MATH 267 Section E1 Practice Test Number 2

Problem 1(20 points) Solve the following Boundary Value Problem.

$$y''' - y = 0,$$

$$y(0) = 0, \qquad y'(0) = 1, \qquad y''(0) = 0.$$

Problem 2(20 points) Use the method of variation of parameters to find a particular solution of the following differential equation

$$y'' - y = 1.$$

Problem 3(20 points) Use the method of undetermined coefficients to find a particular solution of the following differential equation:

$$y''' + y = e^{-t} + sin(t).$$

Problem 4(20 points) Verify that the following three functions form a fundamental set of solutions of the differential equation

$$y''' + y' = 0,$$

$$y_1 = 1, \qquad y_2 = sin(t), \qquad y_3 = cos(t).$$

Problem 5(20 points) Consider the differential equation

$$y'' - 2\frac{y}{t^2} = -\frac{2}{t^2}.$$

A solution of the associated homogeneous equation is $y_1 = t^2$. A particular solution is $y_p \equiv 1$. Find the general solution. (Hint: use reduction of the order)