Math 8452, Homework #6. Due on 7/15/20 (Wed section) or 7/16/20 (Thu section).

Reading from the textbook:

- Read Section 8.4 on a bootstrap confidence interval for Kendall's tau.
- Read Sections 12.2 and 12.3 on kernel density estimation.
- Read Section 14.3 on kernel smoothing.

Problems to do:

1. (To turn in - Numerical answers and R code.) Using the data in the table below, find point estimates, bootstrap standard errors, bootstrap bias estimates, and 95% bootstrap percentile confidence intervals for (a) the population mean μ, (b) the population standard deviation σ, and (c) the population coefficient of variation σ/μ. Please draw at least 1000 bootstrap samples, and please assume that the point estimates are the sample mean $\bar{x}$, the sample standard deviation s, and the sample coefficient of variation $s/\bar{x}$, respectively. Are any of the estimates seriously biased?

7	10	10	10	11
12	12	13	13	14
14	15	22	31	37

2. (To turn in.) Using listing, find the bootstrap distribution of the sample range (maximum minus minimum) if the data are 3, 8, and 10.

3. (To turn in - Including the plot.) Apply kernel density estimation to a univariate data set from your project. Indicate (i) the sample size, (ii) the kernel that you used, and (iii) the bandwidth. Comment on what the plot of the estimated density suggests about the shape of the distribution. Please indicate which bandwidths you tried (Do try some!) in addition to the default choice.

4. (Not to turn in.) Continue to work on the course project. I am very interested in meeting with you to talk about your results. Please contact me if you'd like to set up a time.