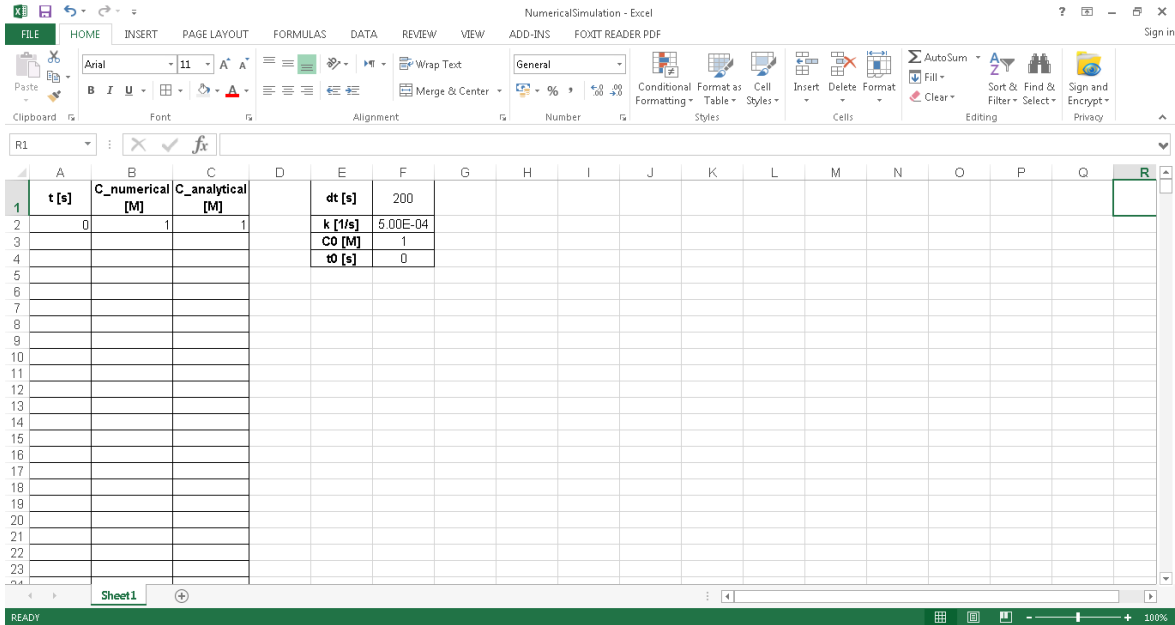


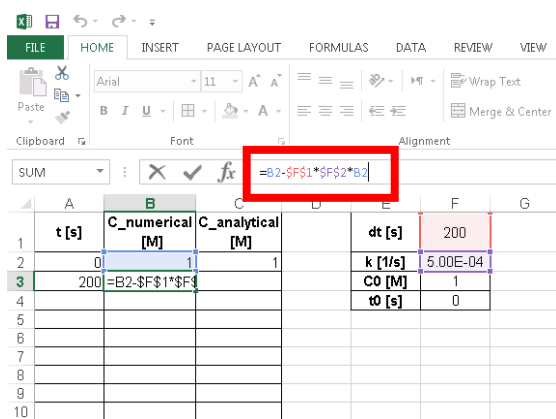
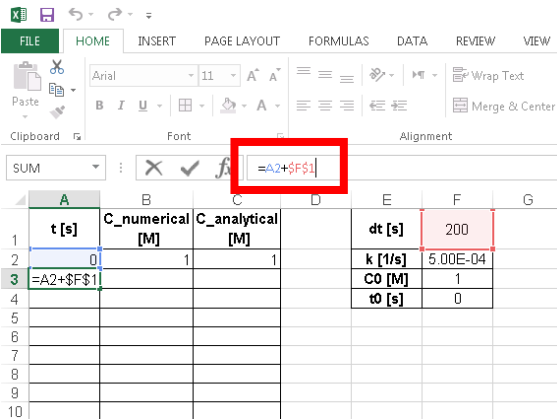
# A Guide to Numerical Simulation in Excel

1. Start by placing the titles, the constants and the boundary conditions, that will be necessary for the calculations:



2. Calculate the time and concentration in the second-step, according to Euler's method:

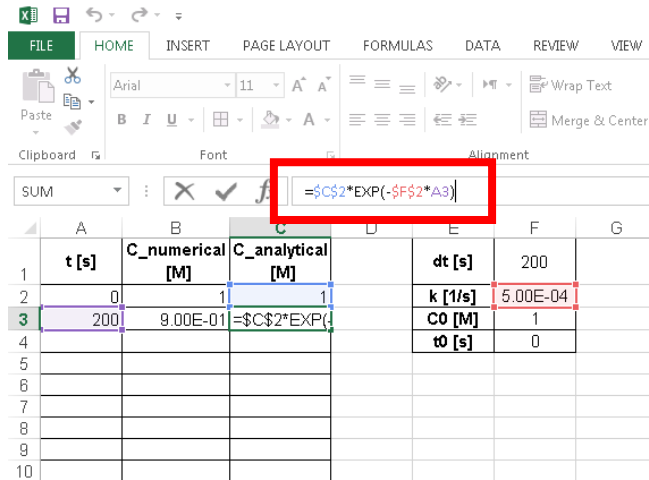
$$t_1 = t_0 + \Delta t \cdot 1, \quad [C]_1 = [C]_0 - \Delta t \cdot k[C]_0$$



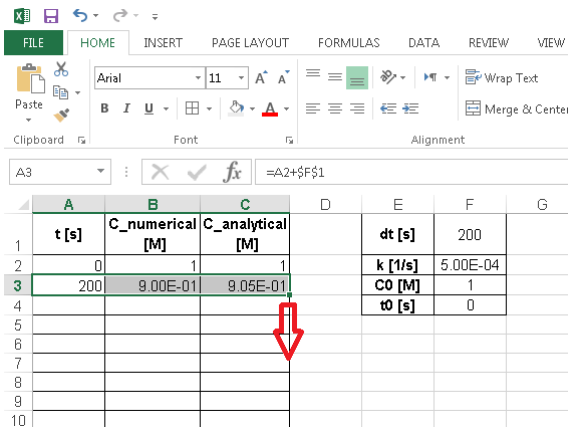
\* Notice that placing the "\$" symbol in front of the column letter and row number of a cell in the Excel formula will cause the reference to that cell to be fixed. It is essential for the next steps....

- Calculate the concentration in time  $t_1$  according to the exact analytical solution,

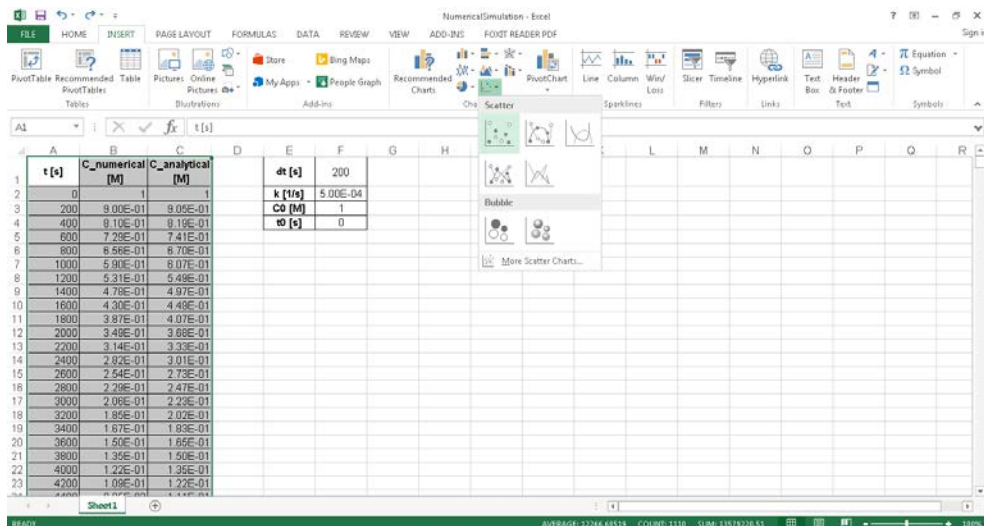
$$[C]_1 = [C]_0 \cdot e^{-kt_1}$$



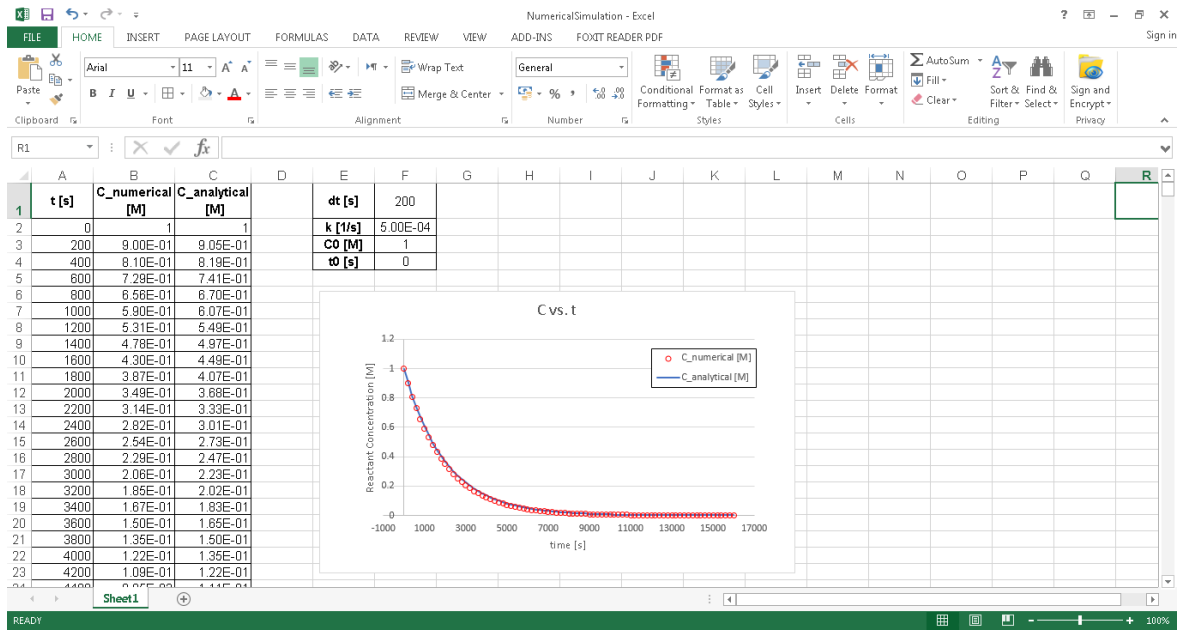
- Choose cells A3+B3+C3 and drag down, in order to calculate the values of the following time steps.



- Choose the relevant columns and add a plot.



6. Modify the plot's appearance to your liking. Make sure both data series are visible and can be compared.



**Good luck!**