

Exercise 1

In this exercise you will have to use R as a calculator to determine the result of more or less complicated mathematical expression. Create a variable `x` with value 6 and a variable `y` with value -2.5. Calculate the following with R:

Note: $\lfloor a \rfloor$ is the floor function, which always rounds a down irrespective of the fractional part. $\lceil a \rceil$ is called ceiling function and defined accordingly. $a \bmod b$ is the modulo operator, which returns the remainder of the division $\frac{a}{b}$.

- (a) $|y|^3$
- (b) e^x
- (c) $(x + y) \cdot 5$
- (d) $\frac{1}{x+y}$
- (e) $\sin(1.5 \cdot \pi)$
- (f) $\sqrt[x]{64}$
- (g) $\left\lceil \frac{19}{x} \right\rceil$
- (h) $\left\lfloor \frac{-17}{y} \right\rfloor$ (once with the `floor` function, once without the `floor` function).
- (i) $17 \bmod x$

Exercise 2

Often you will have to create vectors with special sequences of values, which can be used for further tasks. In this exercise you will be challenged to create vectors with special patterns. Create the following vectors without writing all numbers manually (you do not have to assign them to a variable name):

Even though it might not seem very useful at a glance being able to create all kinds of patterns is very handy in many everyday situations.

- (a) 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
- (b) 1, 4, 7, 10, 13, 16, 19
- (c) 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024
- (d) 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5
- (e) 2, 3, 5, 9, 17, 33, 65, 129, 257, 513, 1025
- (f) 0, 1, 0, 1, 0, 1, 0, 1, 0, 1