Exercise 9 – Root finding

Exercise 9.1

Consider the function $f(x) = e^{-x} - x$

- Draw the function in ROOT at another equivalent program.
- Write a program which evaluates the root with precision 10^{-8} using
   Bisection method
   Newton-Raphson method
- Compare the precisions after N steps

 Some tips
 Create a function which evaluates the value for you and another function
 which gives the derivative (once you have calculated it analytically)

 double myfun(double x)
 double myfun_der(double x)

Exercise 9.2

We consider the motion of a damped oscillator. We assume that the
amplitude of such an oscillator is described by the following function:

$$A(t) = A_0 e^{-\gamma t} (\cos \omega_1 t + \sin \omega_2 t)$$

Let assume the following values for the coefficients:

$$A_0 = 2.0, \gamma = 0.3, \omega_1 = 3/2, \omega_2 = 17/4$$

-Find all the roots with precision 10^{-8} in the interval [0,5] of A(t) using both
the bisection and the Newton-Raphson method.