

MTHSC 405
HW #1
Due Monday, September 2

- 1) Seven students volunteered for a comparison of study guides for an advanced math course. They were randomly assigned, four to study guide A and three to study guide B. All were instructed to study independently. Following a two-day study period, all students were given an examination about the material covered by the guides, with the following results:

Study Guide A scores: 68, 77, 82, 85

Study Guide B scores: 53, 64, 71

Perform a randomization test by listing all possible ways students could have been randomized into two groups. There are 35 ways to permute the data. For each outcome calculate the difference between the sample averages. Finally, calculate an approximate p-value for the observed outcome based on this randomization distribution.

- 2) Using the creativity study data (creativity study on Blackboard; in the data folder) from chapter 1 and a computer, assign a set of random numbers to the 47 subjects. Order the entire data set by increasing values of these random numbers, and divide the data into group 1 with the lowest 24 numbers and group 2 with the 23 highest numbers. Compute the difference in the averages. Repeat this process five times using different sets of random numbers. Did you get any differences larger than the one actually observed (4.14)?
- 3) The following are zinc concentrations (in mg/ml) in the blood for two groups of rats. Group A received a dietary supplement of calcium, and group B did not. Researchers are interested in variations in zinc level as a side effect of dietary supplementation of calcium.

Group A: 1.31, 1.45, 1.12, 1.16, 1.3, 1.5, 1.2, 1.22, 1.42, 1.14, 1.23, 1.59, 1.11, 1.10
1.53, 1.52, 1.17, 1.49, 1.62, 1.29

Group B: 1.13, 1.71, 1.39, 1.15, 1.33, 1.00, 1.03, 1.68, 1.76, 1.55, 1.34, 1.47, 1.74, 1.74
1.19, 1.15, 1.20, 1.59, 1.47

- a) Make a back-to-back stem-and-leaf display for the data.
- b) Use a computer to make side-by-side box plots for this data.