1.1.4.

Assuming R = Asymptotic risk for 1-NN and R^* is the Bayes risk. As shown in 1.1.3, the correctly classified point will have probability $(1+\alpha)\,r^*(x)\,(1-r^*(x))$. Now, the NN risk R is

$$R = \lim_{n} E[r(x, x_n')].$$

Now, by the dominated convergence theorem

$$R = E[\lim_{n} r(x, x_n')]$$

and we know

$$R = E[r(x)]$$

$$\Rightarrow R = E[(1+\alpha)\,\hat{\eta}_1(x)\,\hat{\eta}_2(x)]$$

$$= E[(1+\alpha)\,r^*(x)\,(1-r^*(x))]$$

Since, Bayes risk R^* is the expectation of r^*;

$$R = (1+\alpha)\,R^*(1-R^*).$$

or $R \leq (1+\alpha)\,R^*(1-R^*).$