Consider the following 25 data points (so save retyping, this list is also on the website as a text link)

8.26  6.33  10.4  5.27  5.35  5.61  6.12  6.19  5.2  7.01  8.74  7.78  7.02
6  6.5  5.8  5.12  7.41  6.52  6.21  12.28  5.6  5.38  6.6  5.38  6.6  8.74

Using this data

1: Using a randomization test, what is the $p$ value for a test that the mean $= 8$?

2: What is the jackknife estimate, its standard error, and the approximate confidence intervals for the estimated skew,

$$\hat{S}_3 = \frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^3$$

3: Using 1000 bootstrap samples, consider an estimate of the scaled kurtosis,

$$\hat{K} = \frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^4 - 3 \left( \frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^2 \right)^2$$

(a) Plot the distribution of bootstrap values

(b) What is the estimated bias and the standard deviation for $\hat{K}$?

(c) Using the results for (a), what is an approximate 95% (normally-assumption) confidence interval for $K$?

(d) Compute Efron’s 95% confidence limit for this data.

(e) Compute Hall’s 95% confidence limit for this data.

Fun R fact. If $x$ is a vector of data, then the R command `sample(x, replace=T)` returns a sampling with replacement vector of the data in c, i.e., a bootstrap sample.