

5. Problem Statement

. Create the vectors

(a) (2, 3, ..., 29, 30)

(b) (30, 29, ..., 2)

(c) (1, 2, 3, ..., 29, 30, 29, 28, ..., 2, 1)

(d) (4, 6, 3) and assign it to the name dev.

For parts (e), (f) and (g) .

(e) (5, 6, 7, 5, 6, 7, ..., 5, 6, 7) where there are 10 occurrences of 5.

(f) (5, 6, 7, 5, 6, 7, ..., 5, 6, 7, 5) where there are 11 occurrences of 5, 10 occurrences of 6 and 10 occurrences of 7.

(g) (4, 4, ..., 4, 6, 6, ..., 6, 3, 3, ..., 3) where there are 10 occurrences of 4, 20 occurrences of 6 and 30 occurrences of 3.

2. Create a vector of the values of $e^x \sin(x)$ at $x = 3, 3.1, 3.2, \dots, 6$.

3. Execute the following lines which create two vectors of random integers which are chosen with replacement from the integers 0, 1, ..., 999. Both vectors have length 250.

```
set.seed(100)
```

```
x <- Sample(0:999, 250, replace=T)
```

```
y <- Sample(0:999, 250, replace=T)
```

(a) Identify out the values in y which are > 500.

(b) Identify the index positions in y of the values which are > 700?

(c) What are the values in x which are in Same index position to the values in y which are > 400?

(d) How many values in y are within 200 of the maximum value of the terms in y?

(e) How many numbers in x are divisible by 2?

(f) Sort the numbers in the vector x in the order of increasing values in y.

(g) Create the vector $(x_1 + 2x_2 - x_3; x_2 + 2x_3 - x_4, \dots, x_{n-2} + 2x_{n-1} - x_n)$.

(h) Calculate:

4. Use the function paste to create the following character vectors of length 30:

(a) ("Label 1", "Label 2", ..., "Label 30").

*Note that there is a single space between label and the number following.

(b) ("FN1", "FN2", ..., "FN30").

**In this case, there is no space between fn and the number following.

5. Compound interest can be computed using the formula

$A = P \times (1 + R/100)^n$, where P is the original money lent, A is what it amounts to in n years at R percent per year interest.

Write R code to calculate the amount of money owed after n years, where n changes from 1 to 15 in yearly increments, if the money lent originally is 10000 Rupees and the interest rate remains constant throughout the period at 11.5%.

6) Generate the following matrices.

[1] [2] [3] [4]

[1,] 1 101 201 301

[2,] 2 102 202 302

[3,] 3 103 203 303

[4,] 4 104 204 304

[5,] 5 105 205 305

Acadgild Solutions for Business analysis with R_session 4_Assignment 1

Solutions for Question 1 to Question 6

Question 1 Create the vectors

(a) (2, 3, ... , 29, 30)

(b) (30, 29, ... , 2)

(c) (1, 2, 3, ..., , 29, 30, 29, 28, , 2, 1)

(d) (4, 6, 3) and assign it to the name dev.

For parts (e), (f) and (g) .

(e) (5, 6, 7, 5, 6, 7, , 5, 6, 7) where there are 10 occurrences of 5.

(f) (5, 6, 7, 5, 6, 7, , 5, 6, 7, 5) where there are 11 occurrences of 5, 10 occurrences of 6 and 10 occurrences of 7.

(g) (4, 4, , 4, 6, 6, , 6, 3, 3, , 3) where there are 10 occurrences of 4, 20 occurrences of 6 and 30 occurrences of 3.

Answer 1

Part a) `> a<-(2:30)`

`> a`

```
[1] 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
[27] 28 29 30
```

Part b)

`> b<-(30:2)`

`> b`

```
[1] 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5
[27] 4 3 2
```

Part c)

`> c<-c(1:30,29:1)`

`> c`

```
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
[27] 27 28 29 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8
[53] 7 6 5 4 3 2 1
```

Part d) `> c<-c(1:30,29:1)`

```
> x<-c(seq(3.1,6,0.1))
> x
> y<-sin(x)
> y
> z<-exp(x)
> z
r<-c(y*z)
```

```
> r
```

Question 3 -

Execute the following lines which create two vectors of random integers which are chosen with

replacement from the integers 0, 1, : : : , 999. Both vectors have length 250.

```
set.seed(100)
```

```
x <- Sample (0:999, 250, replace=T)
```

```
y <- Sample (0:999, 250, replace=T)
```

(a) Identify out the values in y which are > 500.

(b) Identify the index positions in y of the values which are > 700?

(c) What are the values in x which are in Same index position to the values in y which are > 400?

(d) How many values in y are within 200 of the maximum value of the terms in y?

(e) How many numbers in x are divisible by 2?

(f) Sort the numbers in the vector x in the order of increasing values in y.

(g) Create the vector $(x_1 + 2x_2 - x_3; x_2 + 2x_3 - x_4, \dots, x_{n-2} + 2x_{n-1} - x_n)$.

Answer 3

```
set.seed(100)
```

```
x <- Sample (0:999, 250, replace=T)
```

```
y <- Sample (0:999, 250, replace=T)
```

Part a)

```
> y[y>500] # displays the y values at index no.s stored in ff vector
```

Part b)

```
> gg<-which(y>700) #creates vector gg in which indices of y values > 700 is given
```

```
> gg
```

Part c)

```
> x[y>400]
```

Part d)

```
> sum(y>max(y)-200)
```

e)

```
> length(y[y%%2==0])
```

f)

```
> x[order(y)]
```

g)

h)

Question-4:

Use the function paste to create the following character vectors of length 30:

(a) ("Label 1", "Label 2",, "Label 30")

*Note that there is a single space between label and the number following.

(b) ("FN1", "FN2", ..., "FN30").

**In this case, there is no space between fn and the number following.

Answer 4

a)

```
> r<-paste("label",1:30,sep=" ")
```

```
> r
```

```
[1] "label 1" "label 2" "label 3" "label 4" "label 5" "label 6"
[7] "label 7" "label 8" "label 9" "label 10" "label 11" "label 12"
[13] "label 13" "label 14" "label 15" "label 16" "label 17" "label 18"
[19] "label 19" "label 20" "label 21" "label 22" "label 23" "label 24"
[25] "label 25" "label 26" "label 27" "label 28" "label 29" "label 30"
```

b)

```
> j<-paste0("fn",1:30)
```

```
> j
```

```
[1] "fn1" "fn2" "fn3" "fn4" "fn5" "fn6" "fn7" "fn8" "fn9" "fn10"
[11] "fn11" "fn12" "fn13" "fn14" "fn15" "fn16" "fn17" "fn18" "fn19" "fn20"
[21] "fn21" "fn22" "fn23" "fn24" "fn25" "fn26" "fn27" "fn28" "fn29" "fn30"
```

Question 5 :

Compound interest can be computed using the formula

$A = P \times (1 + R/100)^n$, where P is the original money lent, A is what it amounts to in n years at R percent per year interest.

Write R code to calculate the amount of money owed after n years, where n changes from 1 to 15 in yearly increments, if the money lent originally is 10000 Rupees and the interest rate remains constant throughout the period at 11.5%.

Answer 5

$A = P \times (1 + R/100)^n$, where P is the original money lent, A is what it amounts to in n years at R percent per year interest.

```
> n<-c(1:15)
> n
[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
> p=1000
> p
[1] 1000
> m<-p*(1+11.5/100)^n
> m
[1] 1115.000 1243.225 1386.196 1545.608 1723.353 1921.539 2142.516 2388.905
[9] 2663.629 2969.947 3311.491 3692.312 4116.928 4590.375 5118.268
```

Question 6 Generate the following matrices.

```
[,1] [,2] [,3] [,4]
[1,] 1 101 201 301
[2,] 2 102 202 302
[3,] 3 103 203 303
[4,] 4 104 204 304
[5,] 5 105 205 305
```

Answer 6

```
> n<-c(1:5,101:105,201:205,301:305)
> n
[1] 1 2 3 4 5 101 102 103 104 105 201 202 203 204 205 301 302 303
[19] 304 305
```

```
> m<-matrix(n,5,4)
> m
      [,1] [,2] [,3] [,4]
[1,]     1  101  201  301
[2,]     2  102  202  302
[3,]     3  103  203  303
[4,]     4  104  204  304
[5,]     5  105  205  305
```