Questions 10:
Multilinear Regression

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Question 1

Suppose that a multiple regression model using $m = 6$ input variables should be created based on some data. What is the minimum number of cases the dataset should have?

Question 2

Consider the following data:

Monthly Income (£K)	Monthly Expenses (£K)	Home Owner	Credit Score
2	1	0	3
1	2	0	1
6	2	1	5
3	1	1	4
3	2	0	2

Suppose you are building a linear mean-square model based on this data to predict the customers' credit scores. Let us denote the three input variables (the first three columns of the table) as x_1, x_2 and x_3, while the output variable as y. Answer the following questions:

a) Does this dataset contain a sufficient number of cases to build the model?

b) Compute the centre of gravity $(E\{x_1\}, E\{x_2\}, E\{x_3\}, E\{y\})$.

c) The regression coefficients for this model are $b_1 = 0,69$, $b_2 = -1,31$ and $b_3 = 0,56$. Using the coefficients and the centre of gravity of the data above, write the linear function $f(x_1, x_2, x_3)$.

d) Using the model, compute the credit score for the following customer:

Monthly Income (£K)	Monthly Expenses (£K)	Home Owner	Credit Score
5	3	1	?

e) Explain what does this model represent.

Question 3

How to test whether a model is good in forecasting?

Question 4

Compute correlation for the following set of data:

Monthly Expenses (£K)	Home Owner
1	0
2	1
1	1
2	0

What does the value of the correlation mean in this case?