Simulation Lab

Assignment- 1

Solve all the questions

Problem 1. *Define* $x \leftarrow c(4, -5, 2)$ & $y \leftarrow c(6, 1, -3)$ *find*
(i) *length of* x *and* y *individually.*
(ii) $x + y$ *and* $x - y$
(iii) *total summation over* x *and same for the* y.
(iv) *Find the covariance of* x *and* y *using "*cov*" in R. Then using the formula to find the same.*

Formula: $\text{cov}(x, y) = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{n-1}$

Problem 2. *Write a R code to generate a vector of length* 100*, in which* 1^{st} 10 *elements are* 50*, next* 30 *elements are the combinations of* 1 *and* 2*, next* 50 *elements are from* -1 *to* 3*, next* 8 *elements are* 2 *and last* 2 *elements are the last two digits of your roll number.*

Description: Here you need to merge 5 *vectors* x_1, x_2, x_3, x_4, x_5*(say). Length of* x_1, x_2, x_3, x_4, x_5 *are* $10, 30, 50, 8, 2$ *respectively. As an example* $x_2 = 1, 2, 1, 2, ...$

Problem 3. $A = \begin{pmatrix} 1.5 & -1 \\ -1 & 3 \end{pmatrix}$ *and* $x \leftarrow c(4, 7), y \leftarrow c(1, 0)$. *Generate a matrix* C *of order* 2×4 *whose* 1^{st} *two columns are* 1^{st} *two columns of* A *and last two columns are* x & y *respectively.*

Problem 4. $A = \begin{pmatrix} 3 & -2 & 1 \\ -1 & 4 & -2 \end{pmatrix}$ *and* $B = \begin{pmatrix} -7 & 4 \\ 9 & 5 \\ 2 & -1 \end{pmatrix}$
(i) *Write the codes to generate* A *and* B *using* rbind *and* cbind *both the commands.*
(ii) *Find matrix-matrix multiplication* (AB)
(iii) *Find* $(AB)^t$ *and* $(AB)^{-1}$
(iv) *Find the mean, standard deviation for each column and row for the matrices* A,B,AB,$(AB)^t$,$(AB)^{-1}$.

Problem 5. *Generate a vector* x *using "*seq $(-1, 3, 0.01)$*". Find a vector* y *which contains those elements from* x *do not exceed* 1.25*. Then find the difference between the lengths of* x *and* y.

.....*end*.....