

LAWAL SHERIFF-0

16/ENG031037

ENG 382

CIVIL - ENGR

ASSIGNMENT 6.

$f(\text{hr})$	$d(\text{m})$
0	2
1	5
2	19
3	50
4	151
5	470
6	1435
7	4512
8	12936
9	41125
10	111021

$$d = \alpha \beta^t$$

$$\log d = \log(\alpha \beta^t)$$

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

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

$$y = a_0 + a_1 x_1$$

$x (\text{hr})$	$d(\text{m})$	y	$\log xy$	x^2	y^2
0	2	0.30103	0	0	0.090619
1	5	0.69897	0.69897	1	0.488559
2	19	1.2787536	2.557507	4	1.635211
3	50	1.69897	5.07691	9	2.786499
4	151	2.17897695	8.715908	16	4.717941
5	470	2.67209786	13.36049	25	7.140107
6	1435	3.1562519	18.914111	36	9.965719
7	4512	3.65436909	25.52058	49	13.35441
8	12936	4.11180001	32.8944	64	16.9069
9	41125	4.61410591	41.52695	81	21.28997
10	111021	5.04540513	50.45045	100	25.45611

Σ

55

171726

29.4113305

192.8269

385

103.962

$$y = a_0 + a_1 x$$

$$\sum y = a_0 N + a_1 \sum x \quad - (1)$$

$$\sum xy = a_0 \sum x + a_1 \sum x^2 \quad - (2)$$

$$29.4113 = 11a_0 + 55a_1 \quad - (1) \times 5$$

$$199.8269 = 55a_0 + 375a_1 \quad - (2) \times 1$$

$$\sum 9n \quad (1) \quad - \quad \sum 9n \quad (2)$$

$$\Rightarrow -58.7704 = -110a_1$$

$$a_1 = 0.4797$$

$$29.4113 = 11a_0 + 55(0.4797)$$

$$11a_0 = 29.4113 - 55(0.4797)$$

$$a_0 = 29.4113 - 26.3835$$

"

$$a_0 = 0.2725$$

$$y = a_0 + a_1 x$$

$$y = 0.2725 + 0.4797x$$

$$\log \alpha = a_0$$

$$0.2725 = \log \alpha$$

$$\alpha = 1.8723$$

$$a_1 = \log \beta$$

$$0.4797 = \log \beta$$

$$\beta = 3.0179$$

Correlation Co-efficient

$$R = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{(N \sum x^2 - (\sum x)^2)(N \sum y^2 - (\sum y)^2)}}$$

$$R = \frac{(11 \times 199.8269) - (55)(29.4113)}{\sqrt{((11 \times 375) - 55^2)((11 \times 103.9620475) - (29.4113)^2)}}$$

$$R = 0.999847$$

$$R_{\text{square}} = 0.9996876$$

Excel

$$R^2 = 0.9997$$

$$R = 0.999845$$

$$a_0 = 0.27511$$

$$a_1 = 0.479729$$