```r
#GUIA 2

v <- numeric(3);v

## [1] 0 0 0

v[3] <- 17; v

## [1]  0  0 17

x <- c(2, 4, 3.1, 8, 6)
is.integer(x)

## [1] FALSE

is.double(x)

## [1] TRUE

length(x)

## [1] 5

x <- edit(x)
y = 1:4; y

## [1] 1 2 3 4

y[2] <- 5
u <- 1:12; u1=u[2 * 1:5]
assign("z", c(x, 0, x)); z

##  [1] 2.0 4.0 3.1 8.0 6.0 0.0 2.0 4.0 3.1 8.0 6.0

s1 <- seq(2, 10); s1

## [1]  2  3  4  5  6  7  8  9 10

s2 = seq(from=-1, to=5); s2

## [1] -1  0  1  2  3  4  5

s3<-seq(to=2, from=-2); s3

## [1] -2 -1  0  1  2

s4=seq(from=-3, to=3, by=0.2); s4

##  [1] -3.0 -2.8 -2.6 -2.4 -2.2 -2.0 -1.8 -1.6 -1.4 -1.2 -1.0 -0.8 -0.6 -0.4
## [15] -0.2  0.0  0.2  0.4  0.6  0.8  1.0  1.2  1.4  1.6  1.8  2.0  2.2  2.4
## [29]  2.6  2.8  3.0
```

```r
s5 <- rep(s3, times=3); s5
```

```
##  [1] -2 -1  0  1  2 -2 -1  0  1  2 -2 -1  0  1  2
```

```r
1/x
```

```
## [1] 0.5000000 0.2500000 0.3225806 0.1250000 0.1666667
```

```r
v=2*x+z+1; v
```

```
## Warning in 2 * x + z:  longitud de objeto mayor no es mltiplo de
la longitud de uno menor
```

```
##  [1]  7.0 13.0 10.3 25.0 19.0  5.0 11.0 11.2 20.1 21.0 11.0
```

```r
e1 <- c(1, 2, 3, 4); e2<-c(4, 5, 6, 7); crossprod(e1,e2)
```

```
##      [,1]
## [1,]   60
```

```r
e1 <- c(1, 2, 3, 4); e2<-c(4, 5, 6, 7);t(e1)%*%e2
```

```
##      [,1]
## [1,]   60
```

```r
xt = t(x); xt
```

```
##      [,1] [,2] [,3] [,4] [,5]
## [1,]    2    4  3.1    8    6
```

```r
u = exp(y);u
```

```
## [1]   2.718282 148.413159  20.085537  54.598150
```

```r
options(digits=10); u
```

```
## [1]   2.718281828 148.413159103  20.085536923  54.598150033
```

```r
resum <- c(length(y), sum(y), prod(y), min(y), max(y)); resum
```

```
## [1]  4 13 60  1  5
```

```r
yo <- sort(y); yo
```

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

```r
S<-character()
deptos <- c("Santa Ana", "Sonsonate", "San Salvador"); deptos
```

```
## [1] "Santa Ana"    "Sonsonate"    "San Salvador"
```

```r
deptos[4]="Ahuachapn"; deptos
```

```
## [1] "Santa Ana"    "Sonsonate"    "San Salvador" "Ahuachapn"
```

```r
codDeptos <- c(11, 12, 13, 14)
names(codDeptos) <- c("Usulutn", "San Miguel", "Morazn", "La Unin");codDeptos
```

```
##   Usulutn San Miguel    Morazn   La Unin
##         11         12         13         14
```

```r
Oriente <- codDeptos [c("La Unin", "San Miguel")];Oriente
```

```
##   La Unin San Miguel
##         14         12
```

```r
etiqs<-paste(c("X", "Y"), 1:10, sep=""); etiqs
```

```
##  [1] "X1"  "Y2"  "X3"  "Y4"  "X5"  "Y6"  "X7"  "Y8"  "X9"  "Y10"
```

```r
M <- matrix(numeric(), nrow = 3, ncol=4)
M[2,3] <- 6; M
```

```
##      [,1] [,2] [,3] [,4]
## [1,]   NA   NA   NA   NA
## [2,]   NA   NA    6   NA
## [3,]   NA   NA   NA   NA
```

```r
A <- matrix(c(2, 4, 6, 8, 10, 12), nrow=2, ncol=3); A
```

```
##      [,1] [,2] [,3]
## [1,]    2    6   10
## [2,]    4    8   12
```

```r
mode(A); dim(A); attributes(A); is.matrix(A); is.array(A)
```

```
## [1] "numeric"
## [1] 2 3
## $dim
## [1] 2 3
## [1] TRUE
## [1] TRUE
```

```r
B <- matrix(1:12, nrow=3, ncol=4); B
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    4    7   10
## [2,]    2    5    8   11
## [3,]    3    6    9   12
```

```r
x1 <- seq(0, 10, 2); x1
```

```
## [1]  0  2  4  6  8 10
```

```r
x2 <- seq(1, 11, 2); x2
```

```
## [1]  1  3  5  7  9 11
```

```r
x3 <- runif(6); x3 # Vector con valores de una uniforme(0,1)
```

```
## [1] 0.68384496216 0.64125003852 0.06690298952 0.95745976223 0.45587672922
## [6] 0.01438915939
```

```r
Xcol <- cbind(x1, x2, x3); Xcol
```

```
##      x1 x2            x3
## [1,]  0  1 0.68384496216
## [2,]  2  3 0.64125003852
## [3,]  4  5 0.06690298952
## [4,]  6  7 0.95745976223
## [5,]  8  9 0.45587672922
## [6,] 10 11 0.01438915939
```

```r
Xfil <- rbind(x1, x2, x3); Xfil
```

```
##            [,1]          [,2]          [,3]          [,4]          [,5]
## x1 0.0000000000 2.0000000000 4.00000000000 6.0000000000 8.0000000000
## x2 1.0000000000 3.0000000000 5.00000000000 7.0000000000 9.0000000000
## x3 0.6838449622 0.6412500385 0.06690298952 0.9574597622 0.4558767292
##              [,6]
## x1 10.00000000000
## x2 11.00000000000
## x3  0.01438915939
```

```r
X <- Xfil[1:3, c(2, 3)]; X
```

```
##            [,1]          [,2]
## x1 2.0000000000 4.00000000000
## x2 3.0000000000 5.00000000000
## x3 0.6412500385 0.06690298952
```

```r
v<-c(1, 2); v %*%A
```

```
##      [,1] [,2] [,3]
## [1,]   10   22   34
```

```r
P <- A %*% B; P
```

```
##      [,1] [,2] [,3] [,4]
## [1,]   44   98  152  206
## [2,]   56  128  200  272
```

```
2*A
```

```
##      [,1] [,2] [,3]
## [1,]    4   12   20
## [2,]    8   16   24
```

```
2%*%A
```

```
## Error in 2 %*% A: argumentos no compatibles
```

```
length(A)
```

```
## [1] 6
```

```
T=sqrt(B); T
```

```
##              [,1]        [,2]        [,3]        [,4]
## [1,] 1.000000000 2.000000000 2.645751311 3.162277660
## [2,] 1.414213562 2.236067977 2.828427125 3.316624790
## [3,] 1.732050808 2.449489743 3.000000000 3.464101615
```

```
t(A)
```

```
##      [,1] [,2]
## [1,]    2    4
## [2,]    6    8
## [3,]   10   12
```

```
C <- matrix(c(2, 1, 10, 12), nrow=2, ncol=2); C
```

```
##      [,1] [,2]
## [1,]    2   10
## [2,]    1   12
```

```
det(C)
```

```
## [1] 14
```

```
InvC <- solve(C) ; InvC
```

```
##                [,1]          [,2]
## [1,]  0.85714285714 -0.7142857143
## [2,] -0.07142857143  0.1428571429
```

```
b=diag(2); InvC<-solve(C, b); InvC
```

```
##                [,1]          [,2]
## [1,]  0.85714285714 -0.7142857143
## [2,] -0.07142857143  0.1428571429
```

```
eigen(C)
```

```
## $values
## [1] 12.916079783  1.083920217
##
## $vectors
##               [,1]           [,2]
## [1,] -0.6754894393 -0.99583021557
## [2,] -0.7373696613  0.09122599279
```

```
diag(nombMatriz)
```

```
## Error in diag(nombMatriz):  objeto 'nombMatriz' no encontrado
```

```
diag(nomVector)
```

```
## Error in diag(nomVector):  objeto 'nomVector' no encontrado
```

```
diag(4)
```

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

```
c(length(A), sum(A), prod(A), min(A), max(A))
```

```
## [1]     6    42 46080     2    12
```

```
O <- matrix(sort(C), nrow=2, ncol=2); O
```

```
##      [,1] [,2]
## [1,]    1   10
## [2,]    2   12
```

```
nombres <- matrix(c("Carlos", "Jos", "Ana", "Ren", "Mara", "Mario"),nrow=3, ncol=2); nombres
```

```
##      [,1]     [,2]
## [1,] "Carlos" "Ren"
## [2,] "Jos"    "Mara"
## [3,] "Ana"    "Mario"
```

```
X <- array(c(1, 3, 5, 7, 9, 11), dim=c(2, 3)); X
```

```
##      [,1] [,2] [,3]
## [1,]    1    5    9
## [2,]    3    7   11
```

```
Z <- array(1, c(3, 3)); Z
```

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

```
W <- 2*Z+1; W
```

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

```
TX <- t(X); TX
```

```
##      [,1] [,2]
## [1,]    1    3
## [2,]    5    7
## [3,]    9   11
```

```
a <- c(2, 4, 6); a
```

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

```
b <- 1:3;b
```

```
## [1] 1 2 3
```

```
M <- a %o% b; M
```

```
##      [,1] [,2] [,3]
## [1,]    2    4    6
## [2,]    4    8   12
## [3,]    6   12   18
```

```
Arreglo3 <- array(c(1:8, 11:18, 111:118), dim = c(2, 4, 3));Arreglo3
```

```
## , , 1
##
##      [,1] [,2] [,3] [,4]
## [1,]    1    3    5    7
## [2,]    2    4    6    8
##
```

```
## , , 2
##
##      [,1] [,2] [,3] [,4]
## [1,]   11   13   15   17
## [2,]   12   14   16   18
##
## , , 3
##
##      [,1] [,2] [,3] [,4]
## [1,]  111  113  115  117
## [2,]  112  114  116  118
```