Homework 1

1. For the data in Problem 3.36, use orthogonal polynomial contrasts to test whether or not a linear model is better than an intercept model; whether or not a quadratic model (with a linear term) is better than an intercept model. Are either of these models inferior to the usual cell means model?

2. Problem 3.19. (For part c, there is only one meaningful contrast for comparing Chemist 2; simply find two other contrasts orthogonal to this one.)

3. Problems 3.32 and 3.33a-c

4. Assume that the density of fiddler crab burrows is being tested for four different types of habitat using a CRD. The research wants to conduct a power analysis on the contrast between the mean number of burrows in the first habitat against the average of the mean number of burrows in the remaining three habitats. Suppose that the number of burrows has a variance of 20 and the researcher is testing

$$H_o : \mu_1 - \frac{\mu_2 + \mu_3 + \mu_4}{3} = 0$$

using a $\alpha = .05$ test. Summarize the size of the contrasts that the researcher will be able to detect with 80% power.