Homework 1 - Due Friday, February 4

Do Problems 7.11, 7.15, 7.29, 7.37, 7.38, 7.43, 7.44, 7.50 and the problems below.

Homework should be written neatly and clearly explained.

Problem 1. Let $X_1, X_2, X_3, \ldots$ be independent random variables uniformly distributed on the interval $[0, 2]$.

1. What are μ, the mean of X_1, and σ^2, the variance of X_1?

2. Simulate $\frac{1}{100} \sum_{i=1}^{100} \frac{X_i - \mu}{\sigma}$, 1000 times and give a histogram of the results.

3. Simulate $Y_n = \frac{1}{n} \sum_{i=1}^{n} \frac{X_i - \mu}{\sigma}$ for various values of n and determine how large n must be for Y_n to be approximately normal. (Your answers will vary).

Problem 2. Let T be a t-distributed random variable with 6 degrees of freedom.

1. What is the probability that $|T| \leq 2$?

2. What is the probability that $T \geq 1$?

3. Simulate a random sample of size 1000 of t-distributed random variables with 6 degrees freedom. Plot the histogram and verify that the simulation agrees part 2 of this problem.