1. Undetermined Coefficients.

    a) $y'' - 2y' + 2y = 2x - 2, \quad y(0) = 0, y(\pi) = \pi$

    b) $y''' - 5y'' + 6y' = 8 + 2\sin x$

2. Homogeneous Linear Equations with Constant Coefficients.

    a) $\dfrac{d^4 y}{dx^4} - y = 0$

    b) $\dfrac{d^3 y}{dx^3} + 4\dfrac{d^2 y}{dx^2} + 4\dfrac{dy}{dx} = 0$

3. Construct a Second Solution.

    a) $(1 + 2x)y'' + 4xy' - 4y = 0 \quad y_1 = e^{-2x}$

    b) $y'' + 4y = 0 \quad y_1 = \cos 2x$

4. Determine a homogeneous linear differential equation with constant coefficients having the given solutions.

    a) $10\cos 4x, -5\sin 4x$

    b) $3, 2x, -e^{7x}$

5. Orthogonal Trajectories.

    a) $y = 2 + c(x - 1)^2$

    b) $y^2 - x^2 = cx^3$