1. (a) (2 pts) Express the problem of fitting a line to two-dimensional data in terms of an optimization of the weight vector $\mathbf{w}$.

(b) (2 pts) Do you need to do search in order to fit a line to two-dimensional data?
2. Suppose you want to learn a function that predicts the season batting average of a baseball player given information available at the start of the season. (This is sort of a simplified version of the premise of the movie *Moneyball*, by the way.)

(a) (3 pts) Explain how you would formalize this as a multivariate regression problem.

(b) (2 pts) Is it reasonable to model this relationship using a linear model? Why or why not?

(c) (2 pts) Explain briefly how you might learn the model using an iterative algorithm.
3. (3 pts) Briefly define the following terms:
   (a) Decision boundary
   (b) Linear separator
   (c) Linearly separable

4. (2 pts) Explain briefly the relationship between linear regression (learning a linear model that fits the data) and classification. You might want to use some of the terms you defined above.
(2 pts) 5. Explain briefly the attraction(s) of logistic regression. Is there a downside to using it?