DISCOVERING OMAN

What links a country's economic development with the social impacts of a cyclone?

You are going to carry out a Spearman's Rank Correlation Coefficient test. This is a statistical test which tries to show whether there is a correlation between two sets of data. In this example, the two sets of data are:

- GNI per capita
- Number of fatalities

Your null hypothesis (a statement you need to prove is wrong) is:

"There is no significant correlation between a country's GNI and the number of fatalities it experiences in a tropical cyclone"

We can use 2018 data to investigate these two variables.

Tropical Storms of 2018 North and Southwest Indian Ocean							
Cyclone Name	Country	GNI per capita (US$)	Rank 1 (R_1)	Fatalities	Rank 2 (R_2)	R_1-R_2 (d)	d^2
Ava	Madagascar			73			
Berguitta	Mauritius			1			
Eliakim	Madagascar			21			
Fakir	Reunion Island			2			
Sagar	Somalia			53			
Mekunu	Oman			31			
Bob 1	Myanmar			0			
Bob 3	India			86			
Luban	Yemen			14			
Titli	India			85			
Gaja	India			63			
						TOTAL (Σd^2)	

1. Complete the GNI per capita data column by carrying out internet research.
2. Rank the GNI data from 1 to 11 (R_1), where 1 is the biggest value and 11 is the smallest.
3. Rank the Fatalities data from 1 to 11 (R_2), where 1 is the smallest value and 11 is the biggest.
4. Subtract R_1 from R_2 for each row of the table (d).
5. Square each d value in the final column of the table.
6. Total the value of d^2 at the bottom of the table.
7. Calculate the coefficient value using the following formula: $r_s = 1 - \frac{6\,\Sigma d^2}{n^3 - n}$

   The answer will always be between –1 (a perfect negative correlation) and +1 (a perfect positive correlation).
8. Use the significance table overleaf to determine how significant your result is (how likely the result is just by chance).
9. Write your results here: r_s = ...

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	Level of Significance		
n	0.1	0.05	0.01
4	1.000	1.000	1.000
5	0.900	0.900	1.000
6	0.771	0.829	0.943
7	0.679	0.786	0.893
8	0.643	0.738	0.857
9	0.600	0.683	0.817
10	0.564	0.649	0.782
11	0.527	0.609	0.755
12	0.504	0.587	0.727
13	0.478	0.560	0.698
14	0.459	0.539	0.675
15	0.443	0.518	0.654
16	0.427	0.503	0.632
17	0.412	0.482	0.606
18	0.400	0.468	0.590
19	0.389	0.456	0.575
20	0.378	0.444	0.561

The degree of freedom (n) is the number of pairs of data (in this case, the number of cyclones).

Do you accept or reject the null hypothesis?

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What geographical reasons might there be for this result?

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