

6.034 Quiz 4

December 3, 2008

Name	
E-Mail	

Circle your TA and recitation time, if any, so that we can more easily enter your score in our records and return your quiz to you promptly.

TAs	Thu	Fri
Sam Glidden	Time	Instructor
Mike Klein	1-2	Bob Berwick
Mark Seifert	2-3	Bob Berwick
Norman C. N. Quest	3-4	Bob Berwick
	Time	Instructor
	1-2	Howard Shrobe
	2-3	Howard Shrobe
	3-4	Howard Shrobe

Problem number	Maximum	Score	Grader
1	50		
2	50		
Total	100		

There are 7 pages in this quiz, including this one. In addition, 1 tear-off sheet is provided at the end.

As always, open book, open notes, open just about everything.

Problem 1: Support Vectors (50 points)

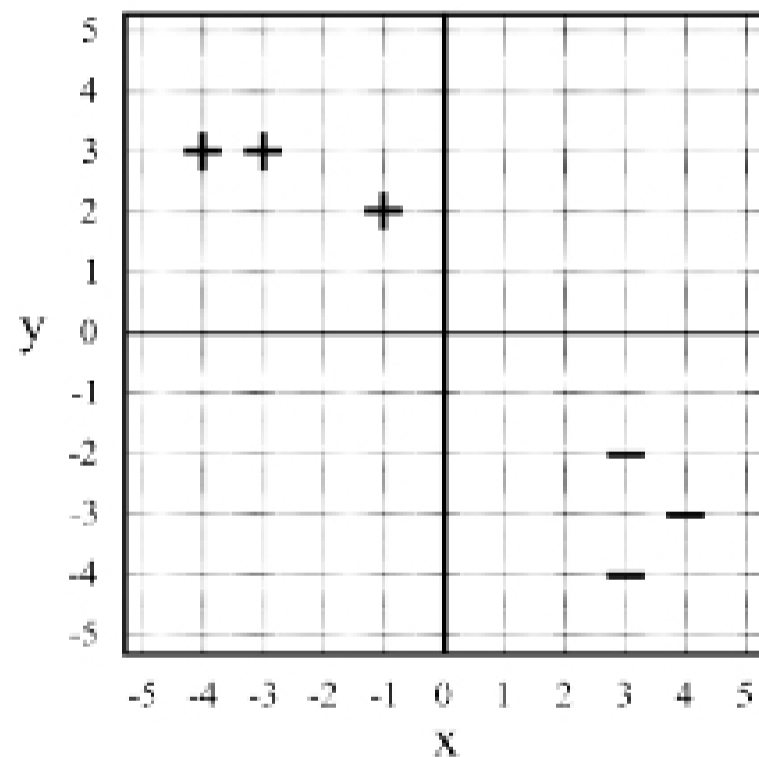
Part A (30 points)

The following three graphs represent the training data for two-dimensional, linear SVMs. + symbols indicate the coordinates of positive examples, which the classifier should give a value of 1 or more, and - symbols represent the coordinates of negative examples, which the classifier should give a value of -1 or less.

For each graph, you should do the following **three** things:

- Circle the support vectors
- Draw the "street" produced by the SVM, with solid lines where the classifier outputs 1 or -1 and a dashed line where the classifier outputs 0
- Describe the classifier function $h(\mathbf{x}) = \mathbf{w} \cdot \mathbf{x} + b$, by giving the values of \mathbf{w} and b

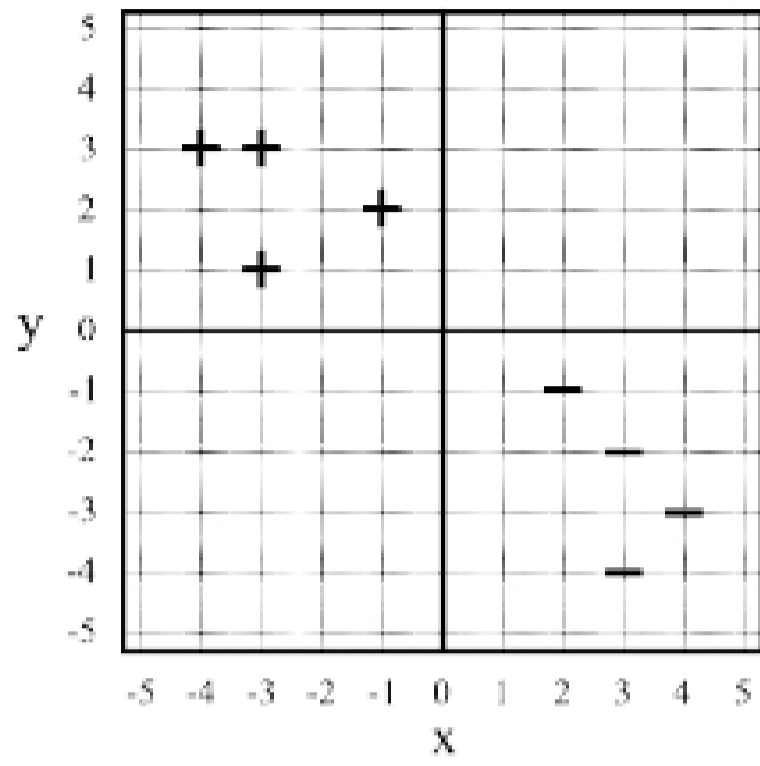
Graph #1



$$\mathbf{w} =$$

$$b =$$

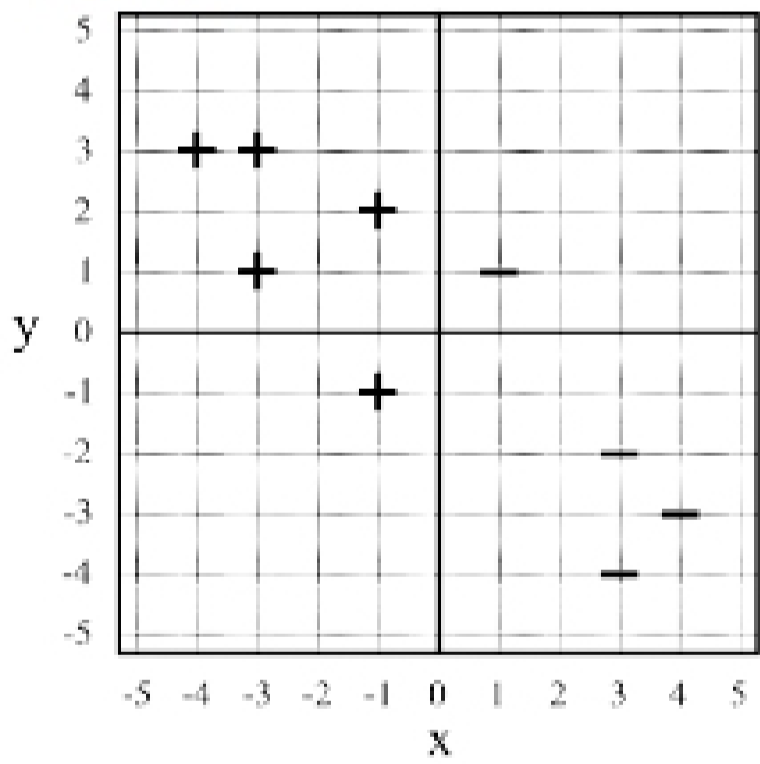
Graph #2



$w =$

$b =$

Graph #3



$w =$

$b =$