

**EXAM 3 385 FALL 2004**

**Problem 1.** Solve the boundary value problem

$$u_{xx} + u_{yy} = 0, \quad x \geq 0, \quad y \geq 0$$

$$u(x, 0) = f(x), \quad u_x(0, y) = 0$$

**Problem 2.** Solve the boundary value problem

$$u_{xx} + u_{yy} = 0, \quad 0 < x < a, \quad 0 < y < b;$$

$$u_x(0, y) = 0, \quad u(x, 0) = f_1(x), \quad u_x(a, y) = 0, \quad u(x, b) = f_2(x)$$

**Problem 3.** Solve the boundary value problem

$$u_{xx} + u_{yy} - u = 0, \quad 0 < x < a, \quad 0 < y < b;$$

$$u(0, y) = 0, \quad u(x, 0) = f_1(x), \quad u(a, y) = 0, \quad u(x, b) = f_2(x)$$

**Problem 4.** Solve the boundary value problem

$$u_{xx} + u_{yy} + u_x - 10u = 0, \quad 0 < x < a, \quad 0 < y < b;$$

$$u(0, y) = 0, \quad u(x, 0) = f_1(x), \quad u(a, y) = 0, \quad u(x, b) = f_2(x)$$