Exercise:
Inference about a Normal Population

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Suppose we are interested in learning about the sleeping habits of students at a particular college. We collect $y_1, ..., y_{20}$, the sleeping times (in hours) for 20 randomly selected students in a statistics course. Here are the observations:

9.0	8.5	7.0	8.5	6.0	12.5	6.0	9.0	8.5	7.5
8.0	6.0	9.0	8.0	7.0	10.0	9.0	7.5	5.0	6.5

a) Assuming that the observations represent a random sample from a normal population with mean μ and variance σ^2 and the usual noninformative prior is placed on (μ, σ^2), simulate a sample of 1000 draws from the joint posterior distribution.

b) Use the simulated sample to find 90% interval estimates for the mean μ and the standard deviation σ.

c) Suppose one is interested in estimating the upper quartile p_{75} of the normal population. Using the fact that $p_{75} = \mu + 0.674\sigma$, find the posterior mean and posterior standard deviation of p_{75}.