MATH2010E HOMEWORK 5

Please do the following problems due to June 19, 2 pm .

1. Let $X'(t) = (e^t, 8t^2 + 2)$ with $X(0) = (1, 3)$. Find the equation for $X(t)$.

2. Solve the equation.
$$x'(t) = x(t) + 2t,$$
$$y'(t) = y(t) - t^2$$
   with initial data $(x(0), y(0)) = (2, -1)$.

3. Let
$$A = \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix}$$
   and $(f(t), g(t)) = (t, 1)$. Solve the equation $X'(t) = AX(t) + \begin{pmatrix} f(t) \\ g(t) \end{pmatrix}$
   with the initial data $(x_0, y_0) = (1, -1)$

4. (Preview) Find the statement of implicit function theorem and understand the statement. I will teach this theorem next Wednesday.