Math 3301 **Homework Set 4** **10 Points**

Real, Distinct Roots

1. Find the general solution to : $6y'' - y' - 4y = 0$.

2. Solve the following IVP

$$5y'' + 3y' - 2y = 0 \qquad y(0) = -1, \quad y'(0) = 0$$

3. Solve the following IVP.

$$y'' - 4y = 0 \qquad y(0) = 4, \quad y'(0) = -7$$

4. Solve the following IVP in terms of β and determine the value(s) of β for which the solution will stay finite at $t \to \infty$.

$$y'' + 3y' - 18y = 0 \qquad y(0) = 4 + 3\beta, \quad y'(0) = 1 - \beta^2$$

Complex Roots

5. Solve the following IVP.

$$9y'' - 6y' + 10y = 0 \qquad y(0) = -3, \quad y'(0) = -1$$

6. Solve the following IVP.

$$y'' - 8y' + 20y = 0 \qquad y\left(\tfrac{\pi}{2}\right) = 0, \quad y'\left(\tfrac{\pi}{2}\right) = 7$$

Double Roots

7. Solve the following IVP.

$$y'' + 18y' + 81y = 0 \qquad y(0) = -5, \quad y'(0) = 2$$

8. Solve the following IVP.

$$4y'' - 12y' + 9y = 0 \qquad y(4) = 0, \quad y'(4) = -9$$