1. The attached excel file contains return on capital and the debt/capital ratio for 96 companies from the sectors Banking, Computers, Construction and Energy, together with dummy variables indicating to which sector each company belongs.

   a) Regress return on capital upon all other variables. The sectors are to be ranked in descending order of return on capital. Based on the regression result, what will that ranking be?

   b) For a given debt/capital ratio, which sector's return on capital can be expected to be different from those of the others also out of sample?

   c) You suspect that the sensitivity of return on capital towards the debt/capital ratio might depend on the companies sector. Create the necessary interaction variables and conduct a partial F-test in order to either confirm or refute that claim.

   d) Use exel's own correlation tool in order to get a correlation matrix of the regressors contained in c). Does it explain the largest variance inflation factors seen in the full model?

   e) Given the analysis above, which variables should be dropped and which retained? Find and interpret the final regression model.

2. The attached excel file contains fuel consumption in miles per gallon, the horsepower and the weight of American and Japanese cars together with a dummy indicating whether the car is American or Japanese.

   a) Regress mpg upon all other variables. What does the model tell about the difference between American and Japanese cars?

   b) Replace mpg in the previous regression with the natural logarithm of mpg. How do we now interpret the parameter estimate for the Japan-dummy?

   c) Check normality of the residuals and the residual plots in order to decide whether a) or b) is the better model. *Hint: You can get a single residual plot for each model by checking 'Residuals and Cook's D' in the real-statistics regression tool.*

3. The data below is taken from an experiment designed to examine how well a certain insecticide kills a certain insect.

Log Concentration:	0.96	1.33	1.63	2.04	2.32
Number of Insects:	50	48	46	49	50
Insects killed:	6	16	24	42	44

   a) Plot the log odds of percent killed against Log Concentration and argue based on this plot that it makes sense to apply logistic regression in modelling the probability of an insect being killed.

   b) Setup an equation for the probability forecast of an insect being killed as a function of Log Concentration based on the output from the Real Statistics Multinomial Logistic Regression add in. *Hint: You might have to change the decimal seperator in the operating system settings from comma to dot for this to work.*

   c) Confirm the odds ratio of an insect being killed and its 95% confidence interval by pen and paper calculations.