

1. Solve $\frac{dy}{dx} = \frac{x+y-3}{x-y+1}$ (30%)

2. Solve $x^3 \frac{d^3 y}{dx^3} - 3x^2 \frac{d^2 y}{dx^2} + x(6-x^2) \frac{dy}{dx} - (6-x^2)y = 0$ (30%)

3. Solve $(2x+1)^3 \frac{d^3 y}{dx^3} - (2x+1)^2 \frac{d^2 y}{dx^2} + 4(2x+1) \frac{dy}{dx} - 8y = (2x+1)^2$ (40%)