(1) Solve by **Undetermined Coefficients** method \( y'' - 3y' = 8e^{3x} + 4\sin(x) \).

(2) Solve by Method of **Variation of Parameters** \( 4y'' - y = x\ e^x \).

(3) Use the substitution \( t = -x \) to solve the IVP: \( 4x^2y'' + y = 0, \ y(-1) = 2, y'(-1) = 4 \).