Assignment 7

1. Suppose our target distribution $p(\theta|y)$ is a standard Normal, and we choose $g(\theta)$ to be a t-distribution with 3 degrees of freedom.

   (a) Draw a sample of size $S = 100$ from $g(\theta)$ and compute the importance ratios. Plot a histogram of the log importance ratios.

   (b) Estimate $E[\theta|y]$ and $Var(\theta|y)$ using importance sampling. Compare to the true values.

   (c) Repeat the first two parts of the question using $S = 10000$.

   (d) Using the sample obtained in the previous part, compute an estimate of the effective sample size.

2. Repeat Question 1, swapping the distributions used for $p(\theta|y)$ and $g(\theta)$.

3. Use the Metropolis algorithm to obtain obtain simulated values of *alpha* and *beta* from the Bioassay example in Section 3.7. Be sure to define your starting points and your jumping rule. Compute with log-densiites (see page 261). Run your simulations long enough for approximate convergence. Include a plot of the last 25% of your simulated values overlaying the contour plot.