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16/ENG02/0240.
Computer Engineering.
ENG 382.
Engineering Mathematics.

Given $d = \alpha \beta^t$ - - - (i)

Comparing eqn (i) to $y = mx + c$

$\log d = \log \alpha + t \log \beta$

Where $a_0 = \log \alpha$

$a_1 = \log \beta$

	$Y = \log d$	$t = x$	XY	$d(cm)$	x^2	y^2
1	0.301029996	0	0	0	0	0.09061905
2	0.698970004	1	0.698970004	1	1	0.48855907
3	1.278753601	2	2.557507202	2	4	1.635210772
4	1.698970004	3	5.096910013	3	9	2.886490076
5	2.178976947	4	8.715907789	4	16	4.747940537
6	2.672097858	5	13.36048929	5	25	7.140106962
7	3.156851909	6	18.94111141	6	36	9.965713925
8	3.654369091	7	25.58058864	7	49	13.35441345
9	4.111800007	8	32.894400 06	8	64	16.9068993
10	4.614165911	9	41.52269532	9	81	21.28997586
11	5.045405135	10	50.45405135	10	100	25.45611297

$\Sigma Y = 29.41133046$

$\Sigma X = 55$

$\Sigma XY = 199.8268839$

$\Sigma X^2 = 385$

$\Sigma Y^2 = 103.9620985$

$\Sigma Y = a_0 N + a_1 \Sigma X$

$29.41133046 = a_0(11) + a_1(55)$ - - - (i)

$$\Sigma xy = a_0 \Sigma x_i + a_1 \Sigma x^2$$

$$199.8268839 = a_0(55) + a_1[385] \quad ---(2)$$

Saving equ 1 and 11

$$29.41133046 = 11a_0 + 55a_1$$

$$199.8268839 = 55a_0 + 385a_1$$

$$a_0 = \frac{\begin{vmatrix} 29.1133046 & 55 \\ 199.8268839 & 385 \end{vmatrix}}{\begin{vmatrix} 11 & 55 \\ 55 & 385 \end{vmatrix}}$$

$$= \frac{[29.41133046][385] - [55][199.8268839]}{[11 \times 385] - [55 \times 55]} = 0.27511$$

$$a_1 = \frac{\begin{vmatrix} 11 & 29.41133046 \\ 55 & 199.8268835 \end{vmatrix}}{\begin{vmatrix} 11 & 55 \\ 55 & 385 \end{vmatrix}}$$

$$= \frac{[11 \times 199.8268835] - [29.41133046 \times 55]}{[11 \times 385] - [55 \times 55]}$$

$$a_1 = 0.47973$$

$a_0 = \log \alpha$

$0.27511 = \log \alpha$

$\alpha = 1.8841$

$a_1 = \log \beta$

$0.47973 = \log \beta$

$\beta = 3.0181$

$\alpha = 1.8841$

$\beta = 3.0181$

d. Correlation Co-efficient

$$R = \frac{N\Sigma XY - [\Sigma X][\Sigma Y]}{\sqrt{[N\Sigma X^2 - (\Sigma X^2)][N\Sigma X^2 - (\Sigma Y)^2]}}$$

$$R = \frac{[11 \times 199.82688839] - [55 \times 29.41330046]}{\sqrt{[11 \times 385 - 55^2] \times [(11 \times 103.9620488] - [29.41330046]^2]}} = 0.999844831 2$$

$$R_{square} = [0.999844831 2]^2 = 0.999689686 4$$

For Manual Method

$R = 0.99984483 12$

$R^2 = 0.99968968 64$

For Matlab

$R = 0.9998$

$R^2 = 0.9997$

For Excel

$R = 0.999844832 35763$

$R^2 = 0.999689688 792257$

d From Observation for all the methods used to Solve the correlation coefficient and its square; It can be seen that $R^2 < R$ [i.e the value of the square of the correlation Coefficient is lesser than the actual value Ox the correlation Co-efficient