

Exercise sheet 1

Exercise 1: Use R to calculate the following

$$4^6, 9!, \sqrt{\pi}$$

Exercise 2: In R vectors are used everywhere. So try to do the following

- Create an object `v1` as the vector
 $(1, 2, 3, \dots, 49, 50)$
- Create an object `v2` as the vector
 $(3, 5, 7, 11, 13, 17)$
- Create an object `v3` as the vector
 $(3, 5, 7, 11, 13, 17, 0, 1, 2, 3, \dots, 48, 49, 50)$
- Create an object `v4` as the vector
 $(0.0, 0.1, 0.2, \dots, 4.8, 4.9)$
- Create an object `v5` as the vector
 $(2, 4, 6, 8, 10, 12, \dots, 96, 98, 100)$
- Create an object `smoker` as the vector of length 100
 $(\text{"yes"}, \text{"no"}, \text{"no"}, \text{"yes"}, \text{"no"}, \text{"no"}, \dots, \text{"yes"}, \text{"no"}, \text{"no"}, \text{"yes"})$
- Create an object `treatment` as the vector of length 100
 $(\text{"treated"}, \text{"control"}, \text{"treated"}, \text{"control"}, \dots, \text{"treated"}, \text{"control"}, \text{"treated"}, \text{"control"})$
- Sum over all the elements of `v1`.
- What is the product of all the elements of `v2`.

Exercise 3: Create the following object

```
age <- round( rexp(100, 0.05) + 10 , 0)
```

- A group of researchers collect data on smoking habits from 100 persons. Using the vector `smoker`, find how many smokers are under 18.
- Create a new vector `x` using all the even elements of `age` that are larger or equal than 18. What is the minimum value of all the elements contained in `x`.
- The researchers treated half of the individuals with a drug that reduces the addictive effects of nicotine. Create a vector `x1` with the age of treated smokers.

- Produce a vector $x2$ containing the age of non-smokers or treated individuals.

Exercise 4: Using the commands `sum()` or `prod()` calculate

$$\sum_{i=1}^{20} \frac{1}{i}, \quad \prod_{i=1}^{20} (2i^2 - i)$$