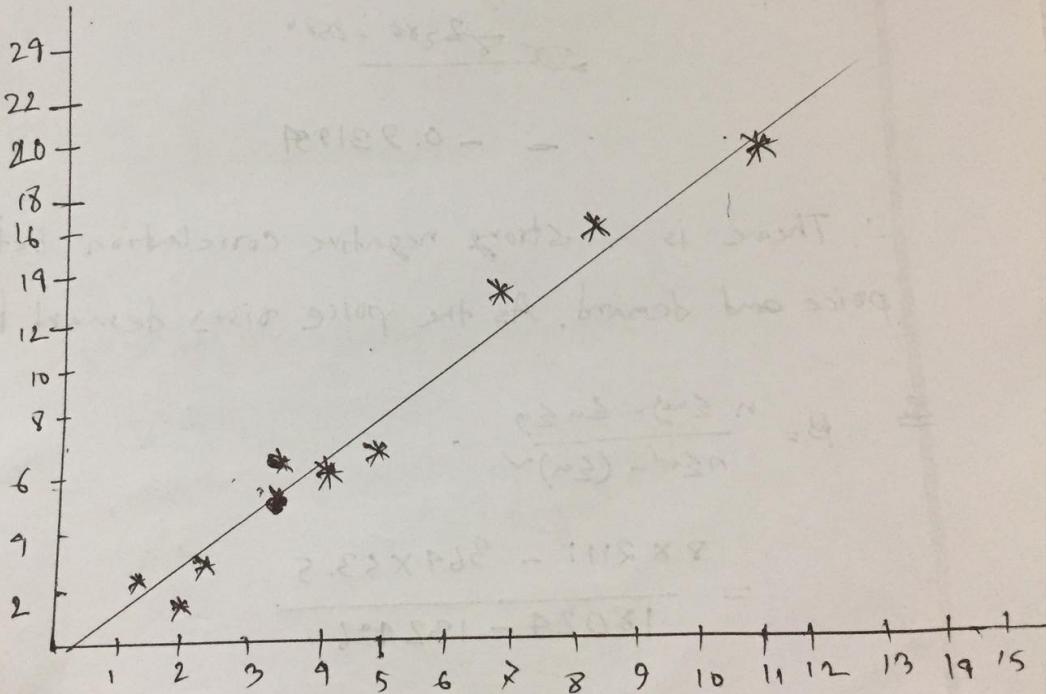
Theme:

### (i) Method 1.

From (a) we got  $\tau = 0.9611$  (coefficient).

Since we got a positive value, it can be said that they are directly proportional.

### Method 2: Scatter diagram.



By this, we can figure out that number of job increases with years of work experience.

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Theme:

3(a)  $P(\text{sum of } 10) = \frac{3}{36}$

(b)  $P(\text{doublet}) = \frac{6}{36}$

(c)  $P(\text{doublet prime}) = \frac{3}{36}$

(d)  $P(\text{doublet even}) = \frac{3}{36}$

(e)  $P(\text{sum greater than } 6) = \frac{21}{36}$

(f)  $P(\text{first even}) = \frac{3}{6} \times \frac{6}{6} = \frac{1}{2}$

(g)  $P(\text{odd and multiple of } 2) = \frac{15}{36}$

4. (a)  $P(\text{two successes}) = \frac{18}{36} \times \frac{15}{36}$   
 $= \frac{1}{4}$  [Ans]

(b)  $P(\text{exactly one success}) = P(\text{odd}) \times P(\text{even}) + P(\text{odd})$   
 $\times P(\text{even})$

$$= \frac{15}{36} \times \frac{15}{36} + \frac{15}{36} \times \frac{15}{36}$$

$$= \frac{1}{2}$$
 [Ans]

Theme:

(i)  $P(\text{at least one success})$

$$= 1 - P(\text{no success})$$

$$= 1 - \left( \frac{15}{30} \times \frac{15}{30} \right)$$

$$= 1 - \frac{1}{4}$$

$$= \frac{3}{4} [\text{Ans}]$$

(ii)  $P(\text{no success}) = \frac{15}{30} \times \frac{15}{30}$

$$= \frac{1}{4} [\text{Ans}]$$

5.

Total student  $\Rightarrow 250$

Let ~~P~~ Pharmacy

P = photography class

S = swimming class

$\therefore P(\text{either in P or S}) \Rightarrow P(P \cup S) = P(P) + P(S) - P(P \cap S)$

$$= \frac{48}{250} + \frac{39}{250} - \frac{12}{250}$$

$$= \frac{7}{25}.$$

Ans correct student mark

9  
∴

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$$\therefore P(\text{in next mo}) = 1 - \frac{2}{25}$$
$$= \frac{18}{25} [Ans]$$

6 ~~Ques~~

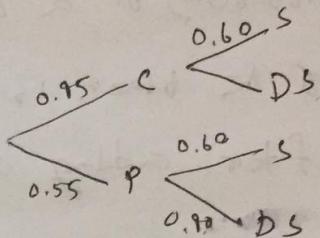
Let

C → Courses

P → prescriptions

S → sufferers

DS → Don't sufferers.



$$P(C|DS) = \frac{0.95 \times 0.40}{(0.95 \times 0.40) + (0.55 \times 0.90)}$$

$$= \frac{9}{20} [Ans]$$

~~Ques~~

in A black = 6

red = 2

~~Total~~ total = 13,

in B black = 9

red = 6

~~Total~~ total = 15

Ball transferred from A to B is red  $A_R = P(A_R) = \frac{6}{13}$ .

" " " " " " Black  $A_B = P(A_B) = \frac{2}{13}$ ,

probability of a ball drawn from bag B is found to be black is  $P(B)$ .

After adding a ball from A to B, total balls = 16.

. if a red ball is transferred,  $P(B|A_R)$

$$= \frac{6}{16}$$

. if a black ball is transferred  $P(B|A_B) = \frac{7}{16}$

. Probability of that the transferred ball was red:

$$P(A_R|B) = \frac{P(B|A_R) \times P(A_R)}{P(B|A_R) \times P(A_R) + P(B|A_B) \times P(A_B)}$$

$$= \frac{\frac{1}{16} \times \frac{6}{13}}{\frac{6}{16} \times \frac{6}{13} + \frac{2}{16} \times \frac{2}{13}}$$

$$= \frac{36}{85} = \frac{36}{85} \quad (\text{Ans})$$