STATISTICAL COMPUTING ASSIGNMENT

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1. Consider the following matrices;

X = [, 1] [, 2] [, 3]

[1,] 1 2 3

[2,] 4 5 6

[3,] 7 8 9

Y = [, 1] [, 2] [, 3]

[1,] 1 2 3

[2,] 4 5 6

[3,] 7 8 9

Write R code to calculate the following;

1. Det of Y.

To calculate the determinant of Y we use the **det(Y)** function;

* *Determinant.Y <- det(Y)*
* *print(Determinant.Y)*

*Output:*

*[1] 0*

1. Inverse of X.

To calculate the inverse of X we use the **solve(X)** function;

* *Inverse.X <- solve(X)*
* *print(Inverse.X)*

*# To use the Solve() function, we need to install the* ***matlib package.***

* *install.packages('matlib')*

*# We also need to ‘call’ the package at the top of file we are working with*

* *library(matlib)*

*Output:*

1. Transpose of X.

To calculate the transpose of X we use the **t(X)** function;

* *Transpose.X <- t(X)*
* *print(Transpose.X)*

*Output:*

*[, 1] [, 2] [, 3]*

*[1,] 1 4 7*

*[2,] 2 5 8*

*[3,] 3 6 9*

1. Use R to show that XY != YX in matrices.

* *print((X%\*%Y) == (Y%\*%X))*

*Output:*

*[, 1] [, 2] [, 3]*

*[1,] FALSE FALSE FALSE*

*[2,] FALSE FALSE FALSE*

*[3,] FALSE FALSE FALSE*

*# It is correct to say that XY != YX*

1. Define Eigen values and Eigen vectors in matrices and determine how to evaluate them in R.

*# Eigenvalues*

*# Are special set of scalars associated with a linear system of*

*# equations that are sometimes also known as characteristic roots,*

*# characteristic values, proper values or latent roots*

*# Get the eigenvalues and eigenvectors using* ***eigen();*** *It returns a*

*# named list, with eigenvalues named values and eigenvectors named*

*# vectors*

* *print(eigen(X))*

*Output:*

*eigen() decomposition $values [1] 1.611684e+01 -1.116844e+00 -1.303678e-15*

*$vectors [, 1] [, 2] [, 3]*

*[1,] -0.2319707 -0.78583024 0.4082483*

*[2,] -0.5253221 -0.08675134 -0.8164966*

*[3,] -0.8186735 0.61232756 0.4082483*