8. use Newton Raphson to solve $x^3+x-1=0$, $x_0=1$

Sol^n: Here,

$x_0 = 1$

$f'(x) = 3x^2+1$

$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$

$= 1 - \frac{1}{4}$

$= 0.75$

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$

$= 0.75 - \frac{0.171875}{2.6875}$

$= 0.686047$

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)}$

$= 0.686047 - \frac{0.008941}{2.411979}$

$= 0.682340$

$x_4 = 0.682340 - \frac{0.000028}{2.396762}$

$= 0.682328$

$x_5 = 0.682328 - \frac{0.0000005}{2.396714}$

$= 0.682328$

∴ Solution is $x = 0.682328$