**Tram Le**

**Homework1: Vector & Matrix**

1. **Create a vector a = (5, 10, 15, 20, . . . , 200).**

a <- seq(5, 200, by = 5)

so a = (5, 10, 15, 20, . . . , 200)

* **How many elements are there in a?**

Length(a)

So there are 40 elements in a

* **What are the 10th, 19th and 22nd elements of a?**

a[10] a[19] a[22]

so a = 50, a = 95, a = 110

* **Create a vector which is obtained by multiplying each element of a by 0.1.**

b <- a \* .1

then b = ( 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, 11.0, 11.5, 12.0, 12.5, 13.0, 13.5, 14.0, 14.5, 15.0, 15.5, 16.0, 16.5, 17.0, 17.5, 18.0, 18.5, 19.0, 19.5, 20.0)

* **Create a vector which consists of odd numbers of a.**

c <- a[which(a %% 2 != 0)]

then c = (5, 15, 25, 35, 45, 55, 65, 75, 85, 95, 105, 115, 125, 135, 145, 155, 165, 175, 185, 195)

* **Sum over all even elements of a.**

sum(a[which(a %% 2 == 0)])

then a = 2100

* **Create a vector which consists of elements of a divisible by 3.**

d <- a[which(a %% 3 == 0)]

then d = (15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195)

1. **Create a matrix A (3 rows and 3 columns) by ordering the vector (5, 6, 7, . . . , 13) by rows.**

A <- matrix(5:13, byrow = TRUE, nrow = 3)

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

[1,] 5 6 7

[2,] 8 9 10

[3,] 11 12 13

* + **Find the second row of A.**

A[2,] then A = [8 9 10]

* + **Find third column of A.**

A[,3] then A = [7 10 13]

* + **Find the transpose of A.**

t(A) then A =

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

[1,] 5 8 11

[2,] 6 9 12

[3,] 7 10 13

* + **Create a diagonal matrix B consisting diagonal elements of A.**

B <- diag(A)

Then B = [5 9 13]

* + **Find the inverse of B.**

B <- diag(1/A)

Then B = A-1 = [0.20000000 0.11111111 0.07692308]

* + **Create a matrix by adding one more column with elements (2, 1, 5) to A.**

A <- cbind(A, c(2, 1, 5)) then A =

[,1] [,2] [,3] [,4]

[1,] 5 6 7 2

[2,] 8 9 10 1

[3,] 11 12 13 5

* + **Create a matrix by adding one more row with elements (0.3, −1.1, 3.5) to A.**

A <- rbind(A, c(0.3, -1.1, 3.5)) Then A =

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

[1,] 5.0 6.0 7.0

[2,] 8.0 9.0 10.0

[3,] 11.0 12.0 13.0

[4,] 0.3 -1.1 3.5