

# BIOS 7361: Exercise Set 7

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$$\begin{aligned}\pi(\lambda|\text{data}) &\propto L(\lambda|\text{data})\pi(\lambda|\alpha_0, \lambda_0) \\ &\propto \left( \lambda^{\sum_{i=1}^n \delta_i} \exp \left\{ -\lambda \sum_{i=1}^n x_i \right\} \right) (\lambda^{\alpha_0-1} \exp(-\lambda_0 \lambda)) \\ &\propto \lambda^{\alpha_0+d-1} \exp \left\{ -\lambda(\lambda_0 + \sum_{i=1}^n x_i) \right\}\end{aligned}$$

$$\text{Var}(\lambda|\text{data}) = \frac{\alpha_0+d}{(\lambda_0+\sum_{i=1}^n x_i)^2}$$