

Basic R - Exercises: Basic operations and functions

Quick guide:

To find out a little more about the organization of mathematical functions in R, we can try the following commands:

- `help("Math")`
- `help("Arithmetic")`
- `help("Trig")`
- `help("Log")`
- `help("Special")`

Fig.1 R Logistics

`help` or `?` allow you to query information about a function. You can also use the search field on the Help tab in the lower right window of RStudio.

Whit `help.search` or `??` allow you to query information about a keyword (enter it in quotes). Again, you can use the search field on the "Help" tab in the lower right window of RStudio.

`install.packages("Paket", dep=TRUE)` installs the package and any other packages it depends on. You can also use the Install button on the Packages tab in the lower right window of RStudio.

`library(Paket)` loads the package. You can also load it by checking it in the Packages window of RStudio

Exercises with R

Part I - Exercises to improve understanding

1. Perform the following steps:

Perform a normal addition of two vectors with `c() + c()`.

Define the variables `a` and `b` associated with each vector

Perform a sum of the created variables

Store the result in the variable 'result'.

Check the result of the previous operation

Delete all previous objects

2. A. Calculate the following operations by hand:

$$2^3+5/2$$

$$2*(3+5/2)$$

$$2*((3+5)/2)$$

2. B. Check that the results in R match your result

3. A. Calculate the following operations using a calculator and record the results.

$$2^3*5$$

$$2^{-5}$$

$$534-76*7+\pi$$

$$2(3+5)$$

$$c(2^3+5/2, 2^3+5/2, 2^3+5/2)$$

$$c(2^{40}+3, 2^{-20}+10, 17/3+10*2)$$

$$\log(8)/\log(10)^5$$

$$7^{\log(2,7)}+1$$

$$\cos(60*\pi/180) + 0.5$$

$$\text{acos}(0.5)*180/\pi + 60$$

$$\text{acos}(2) + 10$$

$$2+5i*3+7i$$

$$(2+5i)/3+7i$$

3. B. Add parentheses to the above operations and compare the results obtained with your calculator and with R.

Part II - Comprehension Test:

1. Give an expression to calculate $(2+7)8+5/2-3^6+8!$ with the operations written exactly in the given order and without unnecessary parentheses, and then, separated by a single blank space, copy exactly the result given by R when evaluated.

Answer:

2. Give an expression to compute $|\sin(\sqrt{2})e^{\sqrt[5]{2}}|$, with the operations and functions written exactly in the given order, and then, separated by a single blank, copy exactly the result given by R when evaluating it.

Answer:

3. Give an expression to calculate $\sin(37^\circ)$, using the construction explained in this lesson for calculating trigonometric functions of given angles in degrees, and then, separated by a single blank, copy exactly the result given by R when evaluating it.

Answer:

4. Give an expression to calculate $3e^{-\pi}$, with the operations written exactly in the given order, and then, separated by a single blank, copy exactly the result given by R when evaluating it.

Answer:

5. Give an expression to calculate $e^{2/3}$ rounded to 3 decimal places, and then, separated by a single blank, copy exactly the result given by R when evaluating it.

Answer:

6. On a single line, define x as $\sqrt{2}$ and y as $\cos(3\pi)$ and calculate $\ln(xy)$; separate the three instructions with semicolons followed by a single blank space. Then, separated by a blank space (no semicolon), copy exactly the result given by R when evaluating this sequence of instructions.

Answer: