ASSIGNMENT-1

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1) Find the global minimum Point and value for the function?

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

solution:- $\frac{df(x)}{dx} = 4x^3 + 6x$

step 1: initialization of the variable:

let $x = 2$, $\eta = 0.01$ (learningrate)

epochs = 0.000001, iteration = 1

max_iteration = 100.

step 2:- $\frac{df(x)}{dx}\Big|_{x=2} = 4(2)^3 + 6(2)$

$= 32 + 12 = 44$

$$\Delta x = -\eta * \frac{df(x)}{dx}$$

$\Delta x = -(0.01) \times (44) = -0.44$

step 3: $\Delta x = x + \Delta x$

$x = 2 - 0.44 = 1.56$

step 4: iteration = iteration + 1

$= 1 + 1$

$= 2$

For iteration 2

$$\left.\frac{df(x)}{dx}\right|_{x=1.56} = 4(1.56)^3 + 6(1.56)$$

$$\frac{df(x)}{d(x)} = 24.54$$

$$\Delta x = -\eta * \frac{df(x)}{dx}$$

$$\Delta x = -(0.01)(24.54) *$$

$$= -0.2454$$

$$x = x + \Delta x$$

$$x = 1.56 - 0.24$$

$$\boxed{x = 1.314}$$

For two iterations

$$\boxed{x = 1.314}$$