Stat 8931, Fall 2005
Homework 1
Due Sep 23, 2005

Q1 Calculate for the example problem in the `mcmc` package vignette (that we went over in class) using MCMC the posterior mean and standard deviation of the quantity

$$\text{logit}^{-1}(\beta_0 + \beta_1 x_1 + \cdots + \beta_4 x_4)$$

where $x_1 = x_2 = x_3 = x_4 = 0$, that is,

$$\text{logit}^{-1}(\beta_0) = \frac{1}{1 + \exp(-\beta_0)}$$

Also produce Monte Carlo standard errors (MCSE). Use the correct method via the delta method of obtaining standard errors explained in class (to be in a future version of the vignette). Run the Markov chain long enough to obtain MCSE smaller than 0.001 for each.

Produce a file that runs and produces your whole analysis. You may either produce a file `foo.R` (or some other name) such that

```
R CMD BATCH --vanilla foo.R
```

produces all your results in `foo.R` or, alternatively, if you want to try Sweave, you can produce a file `foo.Rnw` like the package vignette `demo.Rnw` such that

```
echo 'Sweave("foo.Rnw")' | R --vanilla --quiet
pdflatex foo
```

produces all your results in `foo.pdf` (for more Sweave examples, see `http://www.stat.umn.edu/~charlie/Sweave/`.

When you turn in your homework, send the *source file* (`foo.R` or `foo.Rnw` via e-mail to `charlie@stat.umn.edu` as an attachment. You may also submit paper write-up, but your "write-up" can consist of sufficient comments in the R code to explain what you are doing.