

Directions: You are required to turn in a print out of your work (not necessarily a color copy). The due date for this lab is TBD. The data sets for both case studies (below) are in the same GeoGebra (.ggb) file located on the course materials webpage, the slide associated with Lab 2. ([direct link](#)) Please use a 20-point font on any graphs you make.

Case Study: In an investigation of environmental causes of disease, data were collected on the annual mortality rate (deaths per 100,000) for males in 61 large towns in England and Wales. In addition, the water hardness was recorded as the calcium concentration (parts per million, ppm) in the drinking water.

1. **Graphing.** Export and paste your graphs into your text document.
 - (a) Make a scatter plot of Calcium (x) versus Mortality rate (y). Copy this to your graphics view.
 - (b) Make sure your axes are square, and that your graph has the axes equally scaled. How to do this:
 1. Open your object properties (gear icon) and click on “preferences graphics.”
 2. Set both the values of x -min and y -min to -225 .
 3. Set the values of x -max and y -max to 2200.
 4. Then set “xAxis : yAxis” to be a 1 to 1 ratio.
 5. Make visible your coordinate grid.
 6. Visually check that the axis looks square.
 7. Label your axes; then export your graph to a png file.
 - (c) Make a residual plot of the data. Set your axis square, label your axes, turn the grid on and export your figure.
 - (d) Calculate the statistics of both variables and include a table in your text document summarizing the statistics. Include the values of r and r^2 .

2. **Analysis.** Please use full, coherent sentences to answer the following questions. Please type your answers into your text document.

- (a) Describe what you see in this scatterplot, in context.
 - (b) Which variable should we take as the response variable? As the explanatory variable?
 - (c) What is the regression equation?
 - (d) Interpret the slope and y -intercept of the line, in context. Be specific.
 - (e) What is the value of the largest residual? (Recall that a residual is the difference between the observed and predicted values.) Explain what this means.
 - (f) The hardness of Derby's municipal water is about 100 ppm. Use the regression equation to predict the mortality rate in Derby.
 - (g) Explain the meaning of r^2 in this context.
-

Case Study: A very difficult exam was administered to 37 math, science and engineering students. The exam scores given in the same ggb (geogebra) file as the previous case study.

3. **Graphing and Analysis.** Export and paste your graphs into your word document. Label your axes in each figure for full credit.

- (a) Make a histogram of the test scores with 9 classes (bars) from 10 to 100, using a class width of 10. Note: your axes do not have to be square for this figure.
- (b) Make a distribution table of the test scores.
- (c) Make a table summarizing the exam statistics.