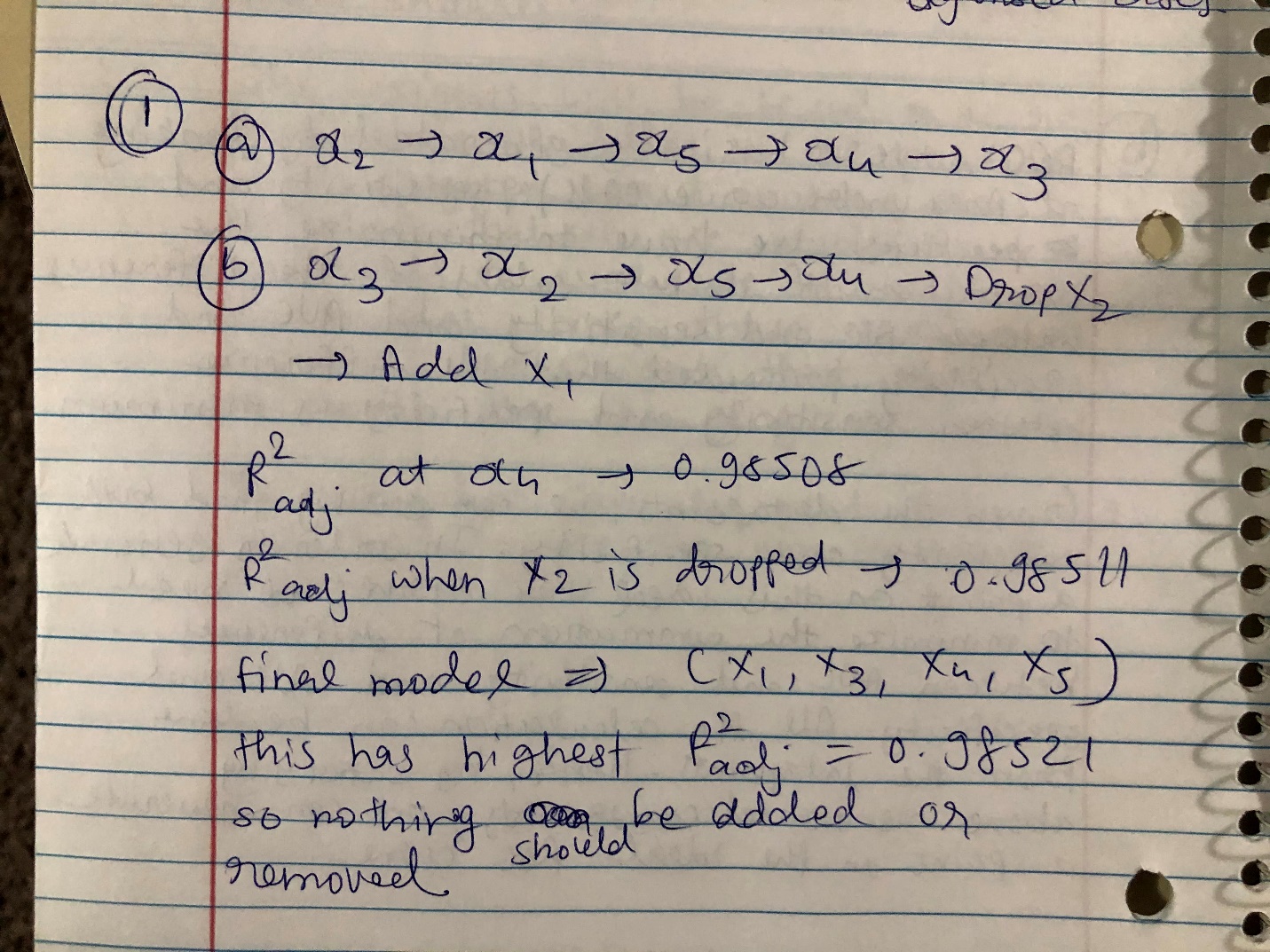
Himesh Buch

Final Exam – Regression Methods

5/12/2020

1



2.

a. 1.452990 / sqrt(4.76) = Wald coefficient for B­4 = 0

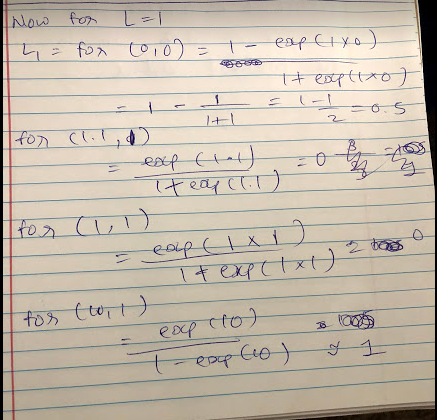
b. 0.002

c. Looking at the output of Logistic regression predicting Y, we can say that B1 = B2 is not true, by looking at the p values, and B4 = 0 is true, again by looking at the p value. Hence, we will accept the hypothesis where B4 = 0

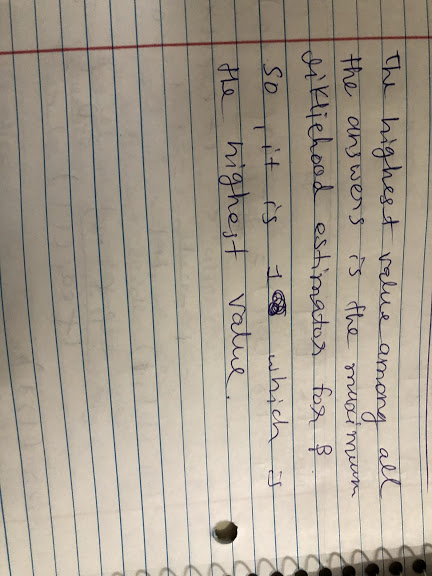
d. From the overall model, the odds ratio for X4 is 4.28, and the 95% CI is (1.73, 10.6). We can see that the CI does not contain 1, and hence X4 is significant in the analysis.

3



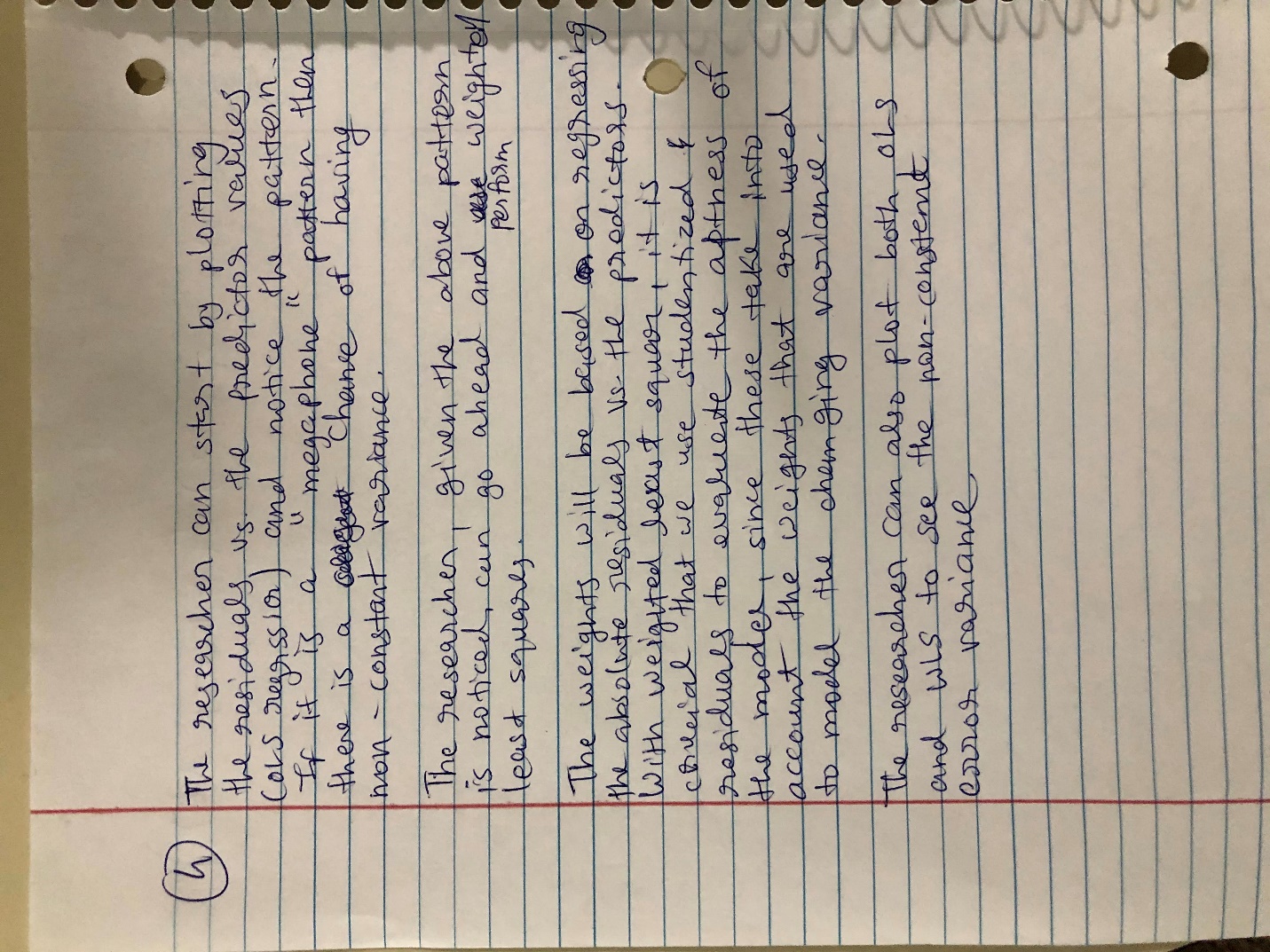


3 (..continued)

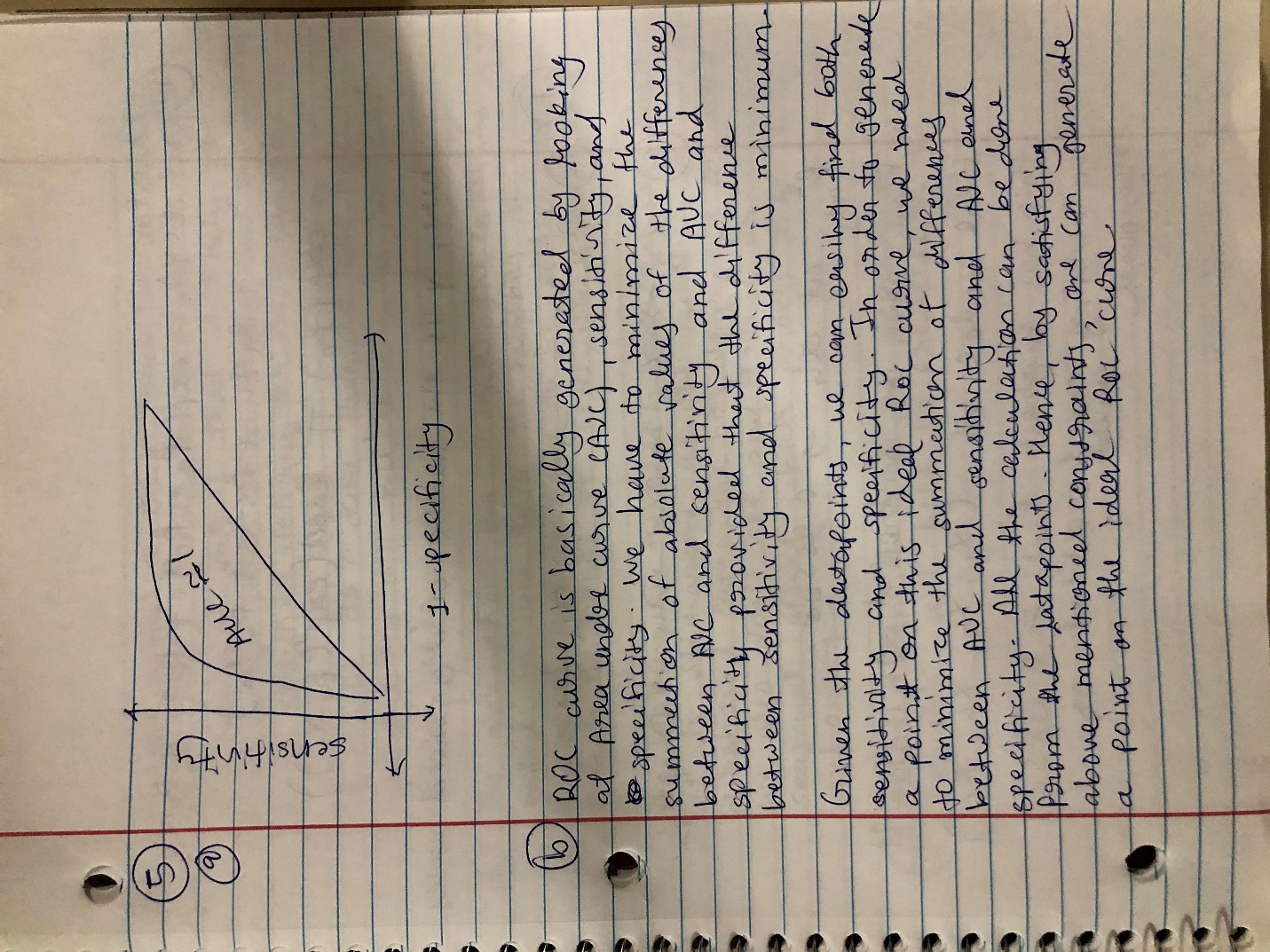


3 (..continued)

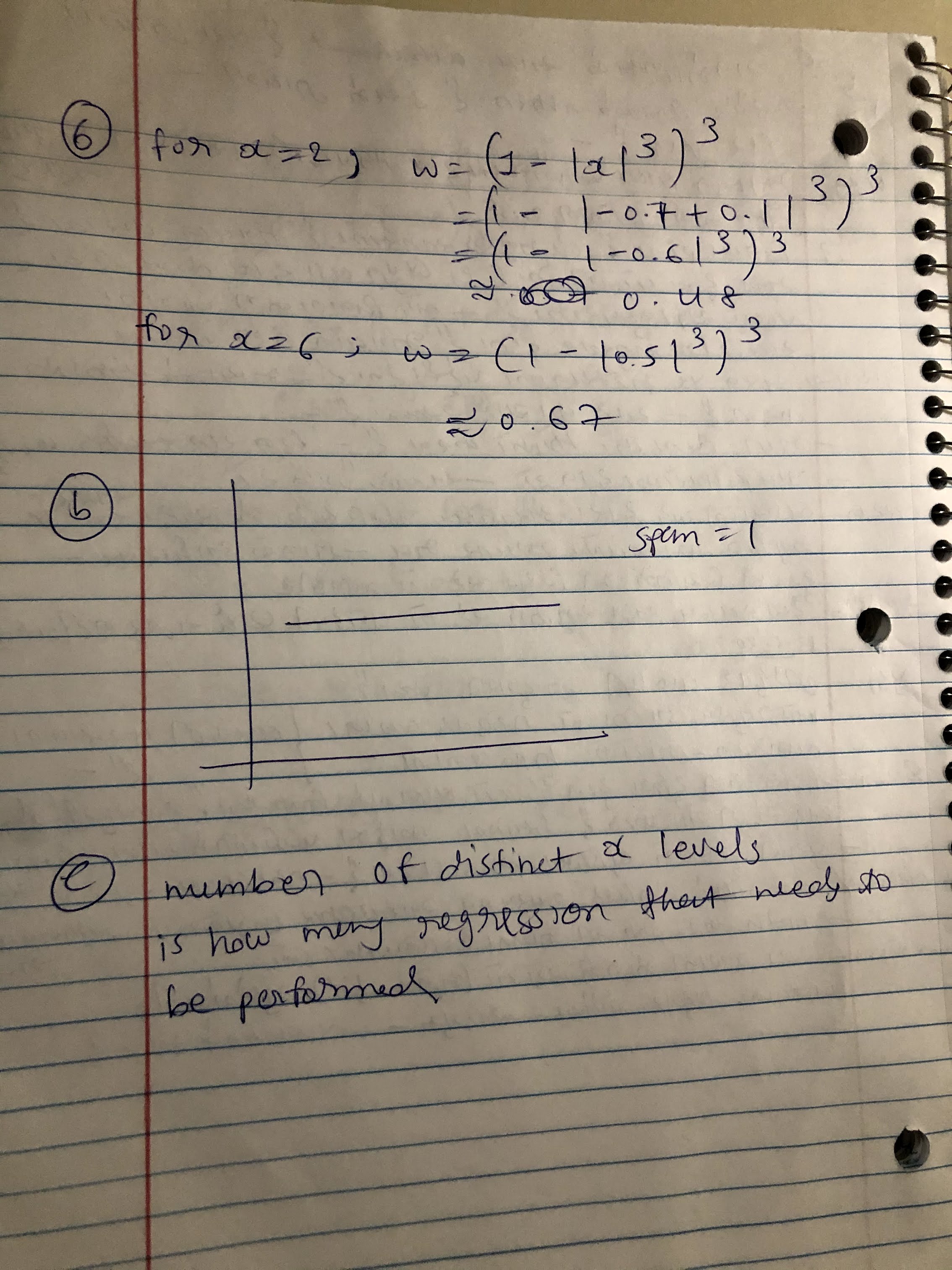
4.



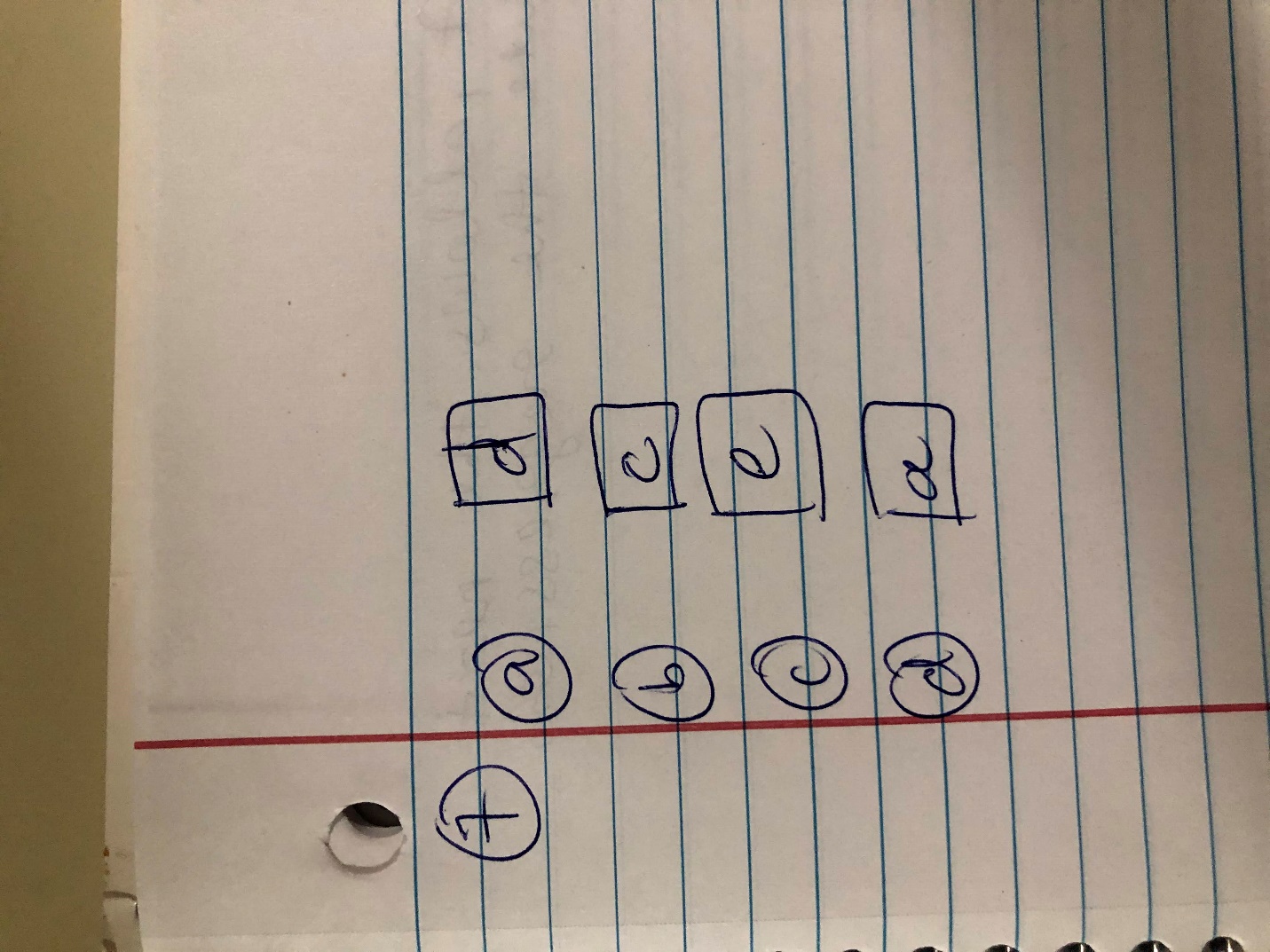
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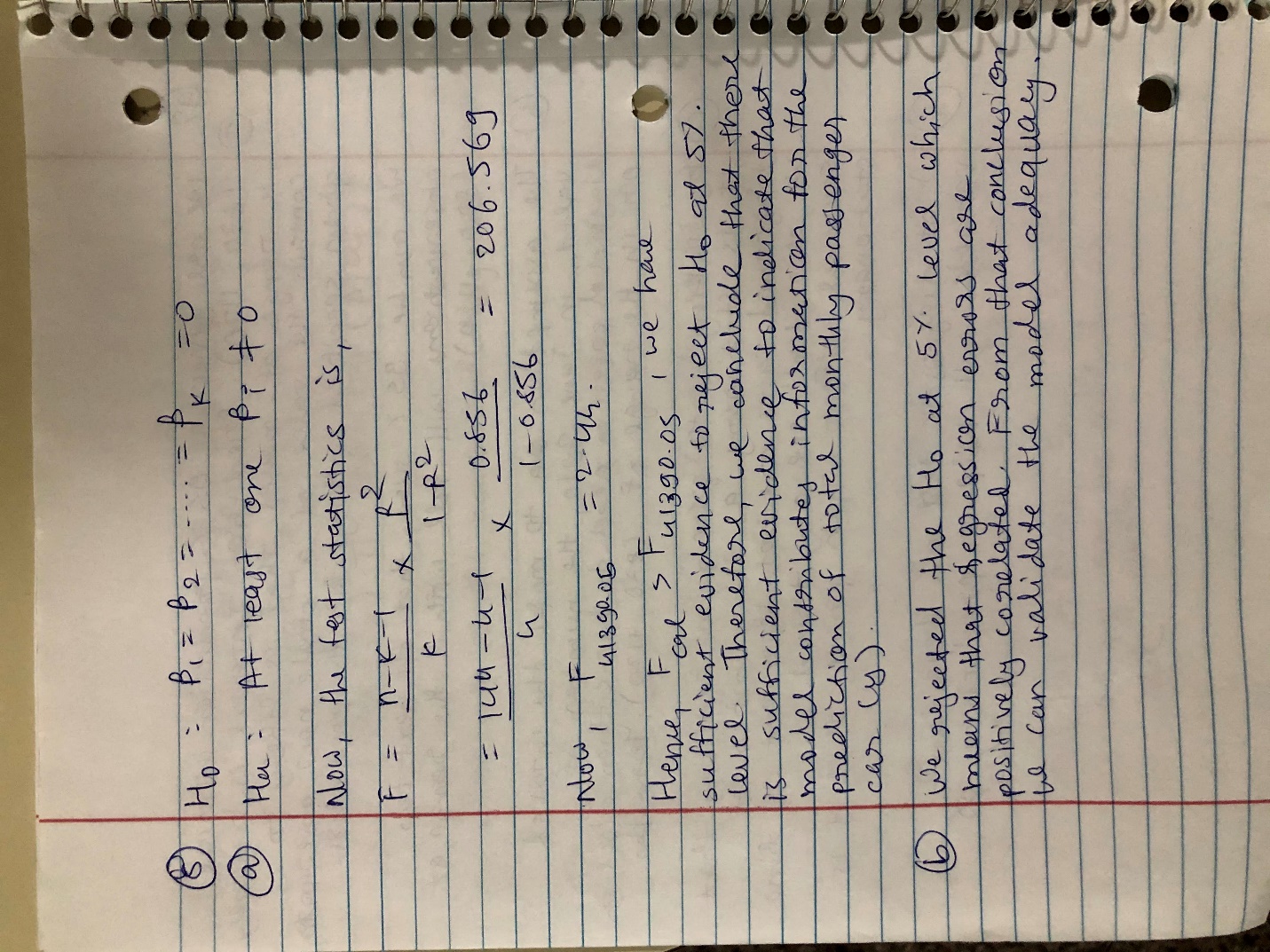
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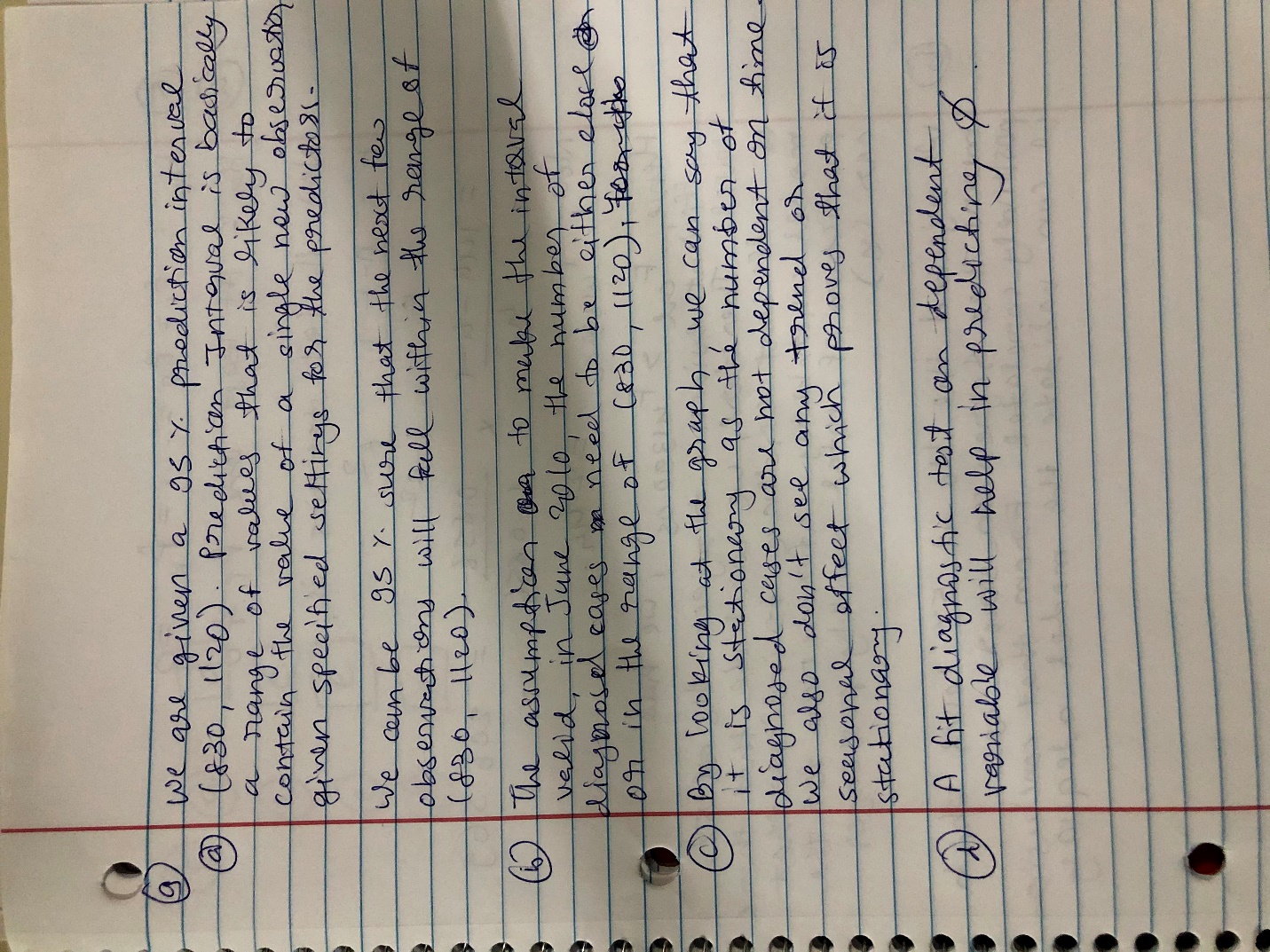
7



8



9



10

1. In logistic regression the likelihood of the saturated model is equal to 1. In a saturated model pihat = yi so likelihood[product of pihat ^ yi x (1-pihat)^(1-yi)] is equal to likelihood[product of yi^yi x (1-yi)^(1-yi)] which is equal to 1.

For our case, we will include all 6 predictors in the model

1. σ2 is defined as -2\*ln[likelihood of the fitted model]

11

1. Lambda = 0.47 allows the next step to compute the regression coefficients

Now, since we know the lambda, we will compute information criteria, which is AIC and BIC using the selected lambda value. The next step will be to plot the information criteria, AIC and BIC, against lambda. Once that is done, we will find optimal lambdas to both AIC and BIC, fit final models, and get their sum of squared residuals and multiple R-squared. By the definition of Ridge regression, we will see how increasing lambda shrinks the coefficients. The higher the lambda, the more the coefficients are shrunk towards zero. We can also plot the coefficients with lambda (or log of lambda) to visualize the shrinkage.

1. In an experimental situation, even when a high degree of collinearity is present, when all variables must be retained in the model, is where we should decide against LASSO regression
2. The package will contain information of possible overfitting which will help in deciding between OLS vs LASSO and Ridge. This can be made possible by providing various data visualization tools. The data visualization tool will also help in choosing between Ridge and LASSO as the researcher can see the shape pf the constraint region.