C++ Functions

```cpp
ftype fname (arguments)
{
    ...
    return [ftype];
}
```
Newton (or Newton-Raphson) Method for Finding Roots
Problem: given \( f(x) = 0 \), solve for \( x \).

Example: consider a balloon rising underwater, subject to the equation:

\[
 h(t) = t^2 - 4
\]

Make a guess that the time \( t_0 = 1 \) at which it reaches the surface. Expand the function in a Taylor series:

\[
 h(t) = h(t) + \Delta t h'(t)
\]

and at \( t = t_0 \) we have

\[
 0 = h(t_0) + \Delta t h'(t_0)
\]

Rearranging,

\[
 \Delta t = -\frac{h(t_0)}{h'(t_0)} = -\left(\frac{1 - 4}{2}\right) = 1.5
\]

We can now make successively better guesses as to the root of \( h(t) \) as follows:

\[
 t_1 = t_o + \Delta t = 2.5 \\
 t_2 = t_1 - \frac{h(t_1)}{h'(t_1)} = 2.05 \\
 \ldots \\
 t_{k+1} = t_k - \frac{h(t_k)}{h'(t_k)}
\]
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\]
\[
\vdots
\]
\[
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