Problem Set #8

1. You are interested in testing the distance of two golf balls, Brand A and Brand B. You take a random sample of 100 golfers, each of whom hits Brand A once and Brand B once. Define X as the distance for Brand A, and define Y as the distance for Brand B, with the distances measured in yards. In your sample of 100 golfers, the $\sum X_i$ = 20,000 yards, and the sum of $\sum Y_i$ = 19,500 yards. The sum of $\sum X_i^2$ = 4,090,000 yards squared, and the sum of $\sum Y_i^2$ = 3,892,500 yards squared. The sum of the product between $\sum X_i Y_i$ equals 3,963,000 yards squared.

   (a) Using the asymptotic distribution, create a 95-percent confidence interval for the average distance of Brand A.

   (b) Using the asymptotic distribution, create a 95-percent confidence interval for the average distance of Brand B.

   (c) Using the asymptotic distribution, test the hypothesis that the average distance of Brand A equals the average distance of Brand B. Use a two-tailed test and a five-percent level of significance.

2. You now structure your sample differently. You take a random sample of 100 golfers, each of whom hits Brand A once. You then take a second random sample of 100 golfers, each of whom hits Brand B once. The second sample is independent of the first. Continue to define X as the distance for Brand A and Y as the distance for Brand B. Assume the sums and sums of squares remain the same as above, so the sum of $\sum X_i$ = 20,000 yards, and the sum of $\sum Y_i$ = 19,500 yards, the sum of $\sum X_i^2$ = equals 4,090,000 yards squared, and the sum of $\sum Y_i^2$ = 3,892,500 yards. Under the new structure of the sample, how will the answers to a, b, and c change?