Exercise 9 – Root finding

Exercise 9.1

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

- Draw the function in ROOT or 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:

$$A(t) = A_0 e^{-¥t}(\cos \mu_1 t + \sin \mu_2 t)$$

Let assume the following values for the coefficients:

$$A_0 = 2.0, ¥ = 0.3, \mu_1 = 3/2, \mu_2 = 17/4$$

-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.