



Skill: Hypothesis Tests for Correlation

Questions

Attempt these questions independently showing full and clear solutions. Check each answer as you go.

1. The table shows the latitude, x (in degrees correct to 3 significant figures), and the average rainfall y (in cm correct to 3 significant figures) of five European cities.

City	x	y
Berlin	52.5	58.2
Bucharest	44.4	58.7
Moscow	55.8	53.3
St Petersburg	60.0	47.8
Warsaw	52.3	56.6

- Calculate the product moment correlation coefficient.
- It is suspected that there is a negative correlation between the latitude and the average rainfall observed in European cities. Test at the 5% significance whether there is sufficient evidence to support this claim.

2. The following table contains information about five households selected at random from a certain town.

Number of people in the household	2	3	3	5	7
Number of cars belonging to people in the household	1	1	3	2	4

It is suspected that there is a positive linear relationship between the number of people in a household and the number of cars. Perform a hypothesis test at the 5% significance level to test this assertion.

3. The table shows the total distance travelled, in thousands of miles, and the amount of commission earned, in thousands of pounds, by each of seven sales agents.

Agent	A	B	C	D	E	F	G
Distance travelled	18	15	12	14	16	24	13
Commission earned	18	45	19	24	27	22	23

- One of the agents is thought to have falsified sales records in order to gain more commission. State which agent this might be, giving a brief reason for your answer. No calculations are required.
- After an investigation, it is decided that agent B's commission is actually accurate. Calculate the product moment correlation coefficient for the entire data set.
- It is suspected that there is a linear correlation between the commission an agent earns and the distance they travel. Test this hypothesis at the 5% significance level.

