1. Suppose X_i for $i = 1, 2, \ldots, 100$ constitute a sample randomly taken from a population. Suppose it is known that for each i, the population mean of X_i is 0.02, and the population variance of X_i is 0.16.

   (a) What is the value of the mean of the sample average?

   (b) What is the value of the sample variance?

   (c) What is the value of the mean of $S_{37} := \sum_{i=1}^{37} X_i$?

   (d) What is the value of the variance of $S_{37} := \sum_{i=1}^{37} X_i$?

   (e) What is the value of the mean of $T_{37} := \sum_{i=1}^{37} (-1)^{i+1} X_i$?

   (f) What is the value of the variance of $T_{37} := \sum_{i=1}^{37} (-1)^{i+1} X_i$?

   (g) What is the value of the covariance between X_{37} and X_{73}?

   (h) What is value of $\mathbb{E}(X_i^2)$ for any $i = 1, 2, \ldots, 100$?

   (i) Suppose the sample average $\overline{X}$ of this sample is 0.01. What is the value of the z score?

   (j) Suppose neither the population mean nor the popular variance is known. Furthermore, suppose the sample average $\overline{X}$ of this sample is 0.01, and the sample variance is estimated to be 0.02. What is the t statistic for the null hypothesis $H_0 : \mu = 0$?

2. What are your takeaways (something interesting, refreshing, or exciting)? Any questions?