

Determine the values of k for which the partial differential equation

$$\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} = 0$$

possesses nontrivial solutions of the form $T(x, y) = f(x) \sinh ky$ such that

$$\frac{\partial T}{\partial x}(0, y) = \frac{\partial T}{\partial x}(\ell, y) = 0.$$