WEEK 7 SECTION PROBLEMS

If not otherwise specified, solve the following problems. If initial conditions are given, solve for all constants of integration. It is okay to leave answers in implicit form or with unsolved integrals.

1. **Solve** $y'' + 3y' + 2.25y = -10e^{-1.5x}$, $y(0) = 1$, $y'(0) = 0$
2. **Solve** $y'' + 4y = sec(2x)$, $y(0) = 0$, $y'(0) = 1$
3. **Direct Method** Consider the following boundary value problem:

$$y'' - 2y' + y = x^2, \qquad y(0) = 0, \qquad y(1) = 1$$

   a) Solve the BVP analytically.

   b) Classify the boundary conditions

   c) Set up the recursive equation for an interior node using second order central differencing schemes.

   d) Set up the matrix equation $A\vec{x} = b$ for $N = 6$ nodes.

   e) Complete the previous parts, except with the right boundary condition now changed to $y'(1) = 1$. (*Hint:* very little will change for this part.)