1. Gas chromatography is a technique used to detect very small amounts of a substance, for example, a contaminant in drinking water. Laboratories use regression to calibrate such techniques. The data below show the results of five measurements for each of four amounts of the substance being investigated. The explanatory variable x is the amount of substance in the specimen, measured in nanograms (ng), units of 10-9 gram. The response variable y is the reading from the gas chromatograph.

|  |  |
| --- | --- |
| Amount (ng) | Response |
| 0.25  1.00  5.00  20.00 | 6.55 7.98 6.54 6.37 7.96  29.7 30.0 30.1 29.5 29.1  211 204 212 213 205  929 905 922 928 919 |

a). Make a scatterplot of these data (in excel). The relationship appears to be approximately linear, but the wide variation in the response values makes it hard to see detail in this graph.

b). Compute the least-squares regression line of y on x, and plot this line on your graph.

c). Now compute the residuals and make a plot of the residuals against x. It is much easier to see deviations from linearity in the residual plot. Describe carefully the pattern displayed by the residuals.