c)

$$\begin{aligned} x \to r(x) &= argmax\{p(k) \cdot p(x|k)\} \\ &= argmax\{p(k) \cdot N(x|\mu_k, \Sigma)\} \\ &= argmax\{p(k) \cdot \frac{1}{\prod_{d=1}^{D} \sqrt{2\pi\sigma_{kd}{}^2}} \cdot exp[-\frac{1}{2} \sum_{d=1}^{D} (\frac{x_d - \mu_{kd}}{\sigma_{kd}})^2]\} \end{aligned}$$

$p(k)$ stays unchanged because we can calculate it directly from counts in the training data. Because we have a pooled diagonal variance, we also cancel out $\frac{1}{\prod_{d=1}^{D} \sqrt{2\pi\sigma_{kd}{}^2}}$ because its the same for each class. Same for the $\frac{1}{2}$ in the exponent. So the decicionrule we calculate with in our python scrit is:

$$x \to r(x) = argmax\{p(k) \cdot exp[-\sum_{d=1}^{D} (\frac{x_d - \mu_{kd}}{\sigma_{kd}})^2]\}$$