Name: Feedback

SM339 · Applied Statistics Spring 2023 · Uhan

Quiz 7 – 3/29/2023

Instructions. You have 15 minutes to complete this quiz. You may use your plebe-issue TI-36X Pro calculator. You may not use any other materials.

Show all your work. To receive full credit, your solutions must be completely correct, sufficiently justified, and easy to follow.

Problem	Weight	Score
1a	1	
1b	1	
1c	1	
1d	2	
Total		/ 50

Problem 1. A researcher is interested in studying whether the weight of penguins differs by type. She gathers a random sample of the same number of penguins from each of the following five types: King, Emperor, Chinstrap, Royal, and Gentoo. For each penguin, she records its *Weight* and *Type*. She performs one-way ANOVA, using *Weight* as the response variable and *Type* as the explanatory variable. The ANOVA table is below – note that some entries of the table are missing:

```
             Df  Sum Sq  Mean Sq  F value    Pr(>F)
Type         ??   22.74    5.685   20.159  7.79E-11
Residuals    65   18.31      (*)
```

a. What are the treatments?

See page 1 of Lesson 23 for the definition of **treatment** in a one-way ANOVA setting.

b. What is the total sample size?

See page 3 of Lesson 23, in particular, the ANOVA table. Note that error DF is equal to $n - K$, where n is the total sample size, and K is the number of groups.

c. What is the value of `(*)` in the table? Provide your answer rounded to 3 decimal places.

See page 3 of Lesson 23, in particular, the ANOVA table. Note that the entries in the *Mean Square* column are equal to the entries in the *Sum of Squares* column divided by the entries in the *DF* column.

d. Use a one-way ANOVA F-test with a significance level of 0.05 to answer the researcher's question. State all four steps.

See Example 3 in Lesson 23 for a similar example. Note that one-way ANOVA tests for differences in the mean or avarege response values between treatments.