# 30. Statistics

Using scatter graphs to assess cost of living pressures.

You are completing an internship with your local council. During the internship, you have been researching the impact of the increased cost of living on people in your area. You have been presented with the results of various surveys that your department has carried out and have now been asked to analyse the data.

Monthly Rent (£) vs. Flat Size (m^2)
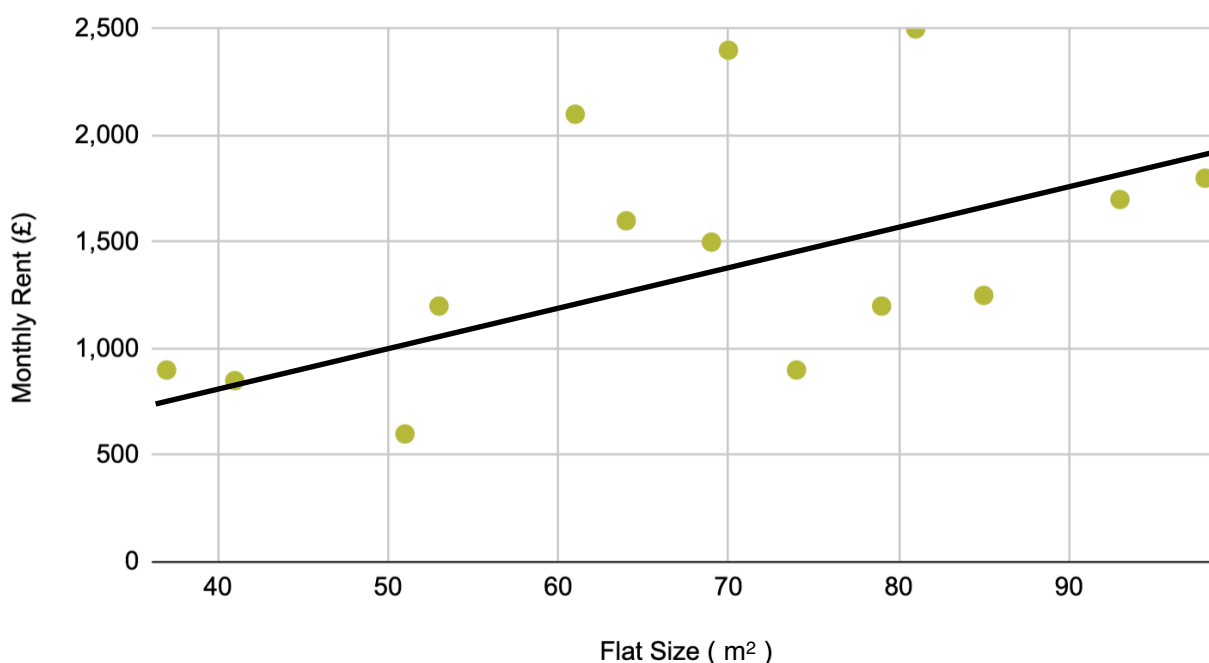
The above graph shows the monthly rent of different sized flats. The data was taken by randomly selecting flats in various UK cities.

1. What type of correlation does the graph show?

2. Describe the relationship between monthly rent and flat size.

3. Draw a line of best fit on the graph and use it to estimate the following data points:

   a. The monthly rent of a 57m² flat.

   b. The size of a flat with rent of £800 per month.

   c. The size of a flat with rent of £1,100 per month.

   d. The monthly rent of a 85m² flat.

4. A classmate draws the following conclusion: "The size of the flat determines its monthly rent. If the flat is bigger, the rent will be higher." To what extent do you agree with your classmate?

5. What other factors other than flat size might impact a flat's monthly rent?

Monthly energy bills (£) vs. Monthly Rent (£)
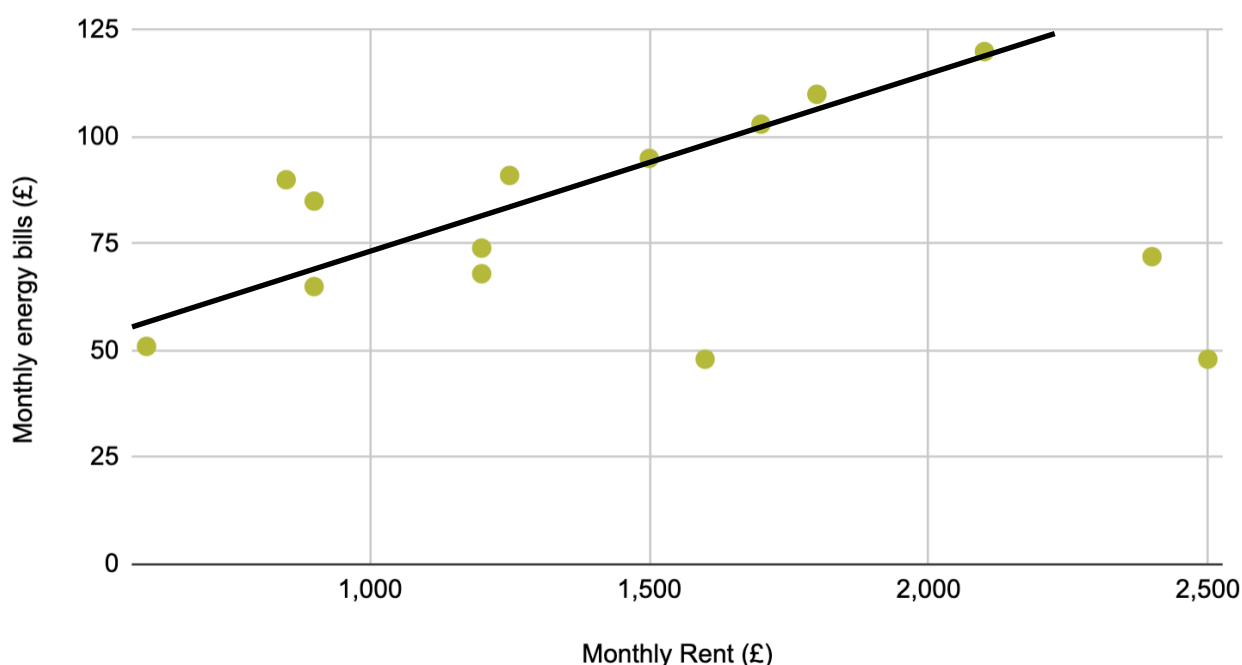
The above graph shows the results from a survey in your city that asked people how much they pay in rent each month and how much their monthly heating bills are.

6. What type of correlation does this graph show?

7. Describe the relationship between monthly rent and the amount spent on energy bills. What do you think the cause of this relationship might be?

8. Draw a line of best fit on the graph. Using your line of best fit, estimate the following data points:

    a. Monthly heating bills in a flat that costs £2,250/month to rent.
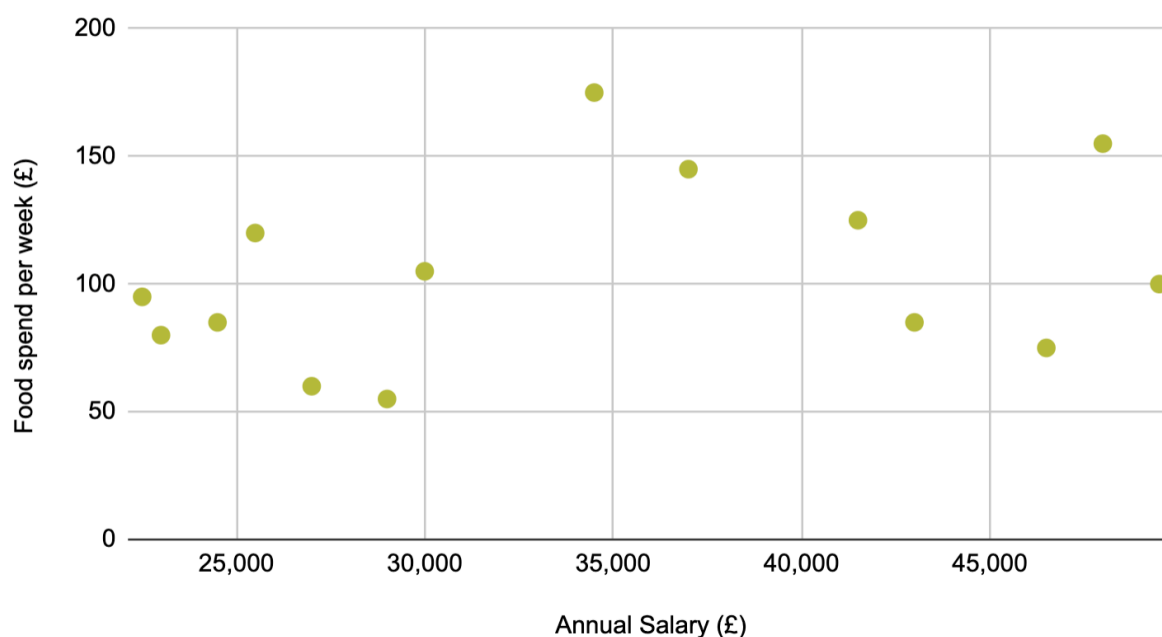
    b. Monthly rent of a home with heating bills of £60/month.

    c. Monthly heating bills in a flat that costs £1,750/month to rent.

d. Monthly rent of a home with heating bills of £110/month.

9. What factors could influence the amount that a household spends on energy bills?

Food spend per week (£) vs. Annual Salary (£)

People were surveyed on their way out of a local supermarket. Every tenth person who left the supermarket was asked to share how much they spend on food each week (including eating out and their food shops) and what their annual salary is. The results are plotted on the graph.

10. What type of correlation does the data show?

11. What sampling method was used?

12. What biases could there be in this data given the method of data collection?

13. If you were planning this piece of research, what would you hypothesise the relationship between food spend and salary is?

14. Suggest three other methods of sampling that you could use to conduct this research and recommend the method that you feel is best suited to produce a reliable conclusion?