

[Hoff: 5.1]Studying: The files school1.dat, school2.dat and school3.dat (<http://www.stat.washington.edu/hoff/Book/Data/hwdata/>) contain data on the amount of time students from three high schools spent on studying or homework during an exam period. Analyze data from each of these schools separately, using the normal model with a conjugate prior distribution, in which $\{\mu_0 = 5, \sigma_0^2 = 4, \kappa_0 = 1, \nu_0 = 2\}$ and compute or approximate the following:

- a) posterior means and 95% credible intervals for the mean θ and standard deviation σ from each school;
- b) the posterior probability that $\theta_i < \theta_j < \theta_k$ for all six permutations $\{i, j, k\}$ of $\{1, 2, 3\}$;
- c) the posterior probability that $\tilde{Y}_i < \tilde{Y}_j < \tilde{Y}_k$ for all six permutations $\{i, j, k\}$ of $\{1, 2, 3\}$, where \tilde{Y}_i is a sample from the posterior predictive distributions of school i .
- d) Compute the posterior probability that θ_1 is bigger than both θ_2 and θ_3 , and the posterior probability that \tilde{Y}_1 is bigger than both \tilde{Y}_2 and \tilde{Y}_3 .