# DATA 505: Homework 1

# Variable assignment and basic arithmetic

2025-09-02

## Context

In Lecture 1, we talked about R, its history, its strengths and weaknesses, and looked at an example that highlights its usefulness for data analysis. In Lab 1, we had our first use of Quarto to produce documents that include integrated R code.

In the next class, we will discuss some basics of R variables, types, and functions.

In between, with this first homework assignment, we will learn about: - Objects and variable assignment in R, and - Syntax for simple arithmetic with numeric variables in R. ("R as a calculator.")

#### References

If the concept of variable assignment or its implementation in R are unfamiliar to you, I recommend section 2.1 and 2.2 here of free online book:

• Grolemund, G. (2014). Hands-On Programming with R. O'Reilly Media. Retrieved from https://rstudio-education.github.io/hopr/.

## Coding tasks

Create an R script and use it to perform these tasks.

- 1. Define a variable x and assign it the value  $5^1$
- 2. Define another variable y and assign it the value 3.

<sup>&</sup>lt;sup>1</sup>In R, you do not need to declare a variable's type before assigning a value, in contrast to languages like C and Java where type declarations are required.

- 3. Add x and y together. What is the result?
- 4. Subtract y from x. What is the result?
- 5. Multiply x and y. What is the result?
- 6. Divide x by y. What is the result?
- 7. Calculate x raised to the power of y (that is,  $(x^y)$ ). What is the result?
- 8. Use the sqrt() function to find the square root of x.
- 9. Assign the value -10 to a variable called z. Use the abs() function to find the absolute value of z.
- 10. Try dividing x by 0. What happens? What result does R give you?
- 11. Assign a new value to x (for example, 12). What happens to the old value?
- 12. Use the # symbol to add a comment to your script explaining what one of your lines of code does.
- 13. Combine arithmetic and a function: Calculate the square root of the sum of x squared and y squared.

# Side note: Variable assignment syntax

A few different syntactical styles are valid for assigning values to variables in R.

```
x <-4 \text{ # most common in } R style convention x = 4 \text{ # less common in } R, but still works 4 \rightarrow x \text{ # awkward but works} x <-y <-4 \text{ # works: assigns to both } x and y x <-4 \rightarrow y \text{ # also works but very eccentric (discourage doing this)}
```

Others are invalid, like:

```
x == 4 # this is logical comparison, not assignment x <= 4 # this is an inequality, not assignment
```