MATH 252-01: Probability and Statistics II

Problem Set 4

Assigned 2019 February 7
Due 2019 February 14

Show your work on all problems! If you use a computer to assist with numerical computations, turn in your source code as well.

1 Devore Chapter 8, Problem 36

Note that problem 8.36 is different in the eighth and ninth editions of Devore. Be sure to do the problem from the ninth edition.

2 Devore Chapter 8, Problem 50

Note that problem 8.50 is different in the eighth and ninth editions of Devore. Be sure to do the problem from the ninth edition.

3 Devore Chapter 8, Problem 70

Note that problem 8.70 is different in the eighth and ninth editions of Devore. Be sure to do the problem from the ninth edition.

4 Computational Exercise

Download the following data set which is a sample of size $n = 30$ from a normal distribution with unknown σ:
`http://ccrg.rit.edu/~whelan/courses/2019_1sp_MATH_252/data/ps04_prob4.dat`
using the username and password given in class.

  a. Consider the null hypothesis $H_0 : \mu = 0$ and the alternative hypothesis $H_a : \mu \neq 0$. Carry out the appropriate test at 90% confidence level, and indicate whether you would reject H_0 in favor of H_a. If you use a software package like minitab which performs the test for you, explain the meaning of each of the quantities it outputs.
  b. Your results from part (a) should contain the quantities needed to construct the test statistic by hand. Explicitly combine them and compare to the percentiles of the t distribution appropriate for this sample size, and to the standard normal distribution. Comment on the appropriateness of the large sample approximation in this case.
  c. Now change the alternative hypothesis to $H_a' : \mu > 0$ and repeat the test.
  d. Return to the original alternative hypothesis $H_a : \mu \neq 0$, and now assume that the population standard deviation is known to be $\sigma = 5$. Carry out the appropriate test in this case.