Assignment - 2

- Manual calculations for $f(x) = x^4 + 3x^2 + 10$.

Iteration - 1:

- choose initial value for x, let $x = 2$ and $\eta = 0.001$.
- Gradient at $x = 2$ i.e. $\frac{\partial f(x)}{\partial x}\Big|_{x=2}$

$$= 4(2)^3 + 6(2) = 44.$$

$$\Delta x = -0.001 * 44 = -0.044.$$

- Update x value as $x = 2 - 0.044 = 1.956$.

Iteration - 2:

- Gradient at $x = 1.956$ i.e $\frac{\partial f(x)}{\partial x}\Big|_{x=1.956}$

$$= 4(1.956)^3 + 6(1.956)$$
$$= 41.670$$

- As gradient not near to zero, calculate step length, $\Delta x = -0.001 * 41.670 = 0.0416$
- Update x value as $x = 1.956 - 0.0416 = 1.914$.

This procedure is repeating until gradient is near to zero.