Newton-Raphson method

• Starting with an initial guess \( x_0 \),

\[
x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}, \quad n = 0, 1, 2, \ldots
\]

• Find a solution to \( f(x) = x^3 + 2x^2 - 3x - 1 = 0 \) for \( x_0 = -3 \) and \( \epsilon = 10^{-8} \).

```
>> newton(-3,1.0e-08,1)
iteration =  1 Error =  8.333333e-02
iteration =  2 Error =  4.425251e-03
iteration =  3 Error =  1.223750e-05
iteration =  4 Error =  9.346302e-11
Approx root = -2.9122291785 after 4 iterations
with error = 9.346302e-11
```