Problem 1  In class we worked through a simple boosting procedure which runs a weak learning
algorithm 3 times (on 3 different distributions) and combines the resulting hypotheses $h_1, h_2, h_3$ by
taking majority vote. We saw that if each weak hypothesis has error rate exactly 40% under its
distribution, then the resulting final hypothesis has error rate 35.2%.

Now generalize what we did by assuming that each weak hypothesis has error rate exactly $\beta$ (for
some value $\beta < \frac{1}{2}$) under its distribution. Prove that the error rate of the resulting final hypothesis
is strictly less than $\beta$. (Hint: Show that this final error rate is $3\beta^2 - 2\beta^3$.)

Problem 2  Show that in the Adaboost algorithm, the error of hypothesis $h_t$ on distribution $D^{t+1}$
is exactly $1/2$. 
