Extra practice problems: coding

Midterm 2

Almost all of following problems should require to use `R` in some way. Remember to check conditions where appropriate!

1. An apple farmer has historically lost an average of 4% of his trees each year. He believes that he has been losing more trees lately. In a random sample of 200 trees, 12 have died.

    a. Using an appropriate method, test the farmer's claim at the 0.01 level.
    b. Using the data from his sample, obtain a 90% confidence interval for the farmer's loss rate of trees.

2. Recall that the `starbucks` data from `openintro` has several different `type`s of food items. We'd like to know if the average calories in hot breakfast items are different from the average calories of sandwich items. Answer this two ways: 1) using an appropriate hypothesis test and 2) using an appropriate confidence interval. Try to do one via mathematical model (if appropriate) and another via simulation.
3. Working with the `starbucks` data again: Using an appropriate method, obtain a 95% confidence interval for the mean calorie per carbohydrate of bakery type items.
4. Take a look at the Help file of the `satgpa` data from `openintro`. Fit a linear model where we use math SAT percentiles to estimate the first year college GPA. Check if your model is appropriate. If so, is a student's performance on the math section of the SAT predictive of their first-year GPA?
5. Yawning. Take a look at the Help file for the `yawn` data from `openintro`. Write down null and alternative hypotheses (in words or in notation is) that correspond to the research question implied in the Help file Description. Make a plot of the data that would be appropriate/helpful exploratory analysis for the researchers. Then using simulation, test your hypotheses at the 0.05 significance level. *Optional but good practice before coding: describe in words how you would implement the simulation using props/cards.* Make a conclusion in context.