Answer on Question #66355 – Math – Statistics and Probability

Question

Work out the Spearman's rank correlation.

Student	Q.T.	M.A.
A	2	3
B	7	6
C	6	4
D	1	2
E	4	5
F	3	1
G	5	8
H	8	7

Solution

Since all the data in columns consists of distinct integers, we can compute Spearman's rank correlation coefficient using the following formula:

$$\rho = 1 - \frac{6\sum_{i=1}^{n} d_i^2}{n(n^2-1)},$$

where $d_i = rg(x_i) - rg(y_i)$ is the difference between two ranks (measure of order) of each observation, $n$is number of observations. In our case ranks coincide with observations, so we'll just sort data by Q.T. for clarity. Then we compute d and d^2.

Student	Q.T.=rg(x)	M.A.=rg(y)	d	d^2
D	1	2	-1	1
A	2	3	-1	1
F	3	1	2	4
E	4	5	-1	1
G	5	8	-3	9
C	6	4	2	4
B	7	6	1	1
H	8	7	1	1

Finally, we substitute obtained values into the formula:

$$\rho = 1 - \frac{6(1+1+4+1+9+4+1+1)}{8(8^2-1)} = \frac{31}{42} \approx 0.7381$$

Answer: $\rho = \frac{31}{42} \approx 0.7381.$