Homework 1: Newton's method

Newton's method for solving equation $g(x) = 0$ is an iterative procedure which at every iteration x^k approximates the function $g(x)$ by its first-order (linear) expansion

$$g(x) \approx g(x^k) + \nabla g(x^k)(x - x^k)$$

and finds the zero point of this approximation.
Newton's method for unconstrained optimization replaces the optimization problem by its optimality condition and solves the resulting equation.

Task:

Implement Newton's method to minimize

$$f(x) = e^{x_1^2 + x_2^2 - 1} + (x_1 - 1)^2$$

with the starting point $x^0 = (0, 0)$.