

## ICQ 3

### Instructions

In this exercise, please use the excel file “Sudarshan\_TE23\_ICQ3.csv”.

### Context behind the data

You are given a data set for a certain number of counties in United States. There are 13 variables in this data set and a detailed description of the variables is given in the Appendix. Your job is to quantitatively and qualitatively describe the relationship between two variables in the data set, and use one of them to predict the other variable.

### Questions

Answer all the following questions. For numerical answers, please leave your answers correct to the nearest 4 decimal places.

1. What is the correlation coefficient  $r$  between “poverty\_2017” and “per\_capita\_income\_2017”?
2. The linear association between “poverty\_2017” and “per\_capita\_income\_2017” is \_\_\_\_\_.  
Choose among the options below:
  - strong and positive
  - strong and negative
  - moderate and positive
  - moderate and negative
  - weak and positive
  - weak and negative
  - zero
3. What is the gradient of the linear regression line if we use “poverty\_2017” to predict “per\_capita\_income\_2017”? Do not perform any transformation before doing linear regression.
4. What is the predicted average value of “per\_capita\_income\_2017” at poverty\_2017 = 9.3 ? Do not perform any transformation before doing linear regression.

## Appendix

A description of the data set is given below:

Variable	Description
State	state
Name	county
Pop2017	population in 2017
Age_over_65_2017	percent of population over 65 (2017)
Speak_english	percent of population that speaks English only (2017)
Hs_grad2017	percent of population that is a high school graduate (2017)
Bachelors_2017	percent of population that earned a bachelor's degree (2017)
Computer_2017	percent of population who has access to a computer (2017)
Poverty_2017	percent of population below poverty level (2017)
Uninsured_2017	percent of population who are uninsured (2017)
Unemployment_rate_2017	unemployment rate in 2017
Per_capita_income_2017	per capita money income in past 12 months (2017)
Median_household_income_2017	median household income (2017)