1. Let $X_1, \ldots, X_n \mid \beta \sim \text{Gamma}(\alpha, \beta)$, where

$$
f(x \mid \beta) = \frac{1}{\beta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-x/\beta}, -\infty < x < \infty.
$$

Assume that $\beta^{-1} \sim \text{Gamma}(\eta, \psi)$. Show that the Bayes estimator of $\beta$ is biased, and find its mean squared error.

2. (a) In Corollary 7.3.15, show that $a(\theta)$ can be written as

$$
a(\theta) = \frac{d}{d\theta} \tau(\theta) - \frac{\tau(\theta)}{\text{Var}(W)}.
$$

(b) Problem 7.48 (b) in the Casella and Berger textbook.

3. Problem 7.49 in the Casella and Berger textbook.