Find the global minimum point and value for the function $f(x,y) = x^2 + y^2 + 10$.

Step - 1: Initialize the variables

$$x = 0, \quad y = 0$$

$$f(x) = 10$$

$$\eta = 0.1, \quad epochs = 100, \quad x = -1, \quad y = +1$$

Step - 2: Iter = 1

Step - 3: $\dfrac{\partial f}{\partial x} = 2x = -2$

$\dfrac{\partial f}{\partial y} = 2y = 2$

Step - 4: Finding the step-length

$$\Delta x = -\eta \dfrac{\partial f}{\partial x} = -0.1(-2) = 0.2$$

$$\Delta y = -\eta \dfrac{\partial f}{\partial y} = -0.1(2) = -0.2$$

Step - 5: $x = x + \Delta x = -1 + 0.2 = -0.8$

$y = y + \Delta y = 1 - 0.2 = 0.8$

Step - 6: iter = iter + 1

Step - 7: if (iter > epochs)

       break

Step   else

            go to step - 3

step-8: iter = 2

step-9: $\dfrac{\partial f}{\partial x} = 2x = 2(-0.8) = -1.6$

$\dfrac{\partial f}{\partial y} = 2y = 2(0.8) = 1.6$

step-10: step-length

$\Delta x = -\eta \dfrac{\partial f}{\partial x} = -0.1(-1.6) = 0.16$

$\Delta y = -\eta \dfrac{\partial f}{\partial y} = -0.1(1.6) = -0.16$

step-11: $x = x + \Delta x = -0.8 + 0.16 = -0.64$

$y = y + \Delta y = 0.8 - 0.16 = 0.64$