HW 6 Problems

Normal with unknown variance

$y_i \sim N(\mu, \sigma^2)$

$$\pi(\mu, \sigma^2 | y_1, \dots, y_n) \propto \pi(\mu, \sigma^2) \prod_{i=1}^{n} N(y_i;\ \mu, \sigma^2)$$

There is a jointly conjugate prior for μ, σ^2:

$\pi(\mu, \sigma^{-2}) \propto N(\mu;\ \mu_0, k_0\sigma^2) Ga(\sigma^{-2}; a, b)$

To do:

Derive the joint posterior for μ and σ^2 and show conjugacy

Derive the marginal posterior for μ (will be some kind of t-distribution)

Derive Gibbs sampler under:

$\pi(\mu, \sigma^{-2}) = \pi(\mu)\pi(\sigma^{-2})$ where $\pi(\mu)$ is normal and $\pi(\sigma^{-2})$ is gamma

Simulate data under:

$y_i \sim N(\mu, \sigma^2)$

and compare inferences on posterior densities of μ