Homework Problem 5 Hint   A much more complicated problem from which some techniques for this problem can be stolen was solved by

> Hobert, J. P. and Geyer, C. J. (1998).
> Geometric ergodicity of Gibbs and block Gibbs samplers for a hierarchical random effects model.
> *Journal of Multivariate Analysis* **67** 414–430.

The only simple functions for which expectations w. r. t. a gamma distribution exist are powers and exponentials. The simplest functions for which expectations w. r. t. a normal distribution exist are quadratics. This suggests a drift function of the form

$$V(\lambda, \mu) = \lambda^{-1} + e^{c\lambda} + k(\hat{\mu}_n - \mu)^2$$

(replacing λ^{-1} with $\lambda^{-1/2}$ would perhaps allow the proof to work even for $n = 1$, but this would complicate the math, so we won't bother).

The scan order update μ then λ makes the proof work best.