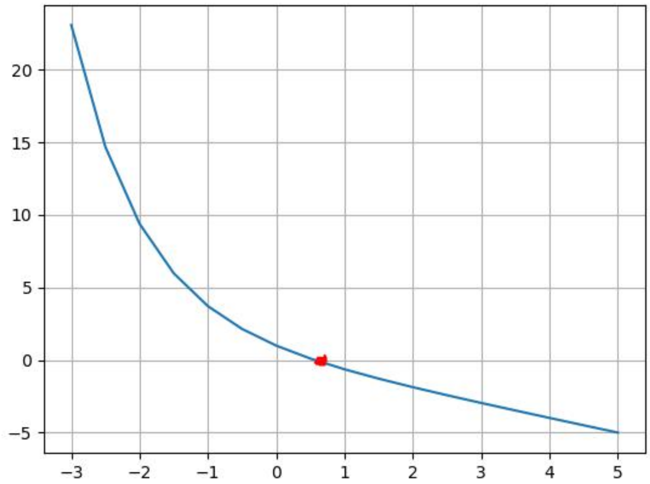
Find the root of the following equation:
$y = f(x) = e^{-x} - x = 0$
by using the Fixed Point Method with initial guess $x_0 = 0$and tolerance $\varepsilon = 10^{-3}$
Solution:



$y = f(x_0 = 0) = 1$
Since $|y_r| > \varepsilon$, then we continue to the iteration

Iteration 1: --
$x_1 = x_0 + f(x_0) = 0 + e^{-0} - 0 = 1$
$y_1 = f(x_1) =- 0.63212$
Since $|y_1| > \varepsilon$, then we continue the iteration

Iteration 2: --
$x_2 = x_1 + f(x_1) = 1 + e^{-1} - 1 = 0.36788$
$y_2 = f(x_2) = 0.32432$
Since $|y_2| > \varepsilon$, then we continue the iteration

Iteration 3: --
$x_3 = x_2 + f(x_2) = 0.36788 + e^{-0.36788} - 0.36788 = 0.69220$
$y_3 = f(x_3) =- 0.19173$
Since $|y_3| > \varepsilon$, then we continue the iteration

Iteration 4: --
$x_4 = x_4 + f(x_4) = 0.69220 + e^{-0.69220} - 0.69220 = 0.50047$
$y_4 = f(x_4) = 0.10577$
Since $|y_4| > \varepsilon$, then we continue the iteration

Let’s skip iterations 5-12 and proceed to iteration 13

Iteration 13: --
$x_{13} = x_{12} + f(x_{12}) = 0.56641 + e^{-0.56641} - 0.56641 = 0.56756$
$y_{13} = f(x_{13}) =- 0.00065$
Since $|y_{13}| < \varepsilon$, then we stop the iteration. The solution is $x = 0.56756$