

Assignment 2.

Given $x^2 + y^2 + 10$

Step 1:- $x=1, y=1, \eta=0.1, \text{epochs}=2$.

Step 2:- $\text{iter}=1$

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

$$\frac{\partial f}{\partial y} = 2y = 2(1) = 2$$

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

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

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

$$\Rightarrow 1 - 0.2 \Rightarrow 0.8$$

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

Step 6:- $\text{iter} = \text{iter} + 1$

$$\Rightarrow 1 + 1 \Rightarrow 2$$

Step 7:- $\text{if}(\text{iter} > \text{epochs})$

$$2 > 2$$

$\hookrightarrow \text{False}$.

Step 3:- $\frac{\partial f}{\partial x} = 2x = 2(0.8) = 1.6$

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

step 4:- $\Delta x = -\eta \cdot \frac{\partial f}{\partial x} = -(0.1)(1.6) = -0.16$

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

step 5:-

$$x = x + \Delta x$$

$$= 0.8 + (-0.16)$$

$$x = 0.64$$

$$y = y + \Delta y$$

$$= 0.8 + (-0.16)$$

$$y = 0.64$$

step 6:- $\text{iter} = \text{iter} + 1 \Rightarrow 2 + 1 \Rightarrow 3$

step 7:- $\text{if } (\text{iter} > \text{epoch})$

$$3 > 2$$

$\hookrightarrow \text{True}$

step 8:- $x = 0.64$

$$y = 0.64$$

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

$$= (0.64)^2 + (0.64)^2 + 10$$

$$= 10.8$$