1. Find the solution of the initial value problem, using the method of undetermined coefficients:

\[ y''' + 3y'' + 3y' + y = 30e^{-x} \]

\[ y(0) = 3, \ y'(0) = -3, \ y''(0) = -3. \]

2. Use the method of variation of parameters and find the solution of the differential equation:

\[ y'' + 3y' + 2y = \sin(e^t) \]

3. Solve the differential equation:

\[ ty^{(4)} + 6y^{(3)} = 0. \]

4. Solve the differential equation:

\[ y''' = \frac{1}{t}. \]