

Homework1

1.a

```
v1<-2:6  
v2<-5:9  
print(v1)
```

```
## [1] 2 3 4 5 6
```

```
print(v2)
```

```
## [1] 5 6 7 8 9
```

1.b

```
v2 - v1
```

```
## [1] 3 3 3 3 3
```

1.c

```
v1%*%v2
```

```
##      [,1]
```

```
## [1,] 150
```

$v1v2 = 25+36+47+58+69 = 10+18+28+40+54 = 150$

1.d

```
v3<-v1+v2
```

```
for (i in 1:length(v3)) {  
  if(v3[i] > 10){  
    v3[i] = 0  
  }  
}
```

```
v3
```

```
## [1] 7 9 0 0 0
```

2.a

```
c1<-1:25  
m1<-matrix(c1,nrow=5, ncol=5)  
m1
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    1    6   11   16   21
## [2,]    2    7   12   17   22
## [3,]    3    8   13   18   23
## [4,]    4    9   14   19   24
## [5,]    5   10   15   20   25
```

2.b

```
m1%*%v1
```

```
##      [,1]
## [1,]  270
## [2,]  290
## [3,]  310
## [4,]  330
## [5,]  350
```

2.c

```
v1%*%m1
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]   70  170  270  370  470
```

2.d

```
m1%*%t(m1)
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]  855  910  965 1020 1075
## [2,]  910  970 1030 1090 1150
## [3,]  965 1030 1095 1160 1225
## [4,] 1020 1090 1160 1230 1300
## [5,] 1075 1150 1225 1300 1375
```

3.a

```
df <- data.frame(matrix(NA,nrow = 5,ncol = 3))

mydates <- c("2023-01-09", "2023-01-10", "2023-01-11", "2023-01-12", "2023-01-13")

df$X1<-as.Date(mydates)
df$X2<-c("Harry Potter", "Transformer", "Men in Black", "Kung Fu Panda", "Star Trek")
df$X3 = c(102, 125, 165, 93, 88)

colnames(df) <- c('Date','Movie most rented','Number')

df
```

```
##           Date Movie most rented Number
## 1 2023-01-09      Harry Potter      102
## 2 2023-01-10      Transformer      125
## 3 2023-01-11      Men in Black     165
## 4 2023-01-12      Kung Fu Panda     93
## 5 2023-01-13      Star Trek        88
```

3.b

```
str(df)

## 'data.frame':    5 obs. of  3 variables:
## $ Date           : Date, format: "2023-01-09" "2023-01-10" ...
## $ Movie most rented: chr  "Harry Potter" "Transformer" "Men in Black" "Kung Fu Panda" ...
## $ Number          : num  102 125 165 93 88
```

3.c

```
write.csv(df, "CompStats1.csv", row.names=FALSE)

df2 = read.csv(file = "CompStats1.csv")

df2
```

```
##           Date Movie.most.rented Number
## 1 2023-01-09      Harry Potter      102
## 2 2023-01-10      Transformer      125
## 3 2023-01-11      Men in Black     165
## 4 2023-01-12      Kung Fu Panda     93
## 5 2023-01-13      Star Trek        88
```

3.d

```
df_new<-df[c(1, 3, 5), c(1:2)]
df_new
```

```
##           Date Movie most rented
## 1 2023-01-09      Harry Potter
## 3 2023-01-11      Men in Black
## 5 2023-01-13      Star Trek
```

3.e

```
df["Number"][df["Number"]%%2 == 0] <- 0

df
```

```
##           Date Movie most rented Number
## 1 2023-01-09      Harry Potter         0
## 2 2023-01-10      Transformer      125
```

```
## 3 2023-01-11      Men in Black      165
## 4 2023-01-12      Kung Fu Panda      93
## 5 2023-01-13      Star Trek         0
```

3.f

```
lst<-list(v1, v2, m1, df)

names(lst)<-c("v1", "v2", "m1", "df")

lst

## $v1
## [1] 2 3 4 5 6
##
## $v2
## [1] 5 6 7 8 9
##
## $m1
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    1    6   11   16   21
## [2,]    2    7   12   17   22
## [3,]    3    8   13   18   23
## [4,]    4    9   14   19   24
## [5,]    5   10   15   20   25
##
## $df
##      Date Movie most rented Number
## 1 2023-01-09   Harry Potter         0
## 2 2023-01-10   Transformer      125
## 3 2023-01-11   Men in Black      165
## 4 2023-01-12   Kung Fu Panda      93
## 5 2023-01-13   Star Trek         0

lst[[3]][,2]

## [1]  6  7  8  9 10
```

4.a

$$f(x) = ax^2 + bx + c$$

$$x = \frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$$