

DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided.

1. Solve the given differential equation by undetermined coefficients.
 $y'' + 6y' + 5y = 2x$

2. Solve the given differential equation by undetermined coefficients. .
 $y'' + y' + y = x^2 - 4x$

3. Solve the given differential equation by undetermined coefficients.

$$y'' + 4y = 6\sin(2x)$$

5. Solve the given initial-value problem in which the input function $g(x)$ is discontinuous.
[Hint: Solve the problem on two intervals, and then find a solution so that y and y' are continuous at $x = \pi/2$]

$$y'' + 4y = g(x), \quad y(0) = 1, \quad y'(0) = 6,$$

$$\text{where } g(x) = \begin{cases} \sin x, & 0 \leq x \leq \pi/2 \\ 0, & x > \pi/2 \end{cases}$$