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. $a \mod b$ 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) $\sin(6 \cdot \pi)$
(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) $17 \mod x$

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`

*Exercise 3

This exercise is for the upcoming lecture to prepare you for the content or to sensibilize you for something.

Imagine you have the sequence `6, 6, 5, 7, 9, 1, 3, NA, 2, 3, NA`, where `NA` (Not Available) stands for an unknown(missing value. Calculate by hand the mean of these values. Which problems do you face? Imagine a vector with the above sequence has been assigned to a variable called `x`. What do you assume will happen if you ask R to calculate the mean of x?

```
mean(x)
```

After you've made an assumption proof it! If you really, really wanted some idea about the mean of these observations, what could you do about the missing values?