Problem set 11

S520

Upload your answers to questions 1 to 4 as one PDF or Word document through the Assignments tab on Canvas by 11:59 pm, Thursday 5th December.

Trosset question numbers refer to the hardcover textbook. Draw all graphs in R and include all R code. You may work with others, but you must write up your homework independently — you should not have whole sentences in common with other students or other sources.

1. (5 points.) We wish to study the effects of four different rat feeds (fruit, carbs, meat, and mixed) on rat weight gain. 140 rats, each kept in a separate cage, are randomly split into four equal groups of 35. Each group is put on a different feed for a month. The amount of weight gained during the month is measured for each rat. The sample means and sample standard deviations of the results (all in grams) are:

   - Fruit: mean 83.5, standard deviation 16.9
   - Carbs: mean 92.3, standard deviation 14.6
   - Meat: mean 88.6, standard deviation 14.2
   - Mixed: mean 99.4, standard deviation 14.1

   Figure 1 (on the next page) shows normal QQ plots of the data.

   (a) What are the assumptions of the analysis of variance F-test? Are the data here approximately consistent with these assumptions?

   (b) Complete the analysis of variance table below.

Variation	Sum of squares	DF	Mean square	F	P-value
Between					
Within					
Total					

Table 1: ANOVA table for weight gain of four groups of rats.

   (c) What can you conclude from the analysis of variance? (Give a substantive conclusion, not just "reject" or "don't reject."

2. (10 points.) Trosset chapter 12.6 problem set B. Data: `http://pages.iu.edu/~mtrosset/StatInfeR/Data/sickle.dat`

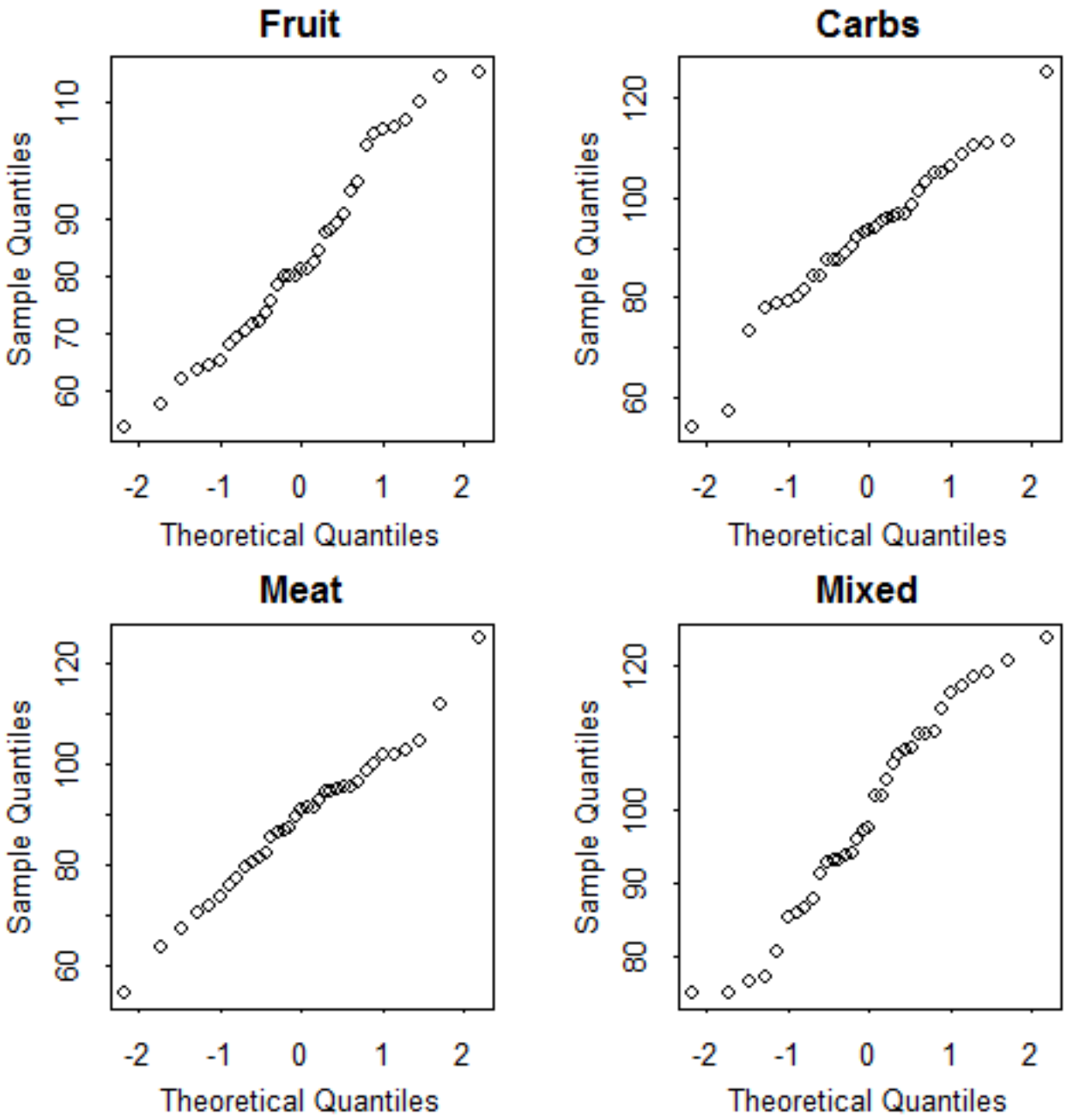

Figure 1: Normal quantile plots for four groups of rats.

3. (10 points.) Trosset chapter 12.6 problem set C. Data: `http://pages.iu.edu/~mtrosset/StatInfeR/Data/cancer.dat` (Note: When the question says $\overrightarrow{y}_1, \ldots, \overrightarrow{x}_5$, it should be $\overrightarrow{y}_1, \ldots, \overrightarrow{y}_5$.)

4. (5 points.) Play the game at `guessthecorrelation.com` and include/upload a screenshot of your name and high score. A score of at least 40 points gets you full credit for this question.