1. (20%) Solve \( y'' - 3y' - 4y = 6e^{4x} \)

2. (20%) Solve \( x^2y'' + xy' + y = 0 \)

3. (20%) Solve \( y' + 5y/x = x^3 + 2; \ y(1) = 10 \)

4. (20%) Solve the boundary value problem, \( k \) is a constant

\[
\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}, \quad 0 < x < 1, \quad t > 0,
\]

\[
u(0,t) = 0, \quad u(1,t) = 0, \quad u(x,0) = 2x
\]

5. (20%) Solve the boundary value problem,

\[
\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0, \text{ for } 0 < x < 1, 0 < y < \pi
\]

\[
u(0,y) = 0, u(1,y) = \sin(y) \text{ for } 0 \leq y \leq \pi
\]

\[
u(x,0) = 0, u(x,\pi) = 0 \text{ for } 0 \leq x \leq 1
\]