Introduction to R
Session 9: Writing functions

1. The factorial of a non-negative integer $n$ is defined to be

\[ n! = n \times (n - 1) \times (n - 2) \ldots \times 2 \times 1, \]

so for example, $4! = 4 \times 3 \times 2 \times 1 = 24$. Create a function that takes a non-negative integer as the argument and returns the factorial of the integer. (Hint: you can use a while loop, but there are many ways to do this). What is the value of $10!$?

2. The formula for converting a temperature in Fahrenheit (F) to Celsius (C) is:

\[ C = \frac{5}{9} \times (F - 32) \]

Write a function that converts a Fahrenheit temperature to Celsius. Use this function to create a data frame containing Fahrenheit values 30, 31, 32, up to 100, and the corresponding temperatures in Celsius.

3. Obtain a root for the following function with the Newton-Raphson method:

\[ f(x) = 5x^3 - 4x^2 + 12x - 7 \]

(Hint: Implement the Newton-Raphson function given in the session 9 slides).