AMS394 Homework 1   R basics

Please save your code and result in doc or txt document. You should submit your homework via blackboard by 1:00 pm, July 18.

1.1 Consider the following weights 60, 72, 34, 56, 87, 80, 89, 55, 93, 28, 48, 59. Use the R script to finish the following questions
    (1) Assign all these weights as vector 'weight'.
    (2) Compute the mean and sd of 'weight' .
    (3) What is the length of the weight?
    (4) How many weights are larger than 55?
    (5) Show if each weight is larger than 55 and smaller than 85.

1.2 Use the following script, we can generate a 3X4 matrix
    tmp<-matrix(rnorm(12), 3, 4).
    Answer the following questions.
    (1) Compute the mean for each row
    (2) Show the dimension of the matrix.
    (3) Use 'cat' function to output elements in the first row that are larger than 0.5.

1.3 Write the logical expression to extract blood.glucose greater than 10 and short.velocity greater than 1.5 in the thuesen data set.

1.4 Generate 10 random integers that are uniformly distributed between 1 and 50 (1 and 50 included).

1.5 (1) Use 'sample' function to generate a random vector that follows a multinomial distribution with probability (0.2, 0.3, 0.5).

    (2) Without use the 'sample' function, generate a random vector that follows a multinomial distribution with probability (0.2, 0.3, 0.5).
    Hint: Using "runif" (or "rbinom") and loop. Please write several lines of R scripts to simulate a multinomial distribution with probability (0.2, 0.3, 0.5).

1.6 Calculate the probability for each of the following events:
    (a) a normally distributed variable with mean 36 and standard deviation 6 is larger than 43
    (b) X>6.7 in a chi-square distribution with 3 degrees of freedom
    (c) getting 10 out of 10 successes in a binomial distribution with probability 0.8

1.7 Construct the following table that summarizes the number of people who have car accidents in a school. (Hint: Age is dimension name, not column name)

Age	Accidents	No accidents
18-20	30	123
21-23	15	98
24-25	17	139
>25	4	60

1.8 Generate 100 exponentially distributed random variables with rate 2, and plot their empirical distribution function.

1.9 (a) Plot a histogram for the "react" data set in the ISwR package.
    (b) Try "truehist" function from the MASS package as a replacement of "hist" function.