

Statistics 5303
Fall 2013

Exam #1 Data

Our first exam is Wednesday, October 16. The exam is open book and open notes. Those of you who have your text and notes electronically on your laptops may bring and use your laptop (or tablets) to access the book and notes. However, you may not use R during the exam or communicate during the exam.

Analyze the two data sets below and bring printed notes on your analysis to class. Answer the exam questions on these data using your notes; your solutions should refer to specific analyses on specific pages of your notes (e.g., see Box-Cox plot on page 3). Attach your notes to your exam when done. Note: there will be some questions that do not involve these data.

In your analyses, remember to check for assumptions and think about interactions. Your analysis should go beyond just the ANOVA and what is significant; it should try to explain what is going on in the data.

This preliminary analysis should be considered part of your exam. *Do your own work!* Discuss these data only with the instructor.

(1) Frozen chicken wings need to be cooked before being eaten. Although the package gives cooking instructions, the discerning consumer of wings might wish to vary the cooking instructions to attain the perfectly cooked wing.

In this experiment, 36 equally sized wings from the same package are randomly assigned to nine different cooking treatments. These treatments are the combinations of cooking for 40, 45, or 50 minutes and cooking at 350, 375, or 400 degrees F. The wings are cooked in random order using their designated combination of time and temperature, and then each wing is rated for how well it is cooked. The rating scale is from 1 to 10, with 1 being extremely undercooked, 5 being just right, and 10 being, well, incinerated. The data for this question are in the file `wings.txt` on the class web page.

Analyze these data to determine the effects of time and temperature and determine acceptable cooking conditions.

(2) We wish to study factors that affect the holding power of glue. In this experiment, we will vary the type of glue (liquid or stick), the quality of glue (generic or name brand), the material glued (cardboard or paper), and whether or not the pieces are pressed together with a weight while the glue dries (yes or no). We randomly order the 16 factor/level combinations of the four factors, and we will run the combinations in that order. For a given combination, we take two pieces of the indicated material, glue them together with the indicated type of glue of the indicated quality, and then either hold them together with a weight or not while the glue dries. When the glue is dried, we put the pieces in a machine that measures the force required to pull the two pieces apart. We then repeat the combination with two more pieces of the same material (and the same glue, etc.) obtaining a second measurement for the combination. We thus obtain 32 force readings. The data for this experiment are in the file `glue.txt` on the class web page.

Analyze these data. We are particularly interested in the effects of type and quality (so that we know which glue to purchase) and in whether we should use a weight.