1. Using a little bit of algebra, prove that (4.2) is equivalent to (4.3).
In other words, the logistic function representation and logit representation for the logistic regression model are equivalent.

(4.2) $p(x) = \dfrac{e^{\beta_0+\beta_1 x}}{1+e^{\beta_0+\beta_1 x}}$ (4.3) $\dfrac{p(x)}{1-p(x)} = e^{\beta_0+\beta_1 x}$.

$$1-p(x) = 1-\frac{e^{\beta_0+\beta_1 x}}{1+e^{\beta_0+\beta_1 x}} = \frac{1+e^{\beta_0+\beta_1 x}-e^{\beta_0+\beta_1 x}}{1+e^{\beta_0+\beta_1 x}} = \frac{1}{1+e^{\beta_0+\beta_1 x}}$$

$$\frac{p(x)}{1-p(x)} = \frac{e^{\beta_0+\beta_1 x}}{\cancel{1+e^{\beta_0+\beta_1 x}}} \cdot \frac{\cancel{1+e^{\beta_0+\beta_1 x}}}{1} = e^{\beta_0+\beta_1 x}.$$

$\therefore$ (4.2) is equivalent to (4.3).