MATH 2070 HOMEWORK 6

1. Knowing that y_1 is a solution to the following given homogeneous ODEs, find the general solution to the ODE:

   (a) $y_1 = \frac{1}{t}, t^2y'' + 3ty' + y = 0.$

   (b) $y_1 = e^t, (t-1)y'' - ty' + y = 0.$

2. Find the general solution to the following ODEs

   (a) $y'' + 2y' + y = 5.$

   (b) $y'' - 5y' + 6y = t + 6.$

   (c) $y'' - 5y' + 6y = te^t.$

   (d) $y'' + y = e^t.$

   (e) $y'' + y = 3\sin 2t + 6\cos 2t.$

   (f) $y'' + \omega_0^2 y = \cos \omega t, \omega, \omega_0$ are constants, with $\omega \neq \omega_0$.

3. Find the solution to the following IVPS

   (a) $y'' + 4y = -2, y(\pi/8) = 1/2, y'(\pi/8) = 2.$

   (b) $2y'' + 3y' - 2y = 14t^2 - 4t - 11, y(0) = 0, y'(0) = 0.$

   (c) $y'' + 2y' + y = 2t\cos t + 2\sin t, y(0) = 1, y'(0) = 0.$