MATH 246 Groupwork 2.5 & 2.6 **Name:** ______________________________

1. Find the solution to the initial value problem

$$y'' - y' = 2 - 2t \text{ with } y(1) = 2 \text{ and } y'(1) = -3$$

by following the steps:

(a) Eyeball a single solution $Y_P(t)$ to the differential equation. Hint: It's a simple polynomial with one term.

(b) Find a fundamental pair for the associated homogeneous differential equation.

(c) Write down the general solution for the given differential equation.

(d) Find the specific solution to the initial value problem.

2. Using the Method of Undetermined Coefficients, write down the undetermined $Y_P(t)$ for each of the following. The first is done for you so you know how little you need to do!

   (a) $y'' - 5y' + 6y = t + 1$

   Solution: $Y_P(t) = At + B$

   (b) $y'' - 5y' + 6y = t^2$

   (c) $y'' - 5y' + 6y = te^{2t}$

   (d) $y'' - 5y' + 6y = e^{3t}$

   (e) $y'' - 5y' + 6y = (3t^2 + 1)e^{3t}$

   (f) $y'' - 4y' + 13y = e^{3t}\cos(t)$

   (g) $y'' - 4y' + 13y = te^{2t}\sin(3t)$

3. Find a solution to $y'' - 5y' + 6y = te^{2t}$ using the Method of Undetermined Coefficients. Note that you did part of this in 2(c).