Homework 3 Self-Grading

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1a: Correct. The ordering in which the proof steps were done seems a little different but the same outcome.

1b: Correct. I did not pull β0 to one side of the equation but it is mathematically equivalent.

1c: Correct; although I did not write out each individual step of the proof which would’ve been a better answer.

2: Incorrect. I started off the problem on the wrong principle. I should’ve started with the equation β0 = E[Y] - β1[X] and solved from there. Clearly from this equation, I can now see that if you set E[X] to X, then you get E[Y].

3. Correct, although the solution given is much more succinct.

4. Correct.

5a: Correct

5b: Correct

5c: Correct; but a shorter answer would’ve been more sufficient. The answer boils down to the idea that small coefficients can still be significant if the p-value falls below a predetermined threshold, especially if the variance is just as small as the mean of the two groups.

6: Correct.

7a: Correct. I would’ve added to my answer the details regarding what it means to have a ‘random structure’” essentially, it means that there is no particular significance assigned to the variable that you’re studying. Moreover, you assume that the value of the predictor variable maps onto a meaningful relationship to the data.

7b: Correct for both parts of this question.

7c: Correct.

8: The second half of this is incorrect; I typed the formula for lmer wrong. I should typed lmer(incidence ~ size + (size|herd), data = cbpp) rather than 1|herd. Thus, the calculated AIC for the second formula was also wrong.

9a: Correct

9b: Correct (but hard to see my version of the graph). Found a nice package called corrplots that will make a correlation matrix that I’ll have to use next time (but used it in homework 4!).

9c: Correct

9d: Correct (except I should’ve mentioned that point 14 is a high leverage point; you can see this point showed up on the Cook’s Distance graph, though.

9e: Correct

9f: Correct

10a: Correct

10b: Correct

10c: Correct

10d: Correct

10e: Correct (though I incorrectly labeled my questions; 10e is under 10d).

10f: Incorrect; I accidently labeled 10h as 10f and forgot to do 10f. Oops! Highlights the importance of double checking these notebooks!

10g: Correct

10h: Correct (but labeled as 10f).

11a: Correct (though it didn’t print out on my jupyter notebook. This is when I was having issues installing packages in jupyter but it’s solved now).

11b: Correct

11c: Correct

11d: Correct

11e: Correct

11f: Correcct

11g: Correct

11h: Correct

11i: Correct

11j: Correct