Quiz 7

1. Solve

$$x' = \begin{bmatrix} -2 & 1 \\ 1 & -2 \end{bmatrix} x + \begin{bmatrix} 2e^{-t} \\ 3t \end{bmatrix}$$

   Note that the solution to the corresponding homogeneous system is

$$x = C_1 \begin{bmatrix} e^{-3t} \\ -e^{-3t} \end{bmatrix} + C_2 \begin{bmatrix} e^{-t} \\ e^{-t} \end{bmatrix}$$

   Hint: I wouldn't use undetermined coefficients

2. Use the Euler method $y_{n+1} = y_n + f(t_n, y_n)h$ to estimate $y(1)$ with a step size of $h = 0.5$

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