PROBLEM SET 6
Due on Monday, November 16

I. Boundary value problems
1. Find the eigenvalues of the boundary value problem
   \[ x^2 u'' - xu' + \lambda u = 0, \quad u(1) = 0, \quad u(2) = 0. \]

II. Bessel functions
2. Problem 20.4
3. Find all bounded solutions of the equation
   \[ \ddot{y} + e^{-t} y = 0, \quad 0 \leq t < \infty. \]
4. Solve the Riccati equation \( y' = x^2 + y^2 \).

III. Separation of variables method in PDE
5-7. Problems 38.1-38.9
8. Problem 20.10