NNDL — Assignment -1

$f(x) = x^4 + 3x^2 + 10$

step - 1 :- Initialize variables

$x = 2$

$\eta = 0.1$

epoches $= 2$

step - 2 :- first order derivative at 'x'.

$$\frac{\partial f}{\partial x} = 4x^3 + 6x$$

$$\left(\frac{\partial f}{\partial x}\right)_2 = 32 + 12$$
$$= 44$$

step - 3 :- finding Δx

$$\Delta x = -\eta \frac{\partial f}{\partial x}$$

$$\Delta x = -(0.1)(44)$$

$$\Delta x = -4.4$$

step - 4 :- update variable

$$x = x + \Delta x$$

$$x = 2 - 4.4$$

$$x = -2.4$$

step - 5 :- Increment iteration

$$iteration = iteration + 1$$
$$= 2$$

step-6 $\vdash$ if $\left(\text{iter} > \text{epoches} \right) \rightarrow$ go to step -7

else

go to step $- 2$

step $- 2 \vdash$ $\left(\dfrac{\partial f}{\partial x} \right)_{x = -2.4}$

$$= -69.6$$

step $- 3 \vdash$ $\Delta x = -\eta \left(\dfrac{\partial f}{\partial x} \right)$

$$\Delta x = -\left(0.1 \left(-69.6 \right) \right)$$

$$\Delta x = 6.96$$

step $- 4 \vdash$ $x = x + \Delta x$

$$x = -2.4 + 6.96$$

$$x = 4.56$$

step $- 5 \vdash$ iter $=$ iter $+ 1$

step $- 6 \vdash$ if $\left(\text{iter} > \text{epoches} \right)$

got to step $- 7$

else

go to step $- 2$

here iter $>$ epoches

step $- 7 = x = 4.56$

$$f(x) = (4.56)^4 + 3 (4.56)^2 + 10$$

$$f(x) = 508.67$$