3 Poisson Regression

(a)

$$p(y;\lambda) = \frac{e^{-\lambda}\lambda^{y}}{y!}$$

$\lambda^{y} = \exp(\ln(\lambda^{y}))$

$= \exp(y \ln \lambda)$

$$\frac{1}{y!}\exp(y \ln \lambda - \lambda)$$

$$b(y)\exp(\eta^{T}y - a(\eta))$$

$$b(y) = \frac{1}{y!}$$

$$\eta = \ln \lambda \longrightarrow \lambda = e^{\eta}$$

$$T(y) = y$$

$$a(\eta) = \lambda = e^{\eta}$$