## 1 Linear Classifiers and Boolean Functions

1. Yes it is Linearly Separable. W = [1 1 1], b = -1
2. Yes it is Linearly Separable. W = [1 2 1] (x1 = 1, x2 = 2, x3 = 1), b = -2
3. Yes it is Linearly Separable. W = [1 -1 2] (x1 = 1, x2 = -1, x3 = 2), b = -1
4. Not Linearly Separable.
5. Yes it is Linearly Separable. W = [-1 1 -1] (x1 = -1, x2 = 1, x3 = -1), b = -1

## 2 Mistake Bound Model of Learning

* 1. The concept class is from 1 to 80, so the size is **80.**
  2. Sdfg

## 3 The Perceptron Algorithm and its Variants

1. I decided to use C# in this programming assignment just because I am most comfortable with C#. For my vectors, I represented them as an array of double. My bias was a double. I then created a WeightBias object that stored the weight array, the bias, and a counter for the total updates. When I stored each of the accuracy’s with their associated weight and bias, I stored them in a Dictionary where the key was the epoch number and the value was an AccuracyWB object which held the WeightBias object and the accuracy. I then calculated the largest accuracy from Dictionary and used its WeightBias to test my data. Each line in the file was stored as an Entry that had the sign and the vector of that line. I then stored each Entry in a List of Entry. While I am doing my algorithm, I am looping through each item in the List of Entry.
2. The Majority Baseline Accuracy for the Test set is: 57.308%

The Majority Baseline Accuracy for the Development set is: 54.920%

1. The following is the Learning Curve for each step (the report is ran with the code):

