

**No Tutorial 8 - Quiz instead****Computer Exercises 8**

1. How does the frequency that a super market product is promoted at a discount affect the price that customers expect to pay for the product? Does the percent reduction also affect expectation? Results of a study in Australia are given in a data frame called `price.df`. The number of promotions were 1,3,5,7 and the percent of reduction were 10, 20, 30 and 40. The response is the expected price (obtained from a customer survey) of a super market product. Perform a detailed two-way ANOVA for these data.
  - (a) Prepare your data for analysis by typing `attach(price.df)` to create vectors with the column labels.
  - (b) Obtain group means of the data, say `price.mean`.
  - (c) Plot the group means and comment on the results.
  - (d) Compute the overall mean and the marginal means of the group means. Store the results as `overall.mean`, `price.row` and `price.col` respectively.
  - (e) Compute group sample variances and store the results as `price.var`.
  - (f) Find the number  $m$  of replicates.
  - (g) Compute the TMS, BMS, IMS and Residual MS ( $s^2$ ) in the two way ANOVA table and store the results as `TMS`, `BMS`, `IMS` and `RMS` respectively.
  - (h) Compute the  $p$ -values corresponding to the different hypotheses relating to the two-way model for this data set. Comment on the results.
  - (i) Check your results by using the built-in `aov` function. Obtain a two-way table as well as a normal qq-plot of the residuals. Comment on the assumptions required for the two-way ANOVA.