Assignment 6

1. For the Schools data, check the model using the test statistic $T(y) = max_j y_j - min_j y_j$, the range. Calculate the p-value for this posterior predictive check.

2. Read through the model for Football Points Spreads in Section 1.6. The model described in chapter 1 is of the form $y \sim Normal(x, 14^2)$ implying that $y - x \sim Normal(0, 14^2)$, hovever figure 1.2a seems to show a pattern of decreasing variance of $y - x$ as a function of x.
   The data can be found in football.txt on Blackboard, and can be read into R using `read.table("football.txt", header=T)`.

   (a) Simulate several replicated data sets y^{rep} under the model and, for each, create graphs like Figurers 1.1 and 1.2. Display several graphs per page, and compare these to the corresponding graphs of the actual data. This is a graphical posterior predictive check as described in Section 6.4

   (b) Create a numerical summary $T(x, y)$ to capture the apparent decrease in variance of $y - x$ as a function of x. Compare this to the distribution of simulated test statistics, $T(x, y^{rep})$ and compute the p-value for this posterior predictive check.