CO-2

Home assignment - 2 2100032175

PSAT

1) average = 40 months

standard derivation = 6.3

Mean = 40

a) more than 32 months

$$P(x>32) = \frac{x-\text{mean}}{\sigma} = \frac{32-40}{6.3} = \frac{-8}{6.3} = -1.27$$

From z table

probability of more than 32 months is

$P(z) - 1.27) = 1 - 0.1021 = 0.8979$

b) less than 28 months

$$P(x<28) = \frac{28-40}{6.3} = \frac{-12}{6.3} = -1.90$$

$P(z<-1.90) = 1 - P(z<1.90)$

$= 1 - 0.9713 = 0.0287$

c) between 37 and 49 months

$$P(37<x<49) = \left(\frac{37-40}{6.3} < z < \frac{49-40}{6.3}\right)$$

$$\boxed{\because P(x=z) = \frac{x-\text{mean}}{\sigma}}$$

$= (-0.48 < z < 1.43)$

$= P(z<0.48) + P(z<1.48) - 1$

$= 0.6844 + 0.9236 - 1$

$= 0.608$

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2)

i) obtain the probability that the signal with exceed 240 MV

$P(x > 240) = 1 - P(x \leq 240)$

$= 1 - P\left(\frac{240-200}{16}\right)$

$N(200, 250)$

$= 1 - P\left(\frac{\cancel{40}^{5}}{\cancel{16}_{2}}\right)$

$\sigma^2 = 256$

$\boxed{\sigma = 16}$

$= 1 - P(2.5)$

$= 1 - 0.9938 = \underline{0.0062}$

ii) obtain the probability that the signal will be not more than 190 MV.

sol

$P(x \leq 190)$

$= P\left\{\frac{240-190}{16}\right\} \quad \because P\left(\frac{z-\mu}{\sigma}\right)$

$= P\left[\frac{\cancel{50}^{25}}{\cancel{16}_{8}}\right]$

$= P\left[\frac{25}{8}\right]$

$= P[3.125]$

$= \underline{0.9991}$

3) Given that

x	y	xy	x^2	y^2
10	30	300	100	900
15	42	630	225	1764
12	45	540	144	2025
17	46	782	289	2116

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x	y	xy	x^2	y^2
13	33	429	169	1089
16	34	544	256	1156
24	40	960	570	1600
$\Sigma x = 107$	$\Sigma y = 270$	$\Sigma xy = 4185$	$\Sigma x^2 = 1759$	$\Sigma y^2 = 10650$

$n = 7$

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

$$r = \frac{7(4185) - 107 \times 270}{\sqrt{7(1759) - 11449}\sqrt{7(10650) - 72900}}$$

$$r = \frac{29295 - 28890}{\sqrt{12313 - 11449}\sqrt{74550 - 72900}}$$

$$r = \frac{405}{\sqrt{864}\sqrt{1650}}$$

$$r = \frac{405}{29.39 \times 40.62}$$

$$r = \frac{405}{1193.82}$$

$$\boxed{r = 0.339}$$

4) Given that

$x =$ corn yield

$y =$ peanut yield (mt/ha)

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x	y	x^2	y^2	xy
2.4	1.33	5.76	1.76	3.192
3.4	2.12	11.56	4.49	7.208
4.6	1.80	21.16	3.24	8.28
3.7	1.65	13.69	2.72	6.105
2.2	2.00	4.84	4	4.4
3.3	1.76	10.89	3.09	5.808
4.0	2.11	16	4.45	8.44
2.1	1.63	4.41	2.65	2.423
$\Sigma x = 25.7$	$\Sigma y = 14.4$	$\Sigma x^2 = 88.31$	$\Sigma y^2 = 26.4$	$\Sigma xy = 46.856$

thus $n=8$

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

$$r = \frac{8(46.856) - (25.7)(14.4)}{\sqrt{8(88.31) - 660.47}\sqrt{8(26.91) - (207.36}}$$

$$r = \frac{374.848 - 370.08}{\sqrt{706.48 - 660.49}\sqrt{215.76 - 207.36}}$$

$$r = \frac{4.768}{\sqrt{45.99}\sqrt{8.4}}$$

$$r = \frac{4.768}{6.781 \times 2.898}$$

$$r = \frac{4.768}{19.651}$$

$\boxed{r = 0.242}$

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5) scatter Diagram:-

→ A scatter diagram is used to examine the relationship between both the axes (x and y) with one variable.

A scatter diagram or scatter plot gives an idea of the nature of relationship.

→ In a scatter correlation diagram, if all the points stretch in one line, then the correlation is perfect and is in unity. However, if the scatter points are widely scattered throught the line, then the correlation is said to be low

6) Given that

$n = 25$

$\Sigma x = 125$

$\Sigma x^2 = 650$

$\Sigma y = 100$

$\Sigma y^2 = 460$

$\Sigma xy = 508$

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wrong pairs

x	y	x^2	y^2	xy
6	14	36	196	84
9	6	81	36	54
$\Sigma x = 15$	$\Sigma y = 20$	$\Sigma x^2 = 117$	$\Sigma y^2 = 232$	$\Sigma xy = 138$

substract from above values

$\Sigma x = 125 - 15 = 110$

$\Sigma y = 100 - 20 = 80$

$\Sigma x^2 = 650 - 117 = 533$

$\Sigma y^2 = 460 - 232 = 228$

$\Sigma xy = 508 - 138 = 370$

correct values

x	y	x^2	y^2	xy
8	12	64	144	96
6	8	36	64	48
$\Sigma x = 14$	$\Sigma y = 20$	$\Sigma x^2 = 100$	$\Sigma y^2 = 208$	$\Sigma xy = 144$

Add above values

$\Sigma x = 14 + 110 = 124$

$\Sigma y = 80 + 20 = 100$

$\Sigma x^2 = 533 + 100 = 633$

$\Sigma y^2 = 208 + 228 = 436$

$\Sigma xy = 144 + 370 = 514$

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

$$r = \frac{(25)(514) - 124 \times 100}{\sqrt{25(633) - (124)^2}\sqrt{25(436) - (100)^2}}$$

$$r = \frac{12850 - 12400}{\sqrt{15825 - 15376}\sqrt{10900 - 10000}}$$

$$r = \frac{450}{\sqrt{449}\sqrt{900}}$$

$$r = \frac{\cancel{450}^{15}}{21.18 \times \cancel{30}}$$

$$r = \frac{15}{21.18}$$

$$\boxed{r = 0.708}$$

7) Given that

x	y	x^2	y^2	xy
27	57	729	3249	1539
45	64	2070	4096	2880
41	80	1681	6400	3280
19	46	361	2116	874
35	62	1225	3844	2170
39	72	1521	5184	2808
$\Sigma x = 206$	$\Sigma y = 381$	$\Sigma x^2 = 7587$	$\Sigma y^2 = 24889$	$\Sigma xy = 13551$

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

$\boxed{\because n = 6}$

$$r = \frac{6(13551) - (206)(381)}{\sqrt{6(7587) - (206)^2}\sqrt{6(24889) - (381)^2}}$$

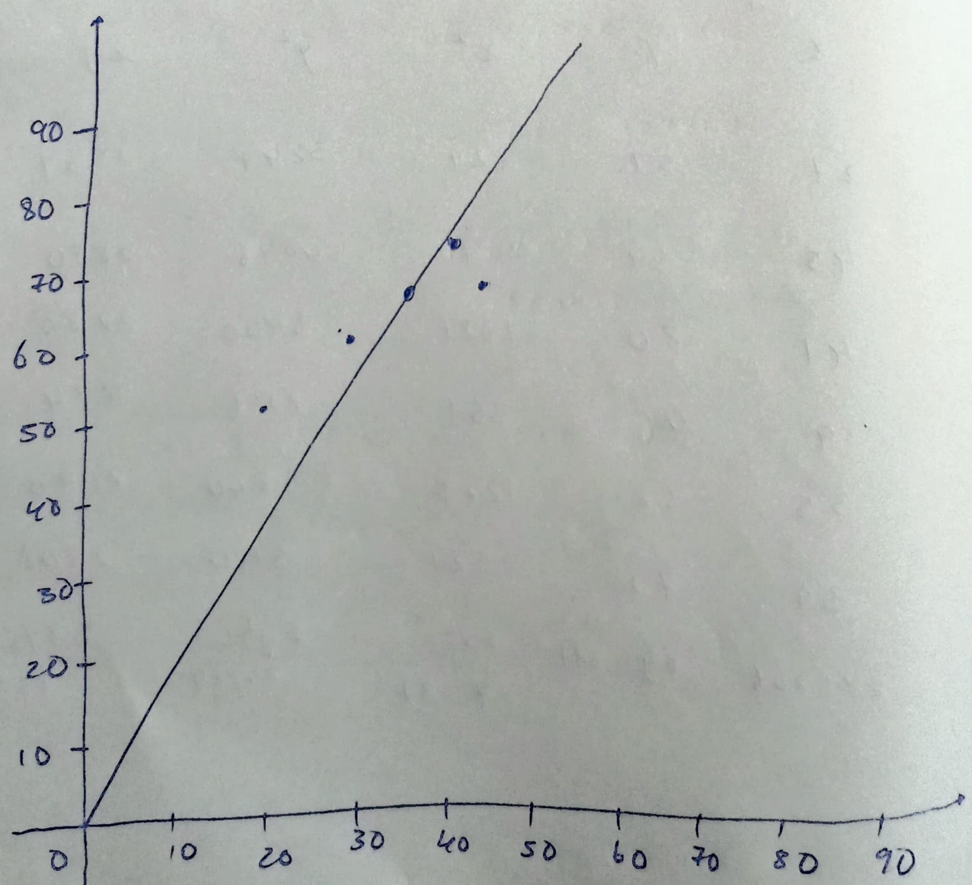
$$r = \frac{81306 - 78486}{\sqrt{45522 - 42436}\sqrt{149334 - 145161}}$$

$$r = \frac{2820}{\sqrt{3086}\sqrt{4175}}$$

$$r = \frac{2820}{55.56 \times 64.59}$$

$$r = \frac{2820}{3569.72}$$

$\boxed{r = 0.78}$



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8) Given that

x	Y	x^2	Y^2	xy
77	82	5929	6724	6314
50	66	2500	4356	8300
71	78	5041	6084	5538
72	34	5184	1156	2448
81	47	6561	2209	3807
94	85	8836	7225	7990
96	99	9216	9801	9504
99	99	9801	9801	9801
97	68	9409	4824	6596
$\Sigma x = 737$	$\Sigma y = 658$	$\Sigma x^2 = 62477$	$\Sigma y^2 = 51980$	$\Sigma xy = 55298$

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

$$= \frac{(658)(62477) - (737)(5529.8)}{9(62477) - (737)^2}$$

$$= \frac{41109866 - 40754626}{562293 - 543169}$$

$$= \frac{355240}{19124} = 18.55$$

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

$$= \frac{9(55298) - (737)(658)}{9(62477) - (737)^2}$$

$$= \frac{497682 - 484946}{19124}$$

$$= \frac{12736}{19124} = 0.665$$

$$y' = a + bx$$

$$\boxed{y' = 18.57 + b0.665x}$$

ii)

$x = 85$

$y = 18.57 + 0.605x$

$y = 18.57 + 0.665(85)$

$y = 18.57 + 56.525$

$$\boxed{y = 75.095}$$

a) Given that

Coefficient of rank b/w statistics

Mathematics = 0.8, sum of square = 83

$$P = 1 - \frac{6 \Sigma (di)^2}{n(n^2-1)}$$

$\therefore \Sigma (di)^2 \rightarrow$ sum of squre of the

different rank

$P = 0.8$

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$$\frac{8}{10} = 1 - \frac{6(33)}{n(n^2-1)}$$

$$\Rightarrow \frac{6(33)}{n(n^2-1)} = 1 - \frac{8}{10}$$

$$\frac{6(33)}{n(n^2-1)} = \frac{\cancel{2}}{\cancel{10}_5}$$

$$\frac{198}{n(n^2-1)} = \frac{1}{5}$$

$$n(n^2-1) = 990$$

$$n(n^2-1) = 10 \times 90$$

$$n(n^2-1) = 10(10^2-1)$$

$$\boxed{n = 10}$$

10)

Memory less property of exponential distribution.

- The memoryless property of the exponential distribution states that the conditional probability of the time until as evend, given that the event has not yet occured is the same as the unconditional probability of the time until the Event.

- In mathematical terms, if T is the time until an event with an exponential distribution with parameter λ, then for any $t > 0$

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$$P(T > t+s / T > s) = P(T > t)$$

→ This property implies that the remaining time until the event is independent of how much time has already passed since the event was last observed to be absent. In other words the past does not affect the future when it comes to the exponential distribution.