This quiz has two sides. You have 15 minutes for the following two problems. Calculators are NOT allowed. Please print your name and section number at the top-right corner before you start.

**Problem 1** (6 points) Write down the recursive formula (give $y_{i+1}$ in terms of a formula of $y_i$) for Euler’s method to solve the following equation:

$$y'(t) = y^3 + t^2, \quad y(0) = 1$$

You can assume we have already chosen $t_i$ such that $t_i = ih$. Also we understand $y_i = y(t_i)$. 
Problem 2  (14 points)

(a) Solve the following ordinary differential equation (10 points).

\[ y'(t) = (2 - y)e^t, \quad y(0) = 1 \]

(b) What is the long time behavior of this equation, ie, \( \lim_{t \to \infty} y(t) =? \) (4 points)