Mentor Help
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(Optional) Margin Error Calculation

In this optional section, we'll calculate the distance between the two margins in the SVM.

First, recall the notation, where Where $W = (w_1, w_2)$ and $x = (x_1, x_2)$, and $Wx = w_1 x_1 + w_2 x_2$.

Notice that all we have three lines, of the following equations:

- $Wx + b = 1$
- $Wx + b = 0$
- $Wx + b = -1$

And in order to find the distance between the first and the third, we only need to find the distance between the first two, and multiply by two, as these are three equidistant parallel lines. That is, we need to find the distance between the two lines in Figure 1.
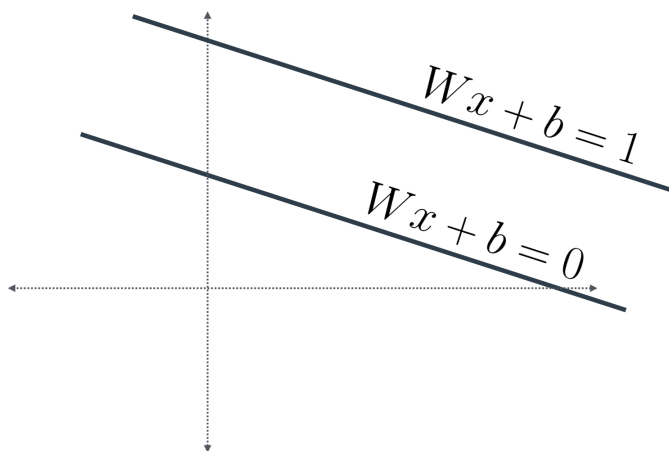

Figure 1

Now, notice that since we're only measuring distances between lines, we might as well translate these two lines, so that one of them touches the origin (Figure 2). Thus, our new equations are:

- $Wx = 0$
- $Wx = 1$