# Homework 11

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Due date: Thursday, May 9.

1. (2 points) For random samples from an infinite population, what happens to the standard error of the meanif the sample size is

   a. increased from 40 to 160;
   b. decreased from 200 to 40.

2. (2 points) Let $U_1, U_2, \ldots, U_n$ be independent and identically distributed standard uniform random variable. Despite the small sample sizes, use the central limit theorem to approximate the probability $P(\sum_{i=1}^{n} U_i > 1)$ for

   a. $n = 2$;
   b. $n = 5$.

3. (2 points) Let $V_1, V_2, \ldots, V_m$ be random variables constructed by $V_i = U_{2i-1} \times U_{2i}$ for $i = 1, 2, \ldots, m$, $n = 2m$, and $U_1, U_2, \ldots, U_n$ are independent and identically distributed standard uniform random variable as defined in #2. Use the central limit theorem to approximate the probability $P(\sum_{i=1}^{n} V_i > 1)$ for

   a. $m = 2$;
   b. $m = 5$.

4. (2 points) **Exercise 8.66** A random sample of size $n = 81$ is taken from an infinite population with the mean $\mu = 128$ and the standard deviation $\sigma = 6.3$. With what probability can we assert that the value we obtain for $\bar{X}$ will not fall between 126.6 and 129.4 if we use the central limit theorem?

5. (2 points) **Exercise 8.70** A random sample of size $n = 64$ is taken from a normal population with $\mu = 51.4$ and $\sigma = 6.8$. What is the probability that the mean of the sample will

   a. exceed 52.9;
   b. fall between 50.5 and 52.3.