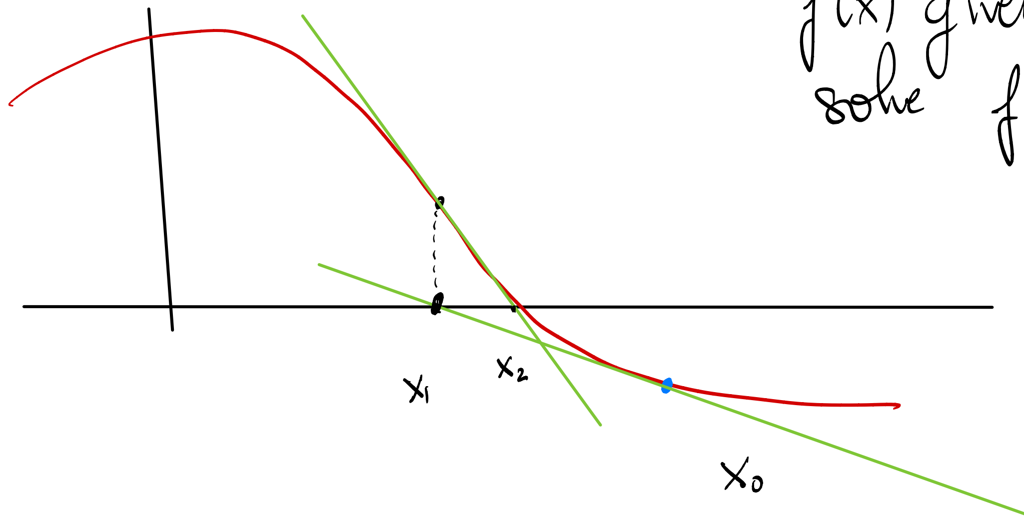
Newton's method:

$f(x)$ given

solve $f(x) = 0$



tangent line to the graph of f at $(x_0, f(x_0))$

- equation of the tan to the graph of f through $(x_0, f(x_0))$

slope is $f'(x_0)$

$$(t) \quad y = f'(x_0)\,x + p$$

when $x = x_0$ $y = f(x_0)$

$$f(x_0) = f'(x_0)\,x_0 + p$$

$$p = f(x_0) - f'(x_0)\,x_0$$

$$(t) \quad y = f(x_0) + f'(x_0)\,x - f'(x_0)\,x_0 = \underline{f(x_0) + f'(x_0)(x - x_0)}$$

x_1 is s.t. $f(x_0) + f'(x_0)(x_1 - x_0) = 0$

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

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

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

G^{al} formula: x_0 given, f, f' given

$$x_n = x_{n-1} - \frac{f(x_{n-1})}{f'(x_{n-1})}$$

(provided that $f'(x_{n-1}) \neq 0$)