

```
#####
```

```
# REVISÃO DE VETORES E MATRIZES
```

```
# vetor em R
```

```
x = c(1,4,3, -2)
```

```
x
```

```
# acessando elemento do vetor
```

```
x[2]
```

```
# operações com o vetor
```

```
2*x
```

```
x^2
```

```
# aplicando funções no vetor
```

```
sum(x)
```

```
# matriz em R
```

```
mx = matrix(c(1:6), nrow = 3, ncol = 2)
```

```
mx
```

```
# acessando elementos da matriz
```

```
mx[1,2]
```

```
mx[3,]
```

```
mx[,2]
```

```
mx + 1
```

```
#####
```

```
# GERAÇÃO DE VARIÁVEIS ALEATÓRIAS
```

```
# exemplo da uniforme
```

```
runif(5, min = 0, max = 10)
```

```
x = runif(1000, min = 0, max = 10)
```

```
length(x)
```

```
mean(x)
```

```
hist(x)
```

```
hist(x, probability = TRUE)
```

```
# exemplo da normal
```

```
y = rnorm(1000, mean = 0, sd = 1)
```

```
hist(y, probability = TRUE, ylim = c(0, 0.5))
```

```
mean(y)
```

```
dnorm(seq(from=-3, to=3, length=10))
```

```
x = seq(from=-3, to=3, length=1000)
```

```
lines(x, dnorm(x))
```

```
# exemplo da Poisson
```

```
z = rpois(10000, 3)
```

```
hist(z, probability = TRUE, xlim=c(-1,14))
```

```
mean(z)
```

```
x = seq(from = 0, to = 15)
```

```
points(x, dpois(x, 3), col='red')
```

```
#####
```

```
# LOOPS/LAÇO
```

```
for (i in c(1:5)) {
```

```
  print(i)
```

```
}
```

```
# variável em um laço
x = c(2, 5, 1, 8, 3)
soma_x = 0
for (i in c(1:5)) {
  soma_x = soma_x + x[i]
  print(paste('o valor do elemento é:', x[i]))
  print(paste('o valor da soma agora é:', soma_x))
  print(" ")
}
```

```
# vetor em um laço
x = rep(0, 10)
for(i in 1:length(x)){
  y = rnorm(50)
  x[i] = max(y)
}
x
sqrt(2*log(50))
```

```
# matriz em um laço
mx = matrix(NA, nrow = 5, ncol = 10)
for (i in 1:nrow(mx)) {
  y = rpois(ncol(mx), 3)
  mx[i,] = y
}
mx
```

```
#####
# LEI DOS GRANDES NÚMEROS
```

```
nrep = 1000
vn = seq(1, nrep, length = nrep)
xbars = rep(NA, nrep)
```

```
for (i in 1:nrep) {
  y = rnorm(vn[i])
  xbars[i] = mean(y)
}
```

```
plot(vn, xbars, pch=1)
abline(a=0, b=0, col='red')
```

```
# exemplo da Poisson
for (i in 1:nrep) {
  y = rpois(vn[i], lambda = 3)
  xbars[i] = mean(y)
}
plot(vn, xbars, pch=1)
abline(a=3, b=0, col='red')
```

```
# exemplo da Unif(0, 10)
```

```
for (i in 1:nrep) {
  y = runif(vn[i], min = 0, max = 10)
  xbars[i] = mean(y)
}
plot(vn, xbars, pch=1)
abline(a=5, b=0, col='red')
```

```
#####
```

```
# TEOREMA DO LIMITE CENTRAL
```

```
nrep = 1000
```

```
vz = rep(NA, nrep)
```

```
# exemplo dos dados
```

```
n = 10
```

```
mu = 7/2
```

```
sig = sqrt(35/12)
```

```
for (i in 1:nrep) {  
  y = sample(c(1:6), n, replace = TRUE)  
  vz[i] = (sum(y) - n*mu)/(sig*sqrt(n))  
}
```

```
hist(vz, probability = TRUE)
```

```
x = seq(-3, 3, length=1000)
```

```
lines(x, dnorm(x))
```

```
# exemplo da Unif(0, 10)
```

```
n = 100
```

```
mu = 5
```

```
sig = sqrt(25/3)
```

```
for (i in 1:nrep) {  
  y = runif(n, min=0, max=10)  
  vz[i] = (sum(y) - n*mu)/(sig*sqrt(n))  
}
```

```
hist(vz, probability = TRUE)
```

```
x = seq(-3, 3, length=1000)
```

```
lines(x, dnorm(x))
```