

# MATH 252-01: Probability and Statistics II

## Problem Set 4

Assigned 2018 February 6  
Due 2018 February 13

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  $\sigma$ :

[http://ccrg.rit.edu/~whelan/courses/2018\\_1sp\\_MATH\\_252/data/ps04\\_prob4.dat](http://ccrg.rit.edu/~whelan/courses/2018_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.