STAT 5380 Assignment 5:
Asymptotics, convergence notions, consistency, limit theorems

1. TPE Problem 1.8.11.
2. TPE Problem 1.8.13.
3. TPE Problem 1.8.17.
4. TPE Problem 1.8.19.
5. TPE Problem 1.8.24.
6. Let $X_1, \ldots, X_n$ be iid as $N(\xi, \sigma^2)$. If $S^2 = \sum(X_i - \bar{X})^2/(n-1)$ denotes the usual sample variance, find the limiting (asymptotic) distribution of:

$$T_n = \sqrt{n}(S^2 - \sigma^2).$$

7. Let $X_1, \ldots, X_n$ be iid as $U(0, \theta)$. From Example 2.1.14 in TPE, the UMVU estimator of θ is $\delta_n = (n+1)X_{(n)}/n$ and the MLE is $X_{(n)}$. Find the limiting (asymptotic) distribution of:
   (a) $n(\theta - X_{(n)})$.
   (b) $n(\theta - \delta_n)$.