

4.1

$$P(X) = \frac{e^{\beta_0 + \beta_1 X}}{1 + e^{\beta_0 + \beta_1 X}}$$
$$\frac{P(X)}{1 - P(X)} = \frac{\frac{e^{\beta_0 + \beta_1 X}}{1 + e^{\beta_0 + \beta_1 X}}}{\frac{1}{1 + e^{\beta_0 + \beta_1 X}}} = e^{\beta_0 + \beta_1 X}$$

4.2

$$P_k(x) = \frac{\pi_k \exp\left\{-\frac{(x - \mu_k)^2}{2\sigma^2}\right\}}{\sum_{i=1}^K \pi_i \exp\left\{-\frac{(x - \mu_i)^2}{2\sigma^2}\right\}}$$

4.3