SHOW ALL WORK ON THIS SHEET

1. [6pts] Find the general solution of the homogeneous problem:

\[ y'' - 2y' + 5y = 0 \]

2. [6pts] Find the unique solution of the following initial value problem

\[ y'' - 2y' + y = 0 \quad , \quad y(0) = 0 \quad , \quad y'(0) = 1 \]
3. [3pts] Find the general solution of the following third order differential equation

\[ y''' - 6y'' + 11y' - 6y = 0 \]

given that \( r = 3 \) is a root of its characteristic polynomial \( P(r) \).

4. [5pts] Use the Method of Undetermined Coefficients to find a particular solution \( y_p(x) \) of:

\[ y'' + 3y' - 2y = 8 - 4x \]