

## Exercise 1

Solve  $u_{xx} + u_{yy} = 0$  in the rectangle  $0 < x < a$ ,  $0 < y < b$  with the following boundary conditions:

$$\begin{array}{ll} u_x = -a & \text{on } x = 0 \\ u_x = 0 & \text{on } x = a \\ u_y = b & \text{on } y = 0 \\ u_y = 0 & \text{on } y = b. \end{array}$$

(*Hint:* Note that the necessary condition of Exercise 6.1.11 is satisfied. A shortcut is to guess that the solution might be a quadratic polynomial in  $x$  and  $y$ .)