

# Exercises-1: Intro to R- vectors

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## The console

Type the following with the correct operator

1. 3 plus 10
2. 6 times 12
3. What is 4 to the power 7?

```
3 + 10
```

```
## [1] 13
```

```
6 * 12
```

```
## [1] 72
```

```
4^7
```

```
## [1] 16384
```

4. Type 3 + then press **Enter**, press **Enter**, press **Enter**!

Whats happening?

press Esc

## Assigning values

1. Assign the value 100 to **x** using two different syntax

```
x = 100
```

```
x <- 100
```

2. Assign the value 21 times **x** to **y** and print to console in one line of code.

```
(y <- 21*x)
```

```
## [1] 2100
```

3. Now change the value of **x** to 200. What happens to the value of **y**?

```
x <- 200
```

```
y
```

```
## [1] 2100
```

```
# y doesn't change i.e. its not a pointer
```

## Functions

1. Take the logarithm (natural base) of 10 by assigning 10 as an argument and calling the correct function. What value does it return?

```
log(10)
```

```
## [1] 2.302585
```

2. What other log base functions are there?

```
log10(10)
```

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

```
log2(10)
```

```
## [1] 3.321928
```

3. Take the reverse function to get back to 10.

```
exp(log(10))
```

```
## [1] 10
```

HINT: use the help documentation in the Help pane by calling ? or help()

## Multiple argument

1. Use the rep() function to repeat the same numbers in a vector. HINT: Look at the help document.

```
rep(1)
```

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

2. Output to the console the number 1 five times.

```
rep(1, 5)
```

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

3. Write the function with the argument for the number of times to repeat (5) first and 1 second.

```
rep(times = 5, x = 1)
```

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

4. Use the rep() function to repeat the numbers 1,2 five times.

```
rep(c(1,2), 5)
```

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

5. Change the arguments so that the total length of the output vector is length 5 with alternating numbers.

```
rep(c(1,2), length = 5)
```

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

6. Change the arguments so that the total length of the output vector is length 5 but with all 1's together and all 2's together.

```
rep(c(1,2), each = 3, length.out = 5)
```

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

## Variables

1. Which of these are numbers? Which are words? How can you tell?

```
1
"1"
"one"
# number: 1
# words: "1", "one"
```

## Vectors

1. How many dimensions does a vector have?

```
# 1
```

2. Consider a vector:

```
x <- c(4,6,5,7,10,9,4,15)
```

What is the value of:

```
c(4,6,5,7,10,9,4,15) < 7
```

- a. TRUE, FALSE, TRUE, FALSE, FALSE, FALSE, TRUE, FALSE
- b. TRUE, TRUE, TRUE, FALSE, FALSE, FALSE, TRUE, FALSE
- c. FALSE, TRUE, TRUE, FALSE, FALSE, FALSE, TRUE, FALSE
- d. TRUE, TRUE, TRUE, TRUE, TRUE, FALSE, TRUE, FALSE

```
# b
```

3. Consider two vectors:

```
p <- c (3, 5, 6, 8) and
```

```
q <- c (3, 3, 3)
```

What is the value of:

```
p+q
```

- a. 6, 8, 6, 8
- b. 6, 8, 0, 0
- c. 6, 8, NA, NA
- d. 3, 5, 6, 8 Warning message: In p+q : longer object length is not a multiple of shorter object length
- e. 6, 8, 9, 11

```
# e
```

4. If

```
Age <- c(22, 25, 18, 20) Name <- c("James", "Mathew", "Olivia", "Stella") Gender <- c("M", "M", "F", "F")
```

then what is the R code for getting the following output

```
##   Age   Name Gender
## 1  22   James      M
## 2  25  Mathew      M
```

a.

```
DataFrame = data.frame(c(Age), c(Name), c(Gender))
subset(DataFrame, Gender == "M")
```

b.

```
DataFrame = data.frame(c(Age),c(Name),c(Gender))
subset(Gender=="M"), eval=FALSE
```

c.

```
DataFrame = data.frame(Age,Name,Gender)
subset(DataFrame,Gender=="M")
```

d.

```
DataFrame = data.frame(c(Age,Name,Gender))
subset(DataFrame,Gender=="M")
```

# c

5. If `z <- 0:9` then what is the output from the following R-statements:

```
digits <- as.character(z)
as.integer(digits)
```

a. Error in subset. object 'z' not found

b. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

c. "NA", "NA", "NA", "NA", "NA", "NA", "NA", "NA", "NA"

d. "0", "1", "2", "3", "4", "5", "6", "7", "8", "9"

e. 0, 0, 0, 0, 0, 0, 0, 0, 0

# b

6. Consider the vector `x <- c(1,2,3,4)`. What is the value of `k` for:

```
(x+2)[(!is.na(x)) & x > 0] -> k
```

a. 1, 2, 3, 4

b. 1, 4, 9, 16

c. Error: object 'k' not found

d. 3, 4, 5, 6

e. `numeric(0)`

# d

7. Consier the AirPassenger data set

```
data(AirPassengers)
```

Which statement will produce the following output?

```
## [1] 112 118 132 129 121 135 148 148 136 119 104 118
```

- a. `AirPassengers[time(AirPassengers) >= 1949 & time(AirPassengers) < 1950, 12]`
- b. `AirPassengers[AirPassengers >= 1949 & AirPassengers < 1950]`
- c. `AirPassengers[time(AirPassengers) >= 1949 & time(AirPassengers) < 1950]`
- d. `AirPassengers[AirPassengers >= 1949 & AirPassengers < 1950, 12]`
- e. `c[[1]]`

# c

8. If `x <- c(2, 4, 6, 8)` and `y <- c(TRUE, TRUE, FALSE, TRUE)`

What is the value of `sum(x[y])`?

- a. 20
- b. 8
- c. 14
- d. NA

# c

9. Consider the vector `x <- c(34, 56, 55, 87, NA, 4, 77, NA, 21, NA, 39)`.

Which R-statement will count the number of NA values in x?

- a. `count(is.na(X))`
- b. `length(is.na(x))`
- c. `sum(is.na(x))`
- d. `count(!is.na(x))`
- e. `sum(!is.na(x))`

# c

10. How many dimensions does a matrix have?

```
1 2 3 4 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
```

# 2

11. If the below matrix is named *M* what is value  $M_{34}$ ? How do you print it to screen?

```
1 2 3 4 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
```

# 6

[<https://www.r-exercises.com/2015/10/09/vector-exercises/>]