

Solve the following equations:

$$1. \frac{d^2 y}{dx^2} - 3 \frac{dy}{dx} - 4y = 0 \quad (20\%)$$

$$2. x^2 \frac{d^2 y}{dx^2} + 5x \frac{dy}{dx} + 3y = 0 \quad (20\%)$$

$$3. \frac{dy}{dx} = -\frac{x}{y} \quad (20\%)$$

$$4. \frac{d^2 y}{dx^2} - 10 \frac{dy}{dx} + 25y = 30x + 3 \quad (20\%)$$

$$5. \begin{cases} \frac{dx}{dt} = 2x - y \\ \frac{dy}{dt} = x \end{cases} \quad (20\%)$$