Assignment - 2

18K41A0278

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

$$\frac{\partial f}{\partial x} = 2x \quad ; \quad \frac{\partial f}{\partial y} = 2y$$

Step 2: Initialising parameter

$x=1$, $y=-1$, $n=0.1$, iteration = 1, epochs = 2

Step 3: $\left(\frac{\partial f}{\partial x}\right)_{x=1} \Rightarrow 2(1) \Rightarrow 2$, $\left(\frac{\partial f}{\partial y}\right)_{y=-1} = 2(-1) \Rightarrow -2$

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

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

Step 5:

$x = x+\Delta x$	$y = y+\Delta y$
$= 1+(-0.2)$	$= -1+0.2$
$\Rightarrow 0.8$	$= -0.8$

Step 6: iteration = iteration + 1 $\Rightarrow 1+1 = 2 \leq$ epochs go to step 7

Step 7: $\left(\frac{\partial f}{\partial f}\right)_{x=0.8} \Rightarrow 2(0.8) \Rightarrow 1.6$

$\left(\frac{\partial f}{\partial y}\right)_{y=-0.8} \Rightarrow 2(-0.8) \Rightarrow -1.6$

$\Delta x = -n\frac{\partial f}{\partial x} = -(0.1)(1.6) \Rightarrow -0.16$

$\Delta y = -n\frac{\partial f}{\partial y} = -(0.1)(-1.6) \Rightarrow 0.16$

18KL41A0278

Step 9: $x = x + Dx$ | $y = y + Dy$

$= (0.8) + (0.16)$ | $= -0.8 + 0.16$

$= 0.64$ | $= -0.64$

Step 10: iteration = iteration + 1 $\Rightarrow$ 2 + 1 = 3 > epochs

go to step 11

Step 11: $f(x,y) \Rightarrow (0.16)^2 + (-0.16)^2 + 10$

$\Rightarrow 10.0512$