Assignment - 2

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

Iteration 1:

1) Choose initial value for x, let $x=2$ and

$$\eta = 0.01$$

2) Find gradient at $x=2$ i.e $\dfrac{\partial f(x)}{\partial x}\bigg|_{x=2}$

$$= 4x^3 + 6x$$
$$= 4(2)^3 + 6(2)$$
$$= 4 \times 8 + 12$$
$$= 44$$

3) As gradient not near to zero, calculate step length $\Delta x = -0.01 \times 44 = -0.44$

4) Update x value as $x = 2 - 0.44 = 1.56$

Iteration 2:

1) choose initial value for x.

2) Find gradient at $x = 1.56$ i.e $\dfrac{\partial f(x)}{\partial x}\bigg|_{x=1.56}$

$$= 4(1.56)^3 + 6(1.56)$$
$$= 15.18 + 9.36$$
$$= 24.54$$

3) Calculate step length.

$$\Delta x = -0.01 \times 24.54 = -0.2454$$

4) update x value as $x = 1.56 - 0.2454$
$$= 1.3146$$

This procedure is repeating until gradient is near to zero