STAT W4201 001, Homework 4

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Code is attached here and also posted at https://github.com/BrianWeinstein/advanced-data-analysis. Where relevant, code snippets and output are are included in-line.

Problem 1: Ramsey 5.23

The data provides overwhelming evidence that the mean oxygen isotopic composition in the 12 bone samples are different (a p-value of 9.7×10^{-7} from a one-way analysis of variance (ANOVA) F-test).

The ANOVA table testing for a difference in mean oxygen isotopic composition is shown below, and a boxplot of oxygen composition for each bone is shown in Figure 1.

Source of Variation	Sum of Squares	d.f.	Mean Square	F-Statistic	p-Value
Between Groups	6.0675	11	0.55159	7.4268	9.73×10^{-7}
Within Groups	2.9708	40	0.07427		
Total	9.0383	51			

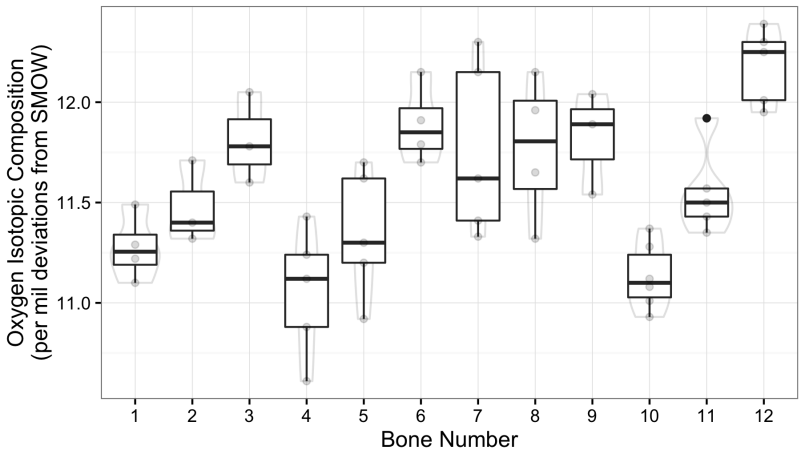

Figure 1: Oxygen Isotopic Composition (per mil deviations from SMOW) for twelve bones of a single Tyrannosaurus rex specimen.

Problem 2: Ramsey 5.25

Problem 3: Ramsey 6.12

Problem 4: Ramsey 6.15

Problem 5: Ramsey 6.16

Problem 6: Ramsey 6.23

Todo list