Homework Problem Set #2

The data are from an experiment designed to compare response to increasing dosage for two types of drug (SAS for Linear Models). 'y' is a response. 'block', 'type', and 'logdose' are predictors. Treat 'block' and 'type' as a categorical variable and a binary variable. Treat 'logdose' as a continuous variable.

(1) Fit a linear regression and test whether there is an interaction between type and logdose using PROC GLM.

(2) Fit a linear regression including an interaction between type and logdose using PROC REG.

(3) Estimate the difference between the two types given block=1 and logdose=0 using PROC GLM ESTIMATE statement. Are they significantly different at $\alpha = 0.05$?

(4) Obtain the p-value for testing the two types given block=1 and logdose=0 using a t-test with the covariance matrix from PROC REG.

(5) Estimate mean response when block=1, type=1, and logdose=1.5 and its 95% confidence interval using PROC GLM. Obtain the mean response and its 95% confidence interval using matrix calculation in R.

(6) Test whether the mean response in part (5) is equal to 50 using a t-test with what you have from R in part (5).

(7) Check the normality of errors, constance variance of errors, and linearity assumption using plots. Are there any influential data points based on Cook's distance and DFFITS (produce plots)?