Homework 9

625.433

1. (20 pts.) Exercise 4.9
2. (20 pts.) Exercise 4.10
3. (20 pts.) Exercise 4.15 (b) and (c). This question in the text isn't very clear. They want you to estimate $E(X)$ in two ways: (1) Estimate it by simulating n values of X and calculating $\frac{1}{n}\sum_{j=1}^{n} X_j$, and (2) Estimate it by simulating n values of Y and calculating $\frac{1}{n}\sum_{j=1}^{n} E(X|Y_j)$.
4. (20 pts.) Exercise 4.18 parts (i), (ii), and (iv). And in this case, only examine variance reductions of the mean and the median. Once again, for this question, the book isn't 100% clear. Calculate $E(X)$ and the median (the value of θ such that $\int_{-\infty}^{\theta} f(x)dx = .5$) using the antithetic variable strategy discussed in Section 4.7.2 in the text.
5. (20 pts.) Assume you use antithetic variables to estimate some parameter of the standard normal distribution. Prove, in this case, that the covariance between X_i and Y_i is -1. Hint: take advantage of the fact that a standard normal distribution is symmetric about 0.