Q3.1

$$P(y=j\mid x)\cdot 0 + P(y\neq j\mid x)\cdot \lambda_s$$

$$= (1-P(y=j\mid x))\cdot \lambda_s$$ ∵ Expected loss should we choose j

Expected loss for reject $= \lambda_r$.

$\Rightarrow$ Expected loss of choosing $j \leq \lambda_r$.

$$1-P(y=j\mid x) \leq \lambda_r/\lambda_s$$

$$P(y=j\mid x) \geq 1-\frac{\lambda_r}{\lambda_s}$$ #

if we wanna minimize risk of choosing j, Q 3.2.

if we adjust $\frac{\lambda_r}{\lambda_s}$ from $0 \to 1$.

$P(y=j \mid x) \geq 1 - \frac{\lambda_r}{\lambda_s}$ will become harder to satisfy.

This we can't change, it's info from data.

→ if at one point this inequality doesn't satisfy

say. $P(y=j \mid x) \geq 1$ (impossible)

→ we aren't able to minimize risk of choosing j

so we should reject.

→ the other way is similar #