CHEM-E7190/2023: Exercise - ODE, Taylor series, Extra

1. Find the first four terms of the Taylor expansion of the solution of

$$y' = x + y^2$$
$$y(0) = 1$$

   about $x = x_0 = 0$

2. Determine the Taylor series for $f(x) = e^x$ about $x = 0$.

3. Determine the Taylor series for $f(x) = e^x$ about $x = -4$.

4. Determine the Taylor series for $f(x) = 3x^2 - 8x + 2$ about $x = 2$.

5.

$$\frac{dy}{dx} = y^3 + 2, y(0) = 3$$

   Find $y(0.2)$ from the 2nd order Taylor polynomial.