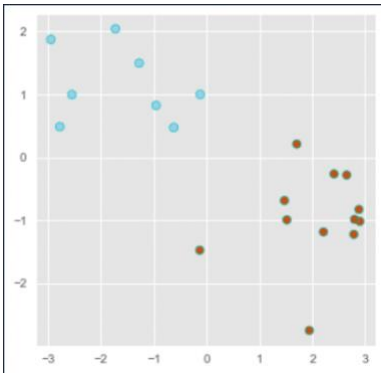
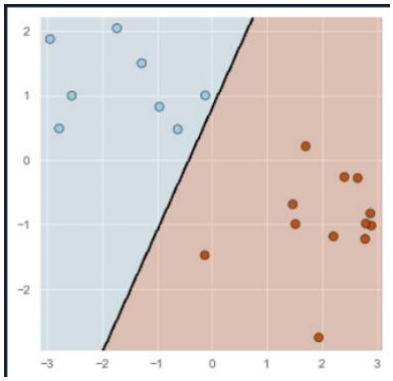
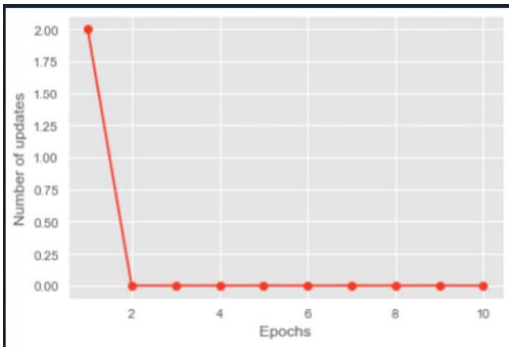
Question 1:

I decided to create a random data set that was linearly separable. Then I plotted those points so I could visually see that the 10 points were separable. I then predicted the fit for the data set and plotted the decision boundary. The decision boundary came out accurate, which meant it was able to accurately label all of the data points. I also graphed the number of updates and epochs to show that the data set converged quite quickly.

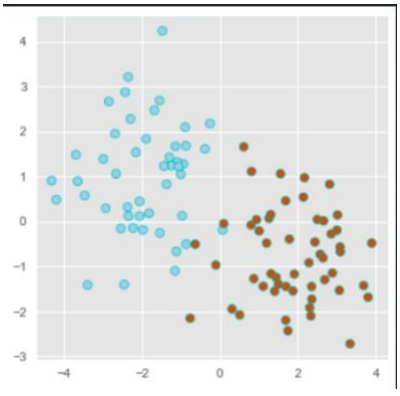


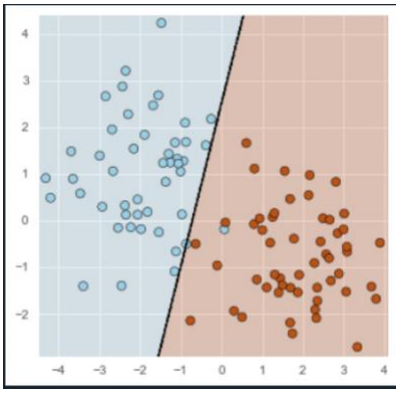


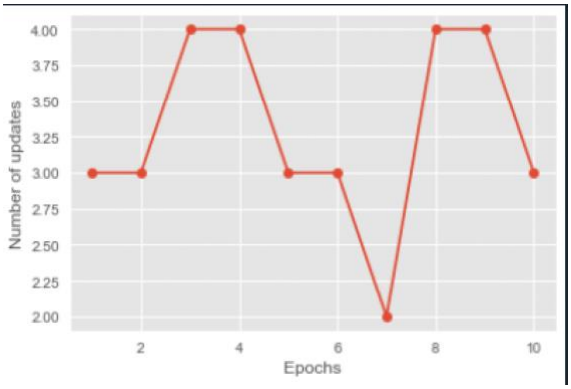


Question 2:

I again decided to create a random data set that was not linearly separable. Then I plotted those points so I could visually see that the points were not separable. I then predicted the fit for the data set and plotted the decision boundary. Obviously, the decision boundary line could not make an accurate line because the data points are not separable, but it gave the pest line possible from the prediction with the perceptron algorithm. Also, it did not really ever converge.

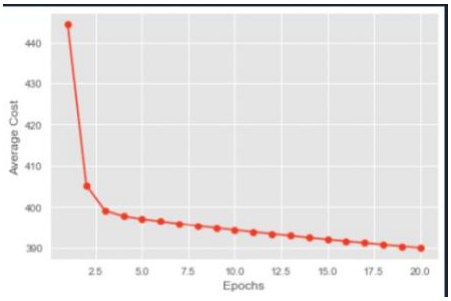






Question 3:

I first started with some data cleaning to make sure that the values would work with the Adaline algorithm. This meant dropping some classes that I did not think were necessary. As well turning categorical variables into numerical variables. Then I filled in missing values for the variable age with the mean. After the cleaning I split the training data set into 70% training and 30% test data. I decided to test this with the batch version of Adaline. We can see from the graph of the test data that it has converged, however based on the predictive values I got, not too accurate.



Question 4:

Based on some data cleaning and looking into which predictive features had the most effect on the Titanic model I concluded that pclass, sex and age had the most pull.

Question 5:

To make sure that the perceptron and Adaline algorithm behaving in an 'intelligent' way, I created a baseline model to compare them to. For Adaline I changed the learning rate with the graph on the right, which shows a much better model than the one on the left. And the baseline model for perceptron accurately labeled the 100 data points given to it.