Assignment 2: Manual Calculations:-

Step 1: $f(x,y) = x^2+y^2+10$

Calculating derivatives

$\frac{\partial f}{\partial x} = 2x$

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

Step 2: Initialising parameters

$x=1$

$y=-1$

$\eta = 0.1$

iters=1

epochs=2

Step 3: $\frac{\partial f}{\partial x}\Big|_{x=1} = 2(1) = 2$

$\frac{\partial f}{\partial y}\Big|_{y=1} = 2(-1) = -2$

Step 4: $\Delta x = -\eta\frac{\partial f}{\partial x} = -(0.1)\times 2) = -0.2$

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

Step 5: $x = x + \Delta x$

$= 1 + (-0.2) = 0.8$

$y = y + \Delta y$

$= -1 + (0.2) = -0.8$

Step 6: iters = iters + 1 = 1 + 1

2 ≤ epochs go to step 3

step 3: $\frac{\partial f}{\partial x}\Big|_{x=0.8} = 2(0.8) = 1.6$

$\frac{\partial f}{\partial y}\Big|_{y=-0.8} = 2(-0.8) = -1.6$

step 4: $x = x + \Delta x = 0.8 - 0.16 = 0.64$

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

step 5: iters = iters + 1 = 2 + 1 = 3 > epochs

goto step 7

$f(x,y) = (0.16)^2 + (-0.16)^2 + 10 = 10.0512$

Global point : (0.64, -0.64)

Global value : 10.0512