MOOC Course - Introduction to R Software

July 2021

Assignment 2

1. Which one of the following is the correct specification to compute $y = \sqrt{\ln(x) + x^{1/3}}$ and what is its value for $x = 7590$?

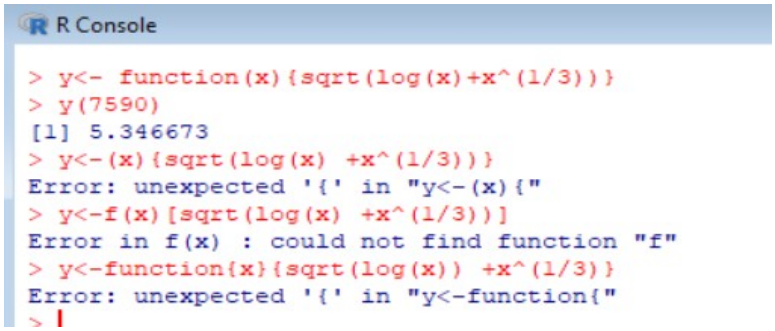
a. `y<-(x){sqrt(log(x) +x^(1/3))}, y = 53.46673`

b. `y<-f(x)[sqrt(log(x) +x^(1/3))], y = 534.6673`

c. `y<-function{x}{sqrt(log(x)) +x^(1/3)}, y = 0.5346673`

d. `y<- function(x){sqrt(log(x)+x^(1/3))}, y = 5.346673`

Solution:



2. Which one of the following is the correct outcome of `z(12,14)` of the function specified as `z=function(x,y){sqrt(x^2+y^2)+exp(-(x^-2+y^-2))-(x^2+y^2)^(2/4)}` ?

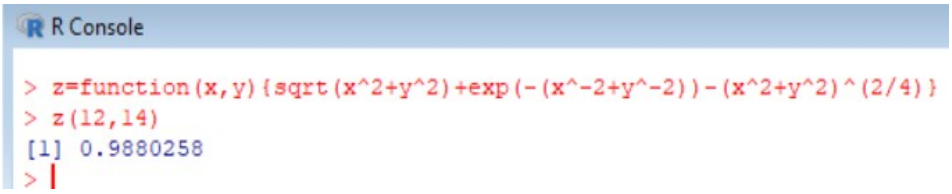
a. `-29.28675`

b. `0.9880258`

c. `37.8662`

d. None of these

Solution:



3. Which one of the following is the correct command to obtain the following matrix?

$$x = \begin{pmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{pmatrix}$$

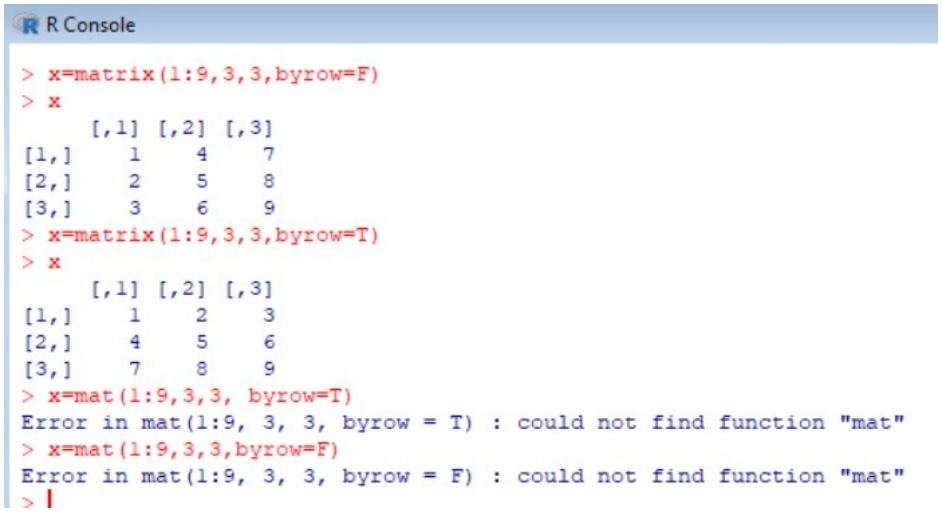
a. `x=matrix(1:9,3,3,byrow=T)`

b. `x=mat(1:9,3,3, byrow=T)`

c. `x=matrix(1:9,3,3,byrow=F)`

d. `x=mat(1:9,3,3,byrow=F)`

Solution:



4. Which one of the following is the correct command to obtain the following matrix?

$$z = \begin{pmatrix} 5 & 6 & 7 \\ 8 & 9 & 10 \end{pmatrix}$$

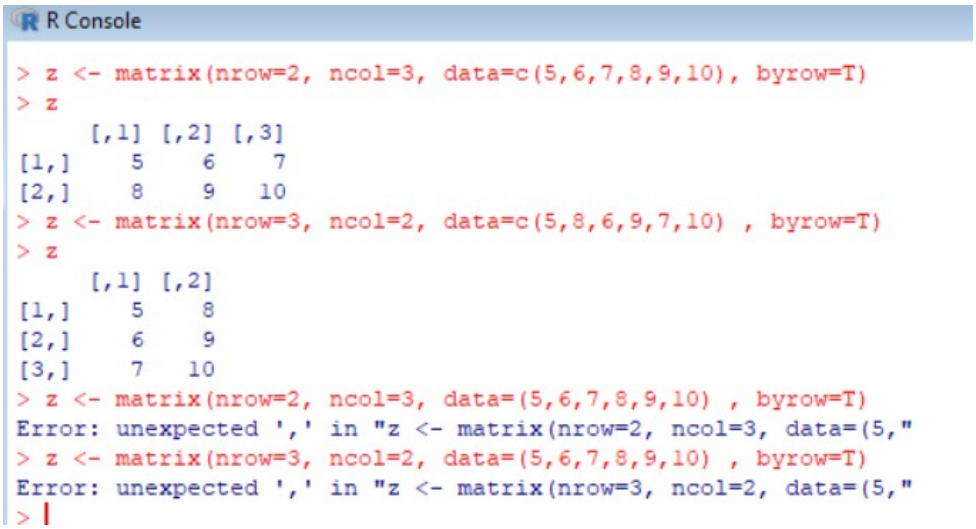
a. `z <- matrix(nrow=2,ncol=3,data=c(5,6,7,8,9,10),byrow=T)`

b. `z <- matrix(nrow=3,ncol=2,data=c(5,8,6,9,7,10),byrow=T)`

c. `z <- matrix(nrow=2,ncol=3,data=(5,6,7,8,9,10),byrow=T)`

d. `z <- matrix(nrow=3,ncol=2,data=(5,6,7,8,9,10),byrow=T)`

Solution:



5. Which one of the following is the correct command to obtain the second column and third row of the following matrix?

$$x = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

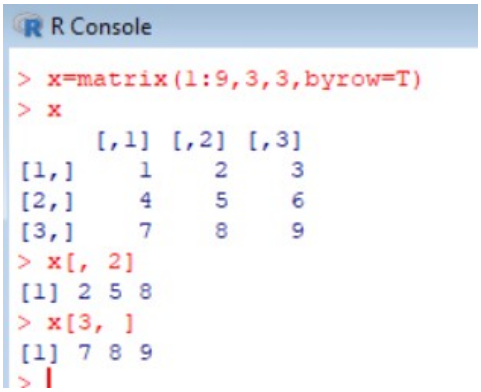
a. `x(2, )` and `x( ,3)` respectively.

b. `x(2, )` and `x(3, )` respectively.

c. `x[ ,2]` and `x[3, ]` respectively.

d. `x[ ,2]` and `x[ ,3]` respectively.

Solution:



6. Which one of the following is the correct outcome of the command `X[3,2]` for the matrix constituted by the command `X<-matrix(1:9,3,3,byrow=F)`?

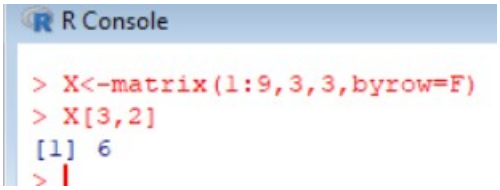
a. `3`

b. `6`

c. `7`

d. `8`

Solution:



7. Which one of the following is the correct outcome of the commands `dim(x)` and `dim(y)` for the matrices obtained by `x<-matrix(1:100,50,2,byrow=T)` and `y<-matrix(1:100,50,2,byrow=F)`?

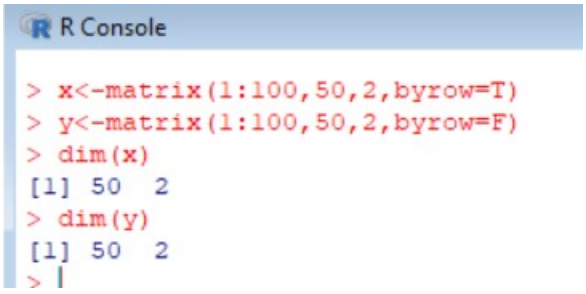
a. `50 2` and `2 50` respectively.

b. `2 50` and `50 2` respectively.

c. `2 50` and `2 50` respectively.

d. `50 2` and `50 2` respectively.

Solution:



8. Which one of the following matrix is the correct outcome of the command

`x <- diag(3, nrow=2, ncol=2)` ?

a. $x = \begin{pmatrix} 3 & 3 & 3 \\ 3 & 3 & 3 \end{pmatrix}$

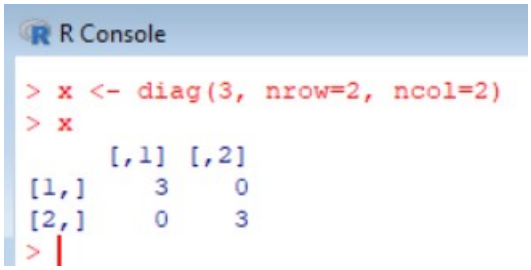
b. $x = \begin{pmatrix} 3 & 0 & 0 \\ 0 & 3 & 3 \end{pmatrix}$

c. $x = \begin{pmatrix} 0 & 3 & 0 \\ 0 & 0 & 3 \end{pmatrix}$

d. $x = \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$

Answer: d

Solution:



9. Which one of the following is the correct outcome of the command `t(x)` for `x<-matrix(nrow=3, ncol=2, data=6:11, byrow=T)` ?

a.

```
     [,1] [,2] [,3]
[1,]    6    8   10
[2,]    7    9   11
```

b.

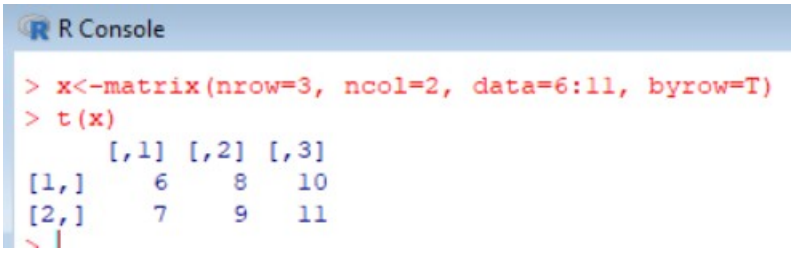
```
     [,1] [,2]
[1,]    6    9
[2,]    7   10
[3,]    8   11
```

c.

```
     [,1] [,2] [,3]
[1,]    6    7    8
[2,]    9   10   11
```

d. None of these

Solution:



10. Which one of the following is the correct command to obtain the multiplication of two matrices `x` and `y` of the same order?

a. `x*y`

b. `%x*y`

c. `x%*%y`

d. `x%%*%%y`

Answer: c

11. Which one of the following is the correct command to obtain the multiplication of two matrices $x = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and $y = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$ along with its correct answer?

a. `x*y`

and its correct answer is

```
     [,1] [,2]
[1,]   19   22
[2,]   43   50
```

b. `x*%*y`

and its correct answer is

```
     [,1] [,2]
[1,]   19   43
[2,]   22   50
```

c. `x%*%y`

and its correct answer is

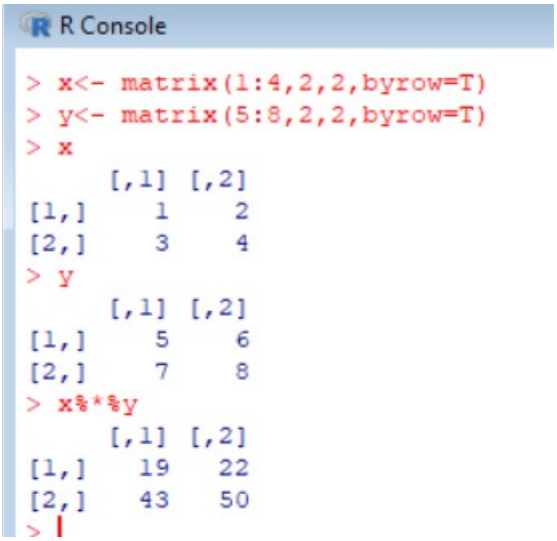
```
     [,1] [,2]
[1,]   19   22
[2,]   43   50
```

d. `x%%*%%y`

and its correct answer is

```
     [,1] [,2]
[1,]   50   43
[2,]   22   19
```

Solution:



12. Let `x<- matrix(nrow=2, ncol=2, data=1:4, byrow=T)` then which one of the following is the correct outcome of `2*x` ?

a.

```
     [,1] [,2]
[1,]    2    4
[2,]    6    8
```

b.

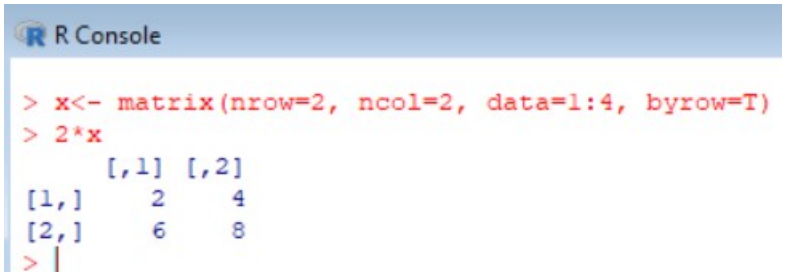
```
     [,1] [,2]
[1,]    2    6
[2,]    4    8
```

c.

```
     [,1] [,2]
[1,]    2    4
[2,]    8    6
```

d. None of these

Solution:



13. Which one of the following is the correct command for the addition of two matrices $x = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ and $y = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$ along with its correct answer?

a.

```
x + y
```

and its correct answer is

```
     [,1] [,2]
[1,]    6    8
[2,]   10   12
```

b.

```
x %+% y
```

and its correct answer is

```
     [,1] [,2]
[1,]    6    8
[2,]   12   10
```

c.

```
x %%+%% y
```

and its correct answer is

```
     [,1] [,2]
[1,]   10   12
[2,]    6    8
```

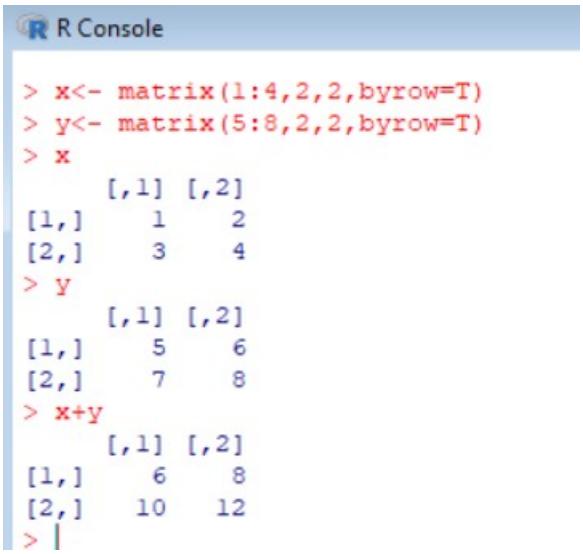
d.

```
x %+%+ y
```

and its correct answer is

```
     [,1] [,2]
[1,]    6    8
[2,]   10   12
```

Solution:



14. Let **`x<- matrix(nrow=2, ncol=2, data=1:4, byrow=T)`** then which one of the following is the correct outcome of **`2%*%x`** ?

a.

```
     [,1] [,2]
[1,]    2    4
[2,]    6    8
```

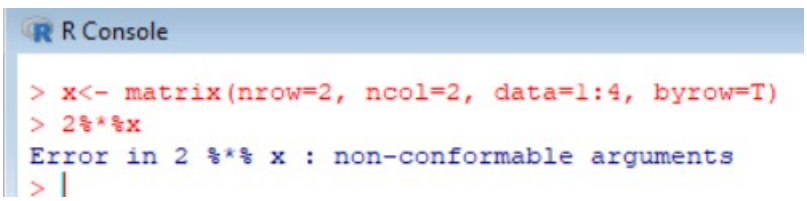
b.

```
     [,1] [,2]
[1,]    2    6
[2,]    4    8
```

c. **`Error...`**

d. None of these

Solution:



15. Which one of the following is the correct outcome of `X[ ,2]` for the matrix specified by

```
X<-matrix(nrow=3, ncol=3, data=c(10,20,30,40,50,60,70,80,90),
    byrow=F)
```

?

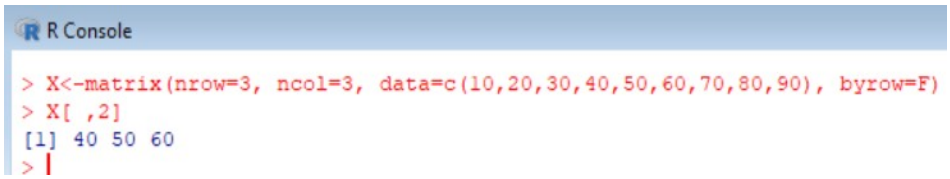
a. `[1] 40 50 60`

b. `[1] 20 50 80`

c. `[1] 10 50 90`

d. None of these

Solution:



16. Which one of the following is the correct outcome of `X[2:3,2:3]` for the matrix specified by

```
X<-matrix(nrow=3, ncol=3, data=c(10,20,30,40,50,60,70,80,90),
    byrow=F)
```

?

a.

```
     [,1] [,2]
[1,]   50   60
[2,]   80   90
```

b.

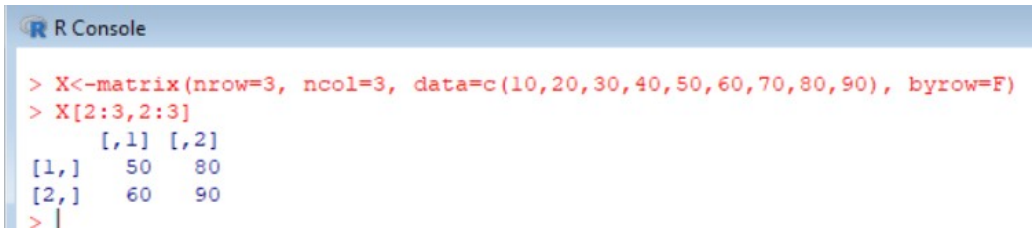
```
     [,1] [,2]
[1,]   50   80
[2,]   60   90
```

c.

```
     [,1] [,2]
[1,]   20   80
[2,]   30   90
```

d. None of these

Solution:



17. Which one of the following is the correct command to get the matrix $\begin{pmatrix} 40 & 70 \\ 50 & 80 \end{pmatrix}$ from the matrix specified by

`X<-matrix(nrow=3, ncol=3, data=c(10,20,30,40,50,60,70,80,90), byrow=F)`?

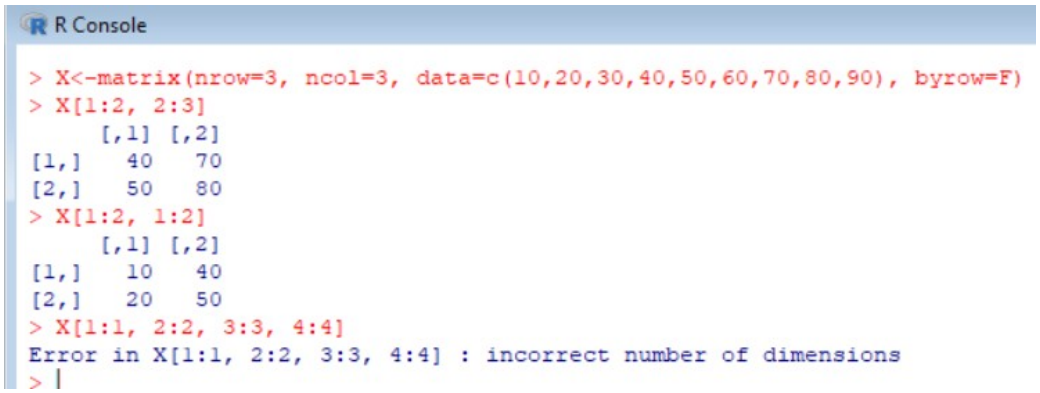
a. `X[1:2, 1:2]`

b. `X[1:2, 2:3]`

c. `X[1:1, 2:2, 3:3, 4:4]`

d. None of these

Solution:



18. If $x = \begin{pmatrix} 12 & 18 & 10 \\ 23 & 34 & 56 \\ 12 & 64 & 22 \end{pmatrix}$ then which one of the following is the correct command and its outcome for obtaining the inverse of the matrix **x**?

a.

```
solve(x) =
             [,1]        [,2]        [,3]
[1,]  0.13899235 -0.01195844 -0.03273868
[2,] -0.00813566 -0.00705744  0.02166242
[3,] -0.05214664  0.02705352  0.00029406
```

b.

```
inv(x) =
             [,1]        [,2]        [,3]
[1,]  0.13899235 -0.01195844 -0.03273868
[2,] -0.00813566 -0.00705744  0.02166242
[3,] -0.05214664  0.02705352  0.00029406
```

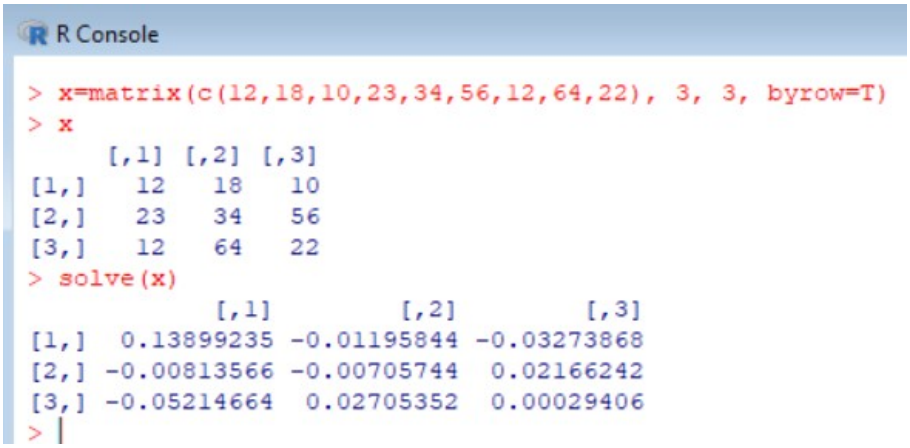
c.

```
inv(x) =
             [,1]        [,2]        [,3]
[1,]  0.13899235 -0.01195844 -0.03273868
[2,] -0.05214664  0.02705352  0.00029406
[3,] -0.00813566 -0.00705744  0.02166242
```

d.

```
solve(x) =
             [,1]        [,2]        [,3]
[1,]  0.13899235 -0.01195844 -0.03273868
[2,] -0.05214664  0.02705352  0.00029406
[3,] -0.00813566 -0.00705744  0.02166242
```

Solution:



19. Suppose **x** is any vector as **x=c(100,200, 300, 1:100, NA)** then which one of the following is the correct outcome of the command **mean(x)**?

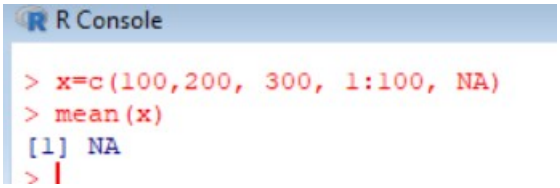
a. **54.85437**

b. **140.2**

c. **Error...**

d. **NA**

Solution:



20. Which one of the following is the correct outcome of the command

(x < 5)&& (x >2) & (x < 5)|| (x > 2)||(x == 7)

when **x = 3** and when **x = -3** ?

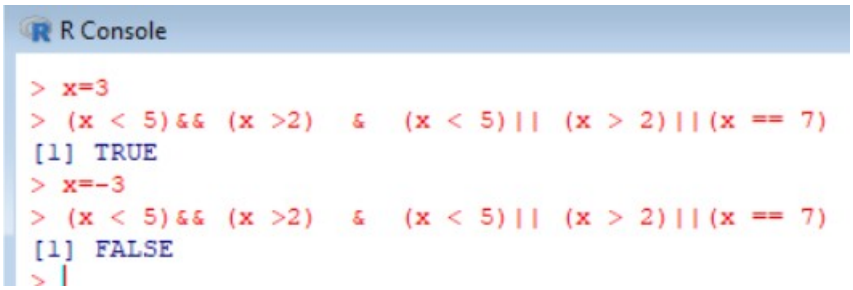
a. **FALSE** and **FALSE** respectively.

b. **TRUE** and **FALSE** respectively.

c. **FALSE** and **TRUE** respectively.

d. **TRUE** and **TRUE** respectively.

Solution:



21. Suppose `x = 3:7` then which one of the following is the correct outcome of the command `(x > 3)&(x < 5)`?

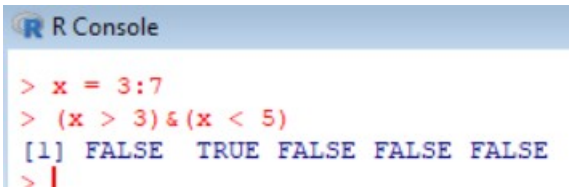
a. **FALSE TRUE FALSE FALSE FALSE**

b. **TRUE FALSE TRUE TRUE TRUE**

c. **TRUE TRUE TRUE FALSE FALSE**

d. **FALSE FALSE FALSE TRUE TRUE**

Solution:



22. Suppose `x = 33:53` then which one of the following correctly specifies the outcomes of the following statements: `x[(x > 28) & (x < 59)]` and `x[(x > 28) || (x < 59)]`?

a. are different for both as

`33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53`

and

`23 24 25 26 27 28 29 30 41 42 43 44 45 46 47 48 49 50 51 52 53`

respectively.

b. are the same for both as

`33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53`

c. are different for both as

`23 24 25 26 27 28 29 30 41 42 43 44 45 46 47 48 49 50 51 52 53`

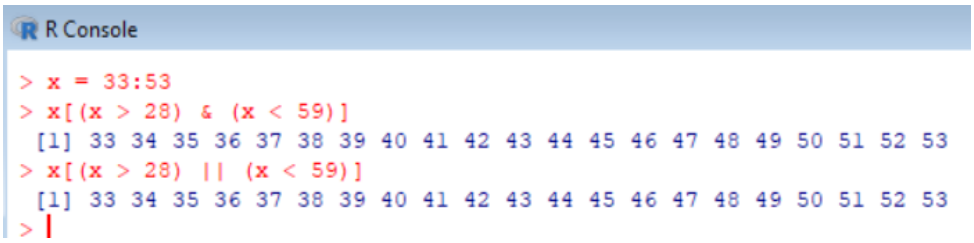
and

`33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53`

respectively.

d. None of these

Solution:



23. Suppose `x = 30:70` then which one of the following is the correct command to know that which of the values in `x` are more than 20 and less than 50?

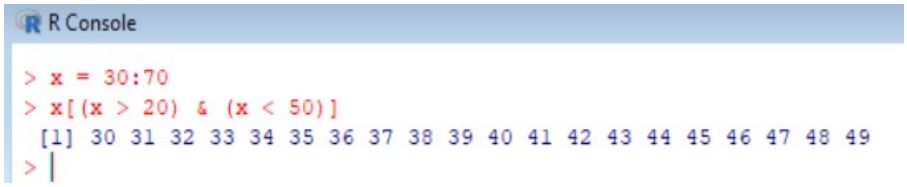
a. `x[(x > 20) & (x < 50)]`

b. `(x > 20) & (x < 50)`

c. `x[(x >= 20) & (x >= 50)]`

d. None of these

Solution:



24. Suppose `x = 53:97` then which one of the following is the correct outcome of `(x > 92) && (x < 85)` and `(x > 92) || (x < 85)`?

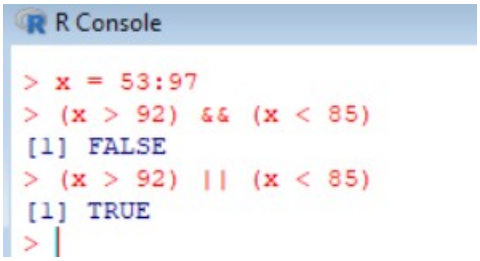
a. `TRUE` and `FALSE` respectively.

b. `FALSE` and `FALSE` respectively.

c. `TRUE` and `TRUE` respectively.

d. `FALSE` and `TRUE` respectively.

Solution:



25. Suppose `x = 3:7` then which one of the following is the correct outcome of `x[(x > 2) || (x < 5)]` ?

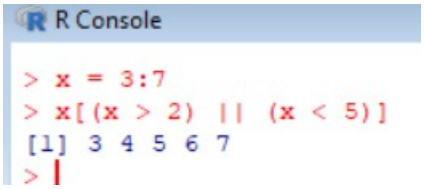
a. `TRUE`

b. `FALSE`

c. `3 4 5 6 7`

d. None of these

Solution:



MOOC Course - Introduction to R Software

Answers of Assignment 2

1. d
2. b
3. c
4. a

5. c
6. b
7. d
8. d
9. a
10. c
11. c
12. a
13. a
14. c
15. a
16. b
17. b
18. a
19. d
20. b
21. a
22. b
23. a
24 . d
25. c