

**Sample Exam 2.**

1. Solve the initial value problem  $y'' - 4y' - 12y = 3e^{5t}$ ,  $y(0) = \frac{18}{7}$ ,  $y'(0) = -\frac{1}{7}$ .
2. Solve the initial value problem  $y'' - 4y' + 4y = 0$ ,  $y(0) = 12$ ,  $y'(0) = -3$ .
3. Find a general solution of  $y'' - 2y' + y = \frac{e^t}{t^2+1}$ .
4. Find another linearly independent solution to  $ty'' + (1-2t)y' + (t-1)y = 0$  given that  $y_0 = e^t$  is a solution.
5. Solve the initial value problem  $2t^2y'' + 3ty' - 15y = 0$ ,  $y(1) = 0$ ,  $y'(1) = 1$ .