1 Newton-Raphson Method

Suppose we want to find a root of the function $f(x)$ using the Newton-Raphson method. Here is the algorithm:

1. Choose an initial guess x_0.
2. Calculate $f(x_0)$ and $f'(x_0)$.
3. Let $x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}$.
4. Calculate $f(x_1)$ and $f'(x_1)$.
5. Let $x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$.
6. Continue this process until the desired level of accuracy is achieved.

The Newton-Raphson method is guaranteed to converge to a root of $f(x)$ provided that $f(x)$ is continuous and differentiable, and the initial guess is sufficiently close to the root.