**Problems Inclass 8\_2.** You can comment in this document and submit a pdf of your work. Please mark clearly all your answers and answer problems in the order provided.

1. Think through and answer the following problems to the best of your abilities.
2. Valentine Day is approaching. A restaurant is trying to decide if to organize a singles’ night or if to offer a special romantic menu. The restaurant has an established base of customers and collects demographic, income, social media and behavioral information on its customers. They decide to use the help of a data scientist to make sense of their Valentine’s day menu in order to maximize sales (Valentine’s days tend to be cash cows for restaurants). What algorithm would you use?
3. Describe the type of information you would collect (what features) to decide if an email is spam or non-spam and what machine learning algorithm you would use.
4. Describe the type of information you would collect (what features) and from what sources to decide if to buy or sell a stock (financial investment). What machine learning algorithm can you use?
5. How would you use Facebook to recommend certain products to people and what machine learning algorithm would you use?
6. A classification algorithm classifies emails into spam and non-spams. The following confusion matrix was returned by using the classifier on the testing set:

|  |  |
| --- | --- |
| 264 | 14 |
| 22 | 158 |

Consider “non-spam” = “positive” class. The matrix has the organization described in class. Calculate and interpret the following:

1. Accuracy rate
2. Precision
3. Recall
4. F1
5. Sensitivity
6. Specificity
7. In your opinion, is it more important to have good recall or precision?