Q1)
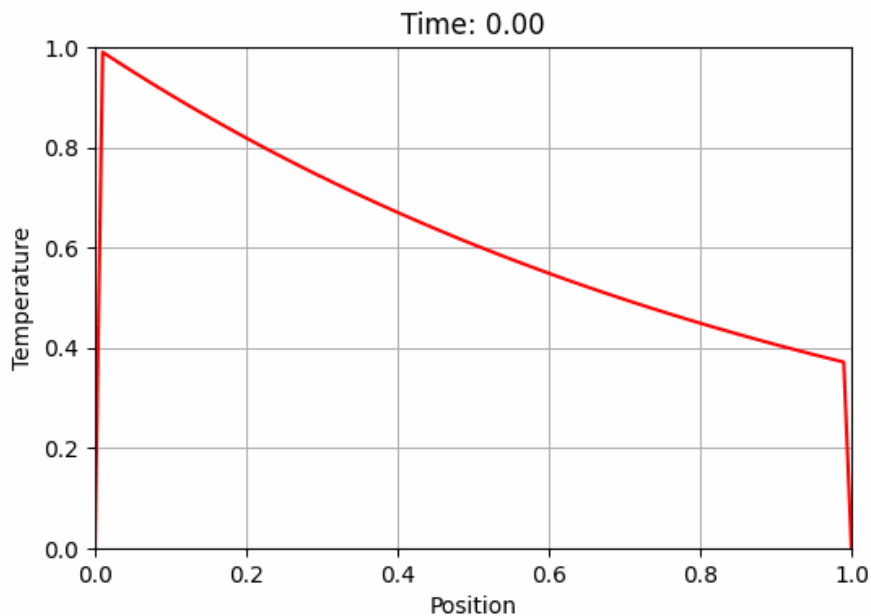

**Q3)**

We are using the bisection method to find the nth root of a number a with an error tolerance of epsilon. We start with an interval [0,a] and repeatedly bisect it until the length of the interval is less than or equal to epsilon.

The number of iterations required to reduce the length of the interval from a to epsilon is equal to the number of times we can divide a by 2 until we get epsilon. This is given by $\log_2$(a/epsilon).

Since a is a constant and the length of the interval is halved at each iteration, the number of iterations required to reduce the length of the interval from a to epsilon is proportional to log(1/epsilon).

Q4)

Rate of Convergence
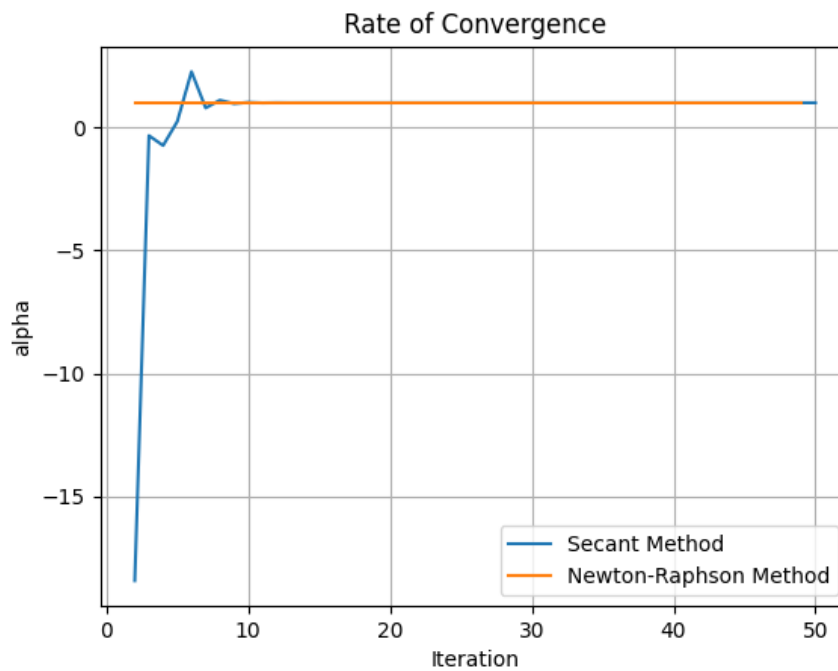
Function used : $f(x) = 3x^2$ with $x_0 = 100$, $x_1 = 200$, $k = 50$ (no of interactions)

Q5)

$||f(x_k)||$ vs iterations