Exercise 3.6

$$p(\beta|y) \propto p(y|\beta)\,p(\beta)$$

where

$$p(y|\beta) \to \mathcal{N}(X\beta, \sigma^2 I)$$

$$p(\beta) \to \mathcal{N}(0, \tau I)$$

$$\underbrace{\frac{1}{\sqrt{2\pi}\,\sigma}}_{\text{const}}$$

$$p(\beta|y) \propto \text{const.}\ \exp\left\{-\frac{1}{2\sigma^2}(y-X\beta)^T(y-X\beta)\right\} \exp\left[-\frac{1}{2\tau}\beta^T\beta\right]$$

$$\propto \exp\left\{ (y-X\beta)^T(y-X\beta) + \frac{\sigma^2}{\tau}\beta^T\beta \right\}$$

$$\frac{\sigma^2}{\tau} \to \lambda$$

Exercise 3.10

$$F = \frac{(RSS_0 - RSS_1)/\overbrace{(p_1 - p_0)}^{=1}}{RSS_1/(N-p_1-1)}$$

→ find the β_j s.t. $\beta_j = 0$ lead to the smallest $RSS_0 - RSS_1$

we know (ex 3.1), $F_{1,N-p-1} \stackrel{d}{=} z_j^2$

⇒ the β_j which, when set equal to 0, increases the least the RSS is that with the smallest z_j^2