1 Differential Equations

35. Solve the following differential equations.
   (a) \( y' = xe^{x^2 - \ln(y^2)} \).
   (b) \( xy' = 2(y - 4) \).
   (c) \( yy' = x + \sin x \).

36. Solve each initial value problem.
   (a) \( u'' + 4u' + 3u = 0 \), with \( u(0) = 1 \) and \( u'(0) = 1 \).
   (b) \( u''' - u = 0 \), with \( u(0) = 1 \), \( u'(0) = 1 \), and \( u''(0) = 0 \).

37. Find all solutions to the following differential equation:
   \[ y''(t) + y'(t) - 2y(t) = \sin t. \]

38. Use power series to find the general solution of the following differential equations:
   (a) \( y'' + 2y' = 0 \)
   (b) \( y'' - 3y' + 2y = 0 \)
   (c) \( x^2y'' - 2xy' + 2y = 0 \)