

## Homework #6

**1. (5 points)** Tony collected daily sleeping time for  $m=4$  coffee drinkers and  $n=4$  tea drinkers. He reported that, according to the Wilcoxon rank-sum test on the data set, the average daily sleeping time of coffee drinkers differs from the average daily sleeping time of tea drinkers at  $\alpha = 0.01$  level. His statistics professor tells Tony that this conclusion is impossible mathematically.

(a) Can the Wilcoxon rank-sum test results in a p-value less than 0.01 on such a data set? If no, why not? If yes, can you make up a such data set with  $m=4$  and  $n=4$ ?

(b) If Tony used the permutation test for sample means difference instead of the Wilcoxon rank-sum test, would he be able to get a p-value less than 0.01 on a data set of size  $m=4$  and  $n=4$ ?

**2. (10 points each)** Do exercises 13.7.7, 13.7.11, 13.7.12.

**3. (15 points)** Do exercise 13.7.13 on page 21. Also, program a permutation-test version of the test used in this problem. Compare the result using your permutation-test code versus your answer in (d).