

Problem Set 1

Associated Reading: Introduction to R at Datacamp.com

A (very) Short Introduction to R by Torfs and Brauer

A Quick Intro to R by Wilkenson Complete the problems using the R software and upload your final document to the Blackboard course site. All final submittals are to be in PDF form. If it is not submitted as a .PDF file it not be graded. Please document any code used to solve the problems and include it with your submission.

1. Posted on the course Blackboard site is a data set (favorite.data) containing 5000 data points. For this data set find the following:
 - (a) The Mean
 - (b) The Median
 - (c) The Standard Deviation
 - (d) The minimum value
 - (e) The maximum value
 - (f) A histogram of the data.
2. Generate 10000 random values from the Normal (0,1) distribution and do the following:
 - (a) Plot a histogram of the values.
 - (b) Find their Mean, Median, and Standard Deviation.
3. Create the following 2 vectors in R: $a = (5, 10, 15, \dots, 160)$ and $b = (87, 86, 85, \dots, 56)$ then use vector arithmetic to multiply these two vectors (element by element) and call the resulting vector d .
 - (a) What are the 15th, 16th, and 17th elements of d ?
 - (b) What are all of the elements of d which are greater than 2,000?
 - (c) How many elements of d are greater than 6,000?
4. Create a function in R that adds up all of the perfect squares between 1 and an inputted value x (inclusive). Then find:
 - (a) The sum of all the perfect squares between 1 and $x = 100$.
 - (b) The sum of all the perfect squares between 1 and $x = 100,000$.
5. Create a function in R that returns a vector of all the perfect squares between 1 and an inputted value x (inclusive). Then find:
 - (a) all of the perfect squares between 1 and 500 as a vector
 - (b) all of the perfect squares between 1 and 100000 as a matrix with 4 columns
 - (c) the entry of the matrix that is in the 15th row and 3rd column
6. Create a numeric x of length 50 that ranges from $-\pi$ to π . Create a vector $y1$ that is the sine of x . Create a vector $y2$ that is the cosine of x .
 - (a) Plot $y1$ vs. x as a series of points.
 - (b) Plot $y2$ vs. x as a smooth line. (Hint: Add the argument `type="l"` to the Plot command.)
 - (c) Add a line with slope $-1/3$ and y-intercept 1 to the plot of $y2$ vs. x .