3.1 Show that in a two class classification task, the Bayes decision rule minimizes the error probability.

3.2 In a two-class one-dimensional problem, the pdfs are Gaussians $\mathrm{N}(0,\sigma^2)$ and $\mathrm{N}(1,\sigma^2)$ for the two classes, respectively. Show that the threshold x_0 minimizing the average risk is equal to

$$x_0 = 1/2 - \sigma^2 \ln \frac{\lambda_{21} P(\omega_2)}{\lambda_{12} P(\omega_1)}$$

Where $\lambda_{11} = \lambda_{22} = 0$ has been assumed.