Lab 1

Exercise 2

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A

Create 2 vectos twice: using the colon oprator and the seq(function)

vec1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

vec2: 2, 7, 12

```
vec1 <- 1:10
vec2 <- seq(2, 12, 5)
cat("Vec1: ", vec1, "\nVec2: ", vec2)
```

```
## Vec1:  1 2 3 4 5 6 7 8 9 10
## Vec2:  2 7 12
```

B

Create a 4x2 matrix of all zeros and store it in a variable (mymat). Then, replace the second row in the matrix with a vector consisting of a 3 and a 6.

```
mymat <- matrix(
  0,
  4,
  2
)
cat("Starting matrix:\n")
```

```
## Starting matrix:
```

```
mymat
```

```
##      [,1] [,2]
## [1,]    0    0
## [2,]    0    0
## [3,]    0    0
## [4,]    0    0
```

```
mymat[2, 1] <- 3
mymat[2, 2] <- 6
cat("Replaced matrix:\n")
```

```
## Replaced matrix:
```

```
mymat
```

```
##      [,1] [,2]
## [1,]    0    0
## [2,]    3    6
```

```
## [3,]    0    0
## [4,]    0    0
```

C

Create a vector x which consists of 20 equally spaced points in the range from $-\pi$ to $+\pi$. Create a y vector which is sin(x).

```
x <- seq(-pi, pi, length.out = 20)
x
```

```
##  [1] -3.1415927 -2.8108987 -2.4802047 -2.1495108 -1.8188168 -1.4881228
##  [7] -1.1574289 -0.8267349 -0.4960409 -0.1653470  0.1653470  0.4960409
## [13]  0.8267349  1.1574289  1.4881228  1.8188168  2.1495108  2.4802047
## [19]  2.8108987  3.1415927
```

```
y <- sin(x)
y
```

```
##  [1] -1.224647e-16 -3.246995e-01 -6.142127e-01 -8.371665e-01 -9.694003e-01
##  [6] -9.965845e-01 -9.157733e-01 -7.357239e-01 -4.759474e-01 -1.645946e-01
## [11]  1.645946e-01  4.759474e-01  7.357239e-01  9.157733e-01  9.965845e-01
## [16]  9.694003e-01  8.371665e-01  6.142127e-01  3.246995e-01  1.224647e-16
```

D

Create a 4x6 matrix of random integers, each in the range from -5 to 5; store it in a variable (mat). Create another matrix that stores for each element the absolute value of the corresponding element in the original matrix (mat_pos).

```
mat <- matrix(
  round(runif(4 * 6, -5, 5), digits = 0),
  4,
  6
)
mat_pos <- abs(mat)

mat
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    4   -1    4   -2    2    0
## [2,]    1    0    0    2   -3   -3
## [3,]    2   -3    4    5    0    1
## [4,]    5    5   -2    0    0   -1
```

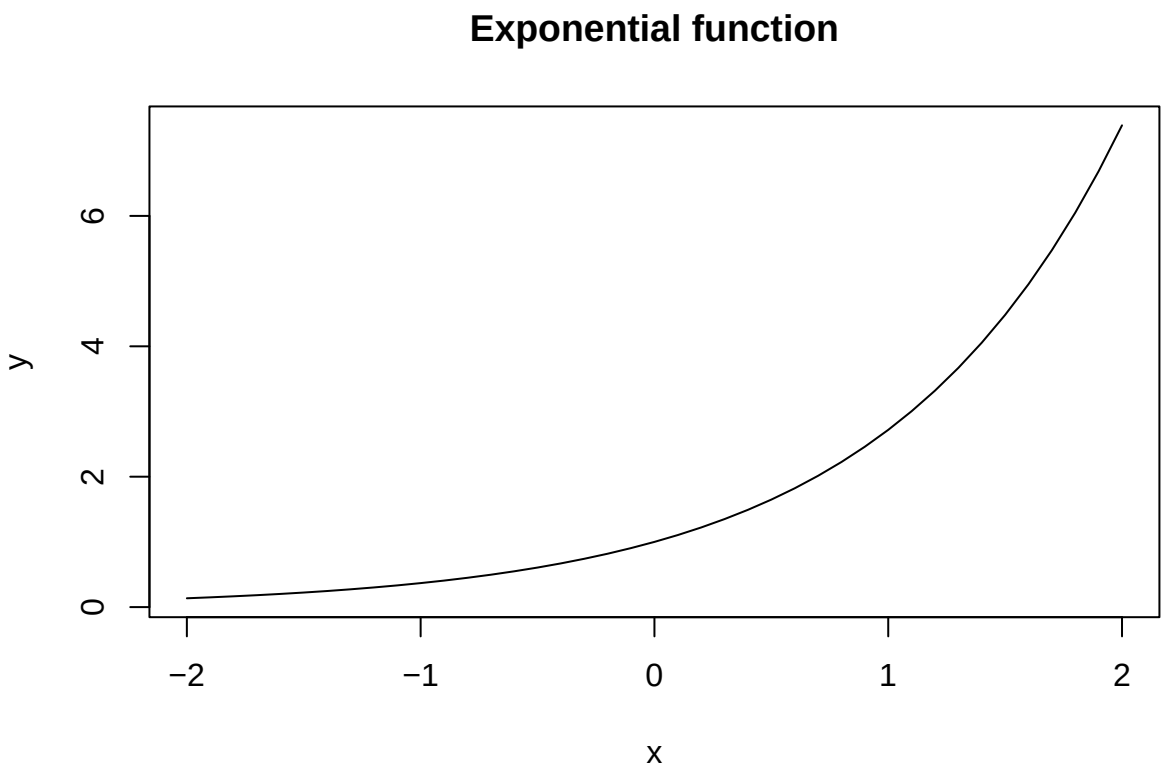
```
mat_pos
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,]    4    1    4    2    2    0
## [2,]    1    0    0    2    3    3
## [3,]    2    3    4    5    0    1
## [4,]    5    5    2    0    0    1
```

E

Plot exp(x) for values of x ranging from -2 to 2 in steps of 0.1. Put an appropriate title on the plot, and label the axes.

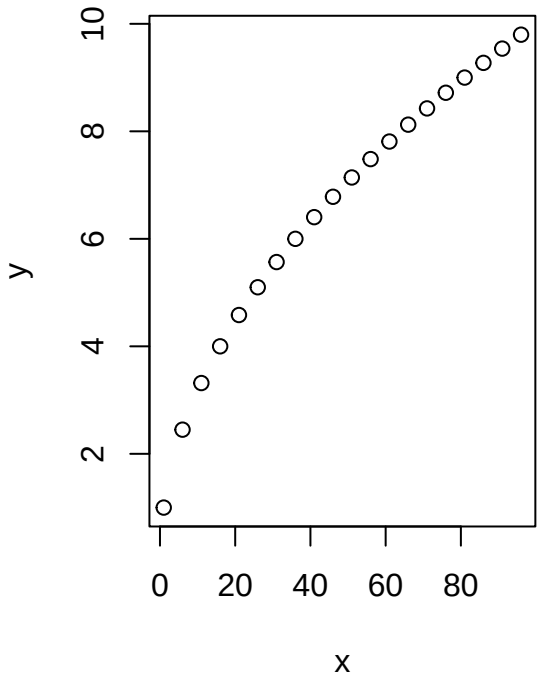
```r
x <- seq(-2, 2, 0.1)
y <- exp(x)
plot(x, y,
  type = "l",
  xlab = "x",
  ylab = "y",
  main = "Exponential function"
)
```

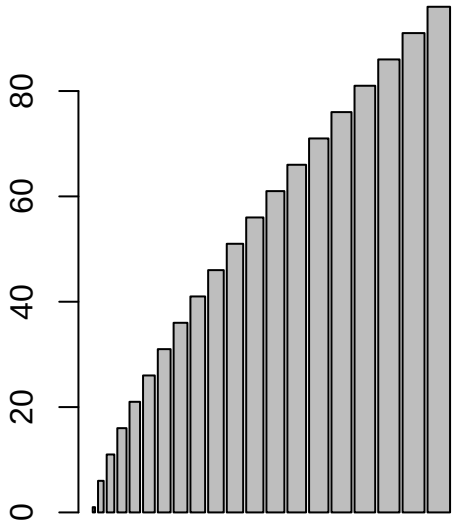


F

Create a vector x with values ranging from 1 to 100 in steps of 5. Create a vector y which is the square root of each value in x. Plot these points. Now, use the barplot() function instead of plot() to get a bar chart. Keep both plots together.

```r
x <- seq(1, 100, 5)
y <- sqrt(x)
par(mfrow = c(1, 2))
plot(x, y)
barplot(x, y)
```


y
2
4
6
8
10
0
20
40
60
80
x


0
20
40
60
80