Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [6 points] Solve the homogeneous sixth order differential equation

$$y^{(6)} - y = 0.$$

Show all steps.

2. [6 points] Solve the nonhomogeneous third order differential equation

$$y''' + 8y'' + 46y' + 68y = 20e^{-2t} + 15t^3.$$

(**Hint**: For the characteristic, make a guess and divide.)