Do not write in either margin

REG No.

Question...

Write on both sides of the paper

Then $y_p'' = u_1'y_1' + u_2'y_2' + u_1y_1'' + u_2y_2''$

Substituting y_p, y_p' and y_p'' into (1) and using the fact that y_1 & y_2 are solutions of the homogeneous part, we get

$$u_1'y_1' + u_2'y_2' = g(x). \text{ ——— } (5).$$

We solve for u_1' & u_2' from (4) & (5) using Cramer's Rule to get:

$$\cancel{u_1' = \frac{-g(x)y_2(x)}{}}$$

$$\left.\begin{aligned} u_1'(x) &= -\frac{y_2 g(x)}{W(y_1,y_2)} \\ u_2'(x) &= \frac{y_1 g(x)}{W(y_1,y_2)} \end{aligned}\right\} \text{ ——— } (6)$$

where $W(y_1,y_2) = \begin{vmatrix} y_1 & y_2 \\ y_1' & y_2' \end{vmatrix}$ ——— (7).

is the Wronskian of the fundamental solutions y_1 & y_2.

Integrating (6) we find:

$$\left.\begin{aligned} u_1(x) &= -\int \frac{y_2 g(x)}{W(y_1,y_2)}\,dx + C_1 \\ u_2(x) &= \int \frac{y_1 g(x)}{W(y_1,y_2)} + C_2. \end{aligned}\right\} \text{ — } (8).$$