

Exercise 01

This Exercise does not have to be handed in as there are no homework tasks for this week. To receive sample solutions for the Presence Tasks throughout the course, you need to submit a solution in **DoIT!**.

Presence task 1:

Copy the following commands into an R script and execute the commands one after the other. Interpret each command and, if necessary, the result (output of R) in a comment and save the script with the included comments:

```
x <- c(4,8,12)
x
x/2
x**2
x^2
sqrt(x)
x^(1/3)
x[2]
x[-1]
x-1
1:5
y <- c(-1,1,0.4)
z <- x*y
z
rep(x, times = 3)
rep(x, each=3, times = 2)
m1 <- rbind(x, y)
m1[1, ]
m2 <- cbind(x, z, -x, 1:3)
dim(m2)
a <- 2
b = 1/3
1.23 -> c
a; b; c
cat("The numbers are:\n a =", a, ", b =", b, ", c =", c, "\n")
```

Presence task 2:

Calculate $\tan(3\pi/4)$ in R (`tan(3*pi/4)`) and assign the result to the variable `x`. Using the `print` function, print the result to R (do it without the `print` function as well). Using R's help function, find out how to calculate the arctan in R (`?arctan`). Store the result of `arctan(x)` in the variable `Y` and output the result. Delete the variables `x` and `y` (`rm(x, y)`). Then check once with the function `ls()` and once by direct input of `x` and `y`, respectively, whether the variables have really been deleted.

Presence task 3:

Height and weight of four people are summarized in the following table: Store the weight

No.	weight in kg	height in cm
1	65	170
2	79	177
3	56	166
4	85	189

in a vector `x`, and the size in `y` (cf. definition of `x` and `y` in P2). The *body mass index* BMI is defined as

$$\text{BMI} = \frac{\text{weight in kg}}{(\text{height in m})^2}.$$

Calculate the BMI of four people and store the result in `z`.

Which individuals have a BMI > 24 ? Hint: Use the function `which()`.

Presence task 4:

In one study, the dry weight of 10 plants grown under specific conditions was measured. The weight units determined are:

67, 88, 99, 102, 76, 69, 85, 92, 83, 77

Save the results in `x`, enter the following commands in R, and interpret the results.

```
sum(x)
length(x)
sum(x) / length(x)
mean(x)
median(x)
sd(x)
var(x)
min(x)
max(x)
summary(x)
sum(x < 80)
range(x)
sort(x)
barplot(x)
hist(x, breaks = c(45, 60, 75, 90, 105, 120))
?hist
```