3.a2

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VECTORS

1.

```
LETTERS <- c("A", "B", "C", "D", "E", "F", "G", "H", "I", "J", "K", "L", "M", "N", "O", "P", "Q", "R",

letters <- c("a", "b", "c", "d", "e", "f", "g", "h", "i", "j", "k", "l", "m", "n", "o", "p", "q", "r",
```

a.

```
firstEl <- LETTERS[1:11]
firstEl
```

```
##  [1] "A" "B" "C" "D" "E" "F" "G" "H" "I" "J" "K"
```

b.

```
oddNum <- LETTERS[seq(1, 26, by = 2)]
oddNum
```

```
##  [1] "A" "C" "E" "G" "I" "K" "M" "O" "Q" "S" "U" "W" "Y"
```

c.

```
vowels <- LETTERS[c(1, 5, 9, 15, 21)]
vowels
```

```
## [1] "A" "E" "I" "O" "U"
```

d.

```
lowerCase <- letters[22:26]
lowerCase
```

```
## [1] "v" "w" "x" "y" "z"
```

e.

```
lower <- letters[15:24]
lower
```

```
##  [1] "o" "p" "q" "r" "s" "t" "u" "v" "w" "x"
```

2.

a.

```
city <- c("Tuguegarao City", "Manila", "Iloilo City", "Tacloban", "Samal Island", "Davao City")
city
```

```
## [1] "Tuguegarao City" "Manila"          "Iloilo City"     "Tacloban"
## [5] "Samal Island"    "Davao City"
```

b.

```
temp <- c(42, 39, 34, 34, 30, 27)
temp
```

```
## [1] 42 39 34 34 30 27
```

c.

```
dfCityAndTemp <- data.frame(city, temp)
dfCityAndTemp
```

```
##              city temp
## 1 Tuguegarao City   42
## 2          Manila   39
## 3     Iloilo City   34
## 4        Tacloban   34
## 5    Samal Island   30
## 6      Davao City   27
```

d.

```
names(dfCityAndTemp) <- c("City", "Temperature")
dfCityAndTemp
```

```
##              City Temperature
## 1 Tuguegarao City          42
## 2          Manila          39
## 3     Iloilo City          34
## 4        Tacloban          34
## 5    Samal Island          30
## 6      Davao City          27
```

e.

```
str(dfCityAndTemp)
```

```
## 'data.frame':    6 obs. of  2 variables:
##  $ City       : chr  "Tuguegarao City" "Manila" "Iloilo City" "Tacloban" ...
##  $ Temperature: num  42 39 34 34 30 27
```

It shows the number of observations and variables. It also shows the data type of the 2 variables.It presents the contents of the data frame horizontally this time. Moreover, it only showed the first few observations of the variable City.

f.

```
dfCityAndTemp[3:4, ]
```

```
##          City Temperature
## 3 Iloilo City          34
## 4    Tacloban          34
```

g.

```
highestTemp <- dfCityAndTemp$City[which.max(dfCityAndTemp$Temperature)]
lowestTemp <- dfCityAndTemp$City[which.min(dfCityAndTemp$Temperature)]

highestTemp
```

```
## [1] "Tuguegarao City"
```

```
lowestTemp
```

```
## [1] "Davao City"
```

MATRICES

2.

a.

```
matOne <- matrix(c(1,2,3,4,5,6,7,8,11,12,13,14),3,4)
matOne
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    4    7   12
## [2,]    2    5    8   13
## [3,]    3    6   11   14
```

b.

```
multiply <- matOne * 2
multiply
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    2    8   14   24
## [2,]    4   10   16   26
## [3,]    6   12   22   28
```

c.

```
rowTwo <- matOne[2, ]
rowTwo
```

```
## [1]  2  5  8 13
```

d.

```
customOne <- matOne[1:2, 3:4]
customOne
```

```
##      [,1] [,2]
## [1,]    7   12
## [2,]    8   13
```

e.

```
customTwo <- matOne[3, 2:3]
customTwo
```

```
## [1]  6 11
```

f.

```
colFour <- matOne[, 4]
colFour
```

```
## [1] 12 13 14
```

g.

```
rownames(multiply) <- c("isa", "dalawa", "tatlo")
colnames(multiply) <- c("uno", "dos", "tres", "quatro")
multiply
```

```
##        uno dos tres quatro
## isa      2   8   14     24
## dalawa   4  10   16     26
## tatlo    6  12   22     28
```

h.

```
dim(matOne) <- c(6, 2)
matOne
```

```
##      [,1] [,2]
## [1,]    1    7
## [2,]    2    8
## [3,]    3   11
## [4,]    4   12
## [5,]    5   13
## [6,]    6   14
```

ARRAY

3.

a.

```
arr <- rep(c(1, 2, 3, 6, 7, 8, 9, 0, 3, 4, 5, 1), 2)
arra <- array(arr, dim = c(2, 4,3))
arra
```

```
## , , 1
##
##      [,1] [,2] [,3] [,4]
## [1,]    1    3    7    9
## [2,]    2    6    8    0
##
## , , 2
##
##      [,1] [,2] [,3] [,4]
## [1,]    3    5    1    3
## [2,]    4    1    2    6
##
## , , 3
##
##      [,1] [,2] [,3] [,4]
## [1,]    7    9    3    5
## [2,]    8    0    4    1
```

b.

```
dim(arra)
```

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

c.

```
rownames(arra) <- c("a", "b")
colnames(arra) <- c("A", "B", "C", "D")
```

```r
dimnames(arra)[[3]] <- c("1st-Dimensional Array", "2nd-Dimensional Array", "3rd-Dimensional Array")
arra
```

```
## , , 1st-Dimensional Array
##
##   A B C D
## a 1 3 7 9
## b 2 6 8 0
##
## , , 2nd-Dimensional Array
##
##   A B C D
## a 3 5 1 3
## b 4 1 2 6
##
## , , 3rd-Dimensional Array
##
##   A B C D
## a 7 9 3 5
## b 8 0 4 1
```