Regression. - Karl pearson

X	Y
3	7
9	13
12	1
14	3
5	9
6	10
11	15

Spearman

X	Y
88	69
91	71
69	92
72	98
98	102
103	58
56	91

KARL PEASON METHOD:

N = Number of pairs of Observation

N = 7

$(X - \bar{x})$

Mean $\bar{x} = 8.57$ $\bar{y} = 8.28$

X	Y	$(x-\bar{x})$	$(y-\bar{y})$	$(x-\bar{x})(y-\bar{y})$	$(x-\bar{x})^2$	$(y-\bar{y})^2$
3	7	-5.57	-1.28	7.1296	31.02	1.63
9	13	0.43	4.72	2.0296	0.18	22.27
12	1	3.43	-7.28	-24.9704	11.76	53
14	3	5.43	-5.28	-28.6704	29.48	27.9
5	9	-3.57	0.72	-2.5704	12.75	0.51
6	10	-2.57	1.72	-4.4204	6.61	2.95
11	15	2.43	6.72	16.3296	5.90	45.02
				$\Sigma(-35.144)$	$\Sigma(97.7)$	$\Sigma(152.98)$

$$r = \frac{\Sigma (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\Sigma (x_i - \bar{x})^2 \cdot \Sigma (y_i - \bar{y})^2}} = \frac{-35.144}{\sqrt{(97.7)(152.98)}}$$

$$= \frac{-35.144}{} = -0.28747$$

Spearman Coefficient

Spearman's rank correlation Coefficient (r_s)

$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

n - no of variables

d - Rank Differences

X	Y	← Rank → R_x	R_y	d	d^2
88	69	4	2	2	4
91	71	5	3	2	4
63	92	2	5	-3	9
72	98	3	6	-3	9
98	102	6	7	-1	1
103	58	7	1	6	36
56	91	1	4	-3	9

$\sum d^2 = 72$

$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)} = 1 - \left(\frac{6 \times 72}{7(49-1)}\right)$$

$$= 1 - \frac{432}{336}$$

$$= 1 - 1.2857 = -0.2857$$

$$r_s \simeq -0.29$$

Weak Negative Rank Correlation.