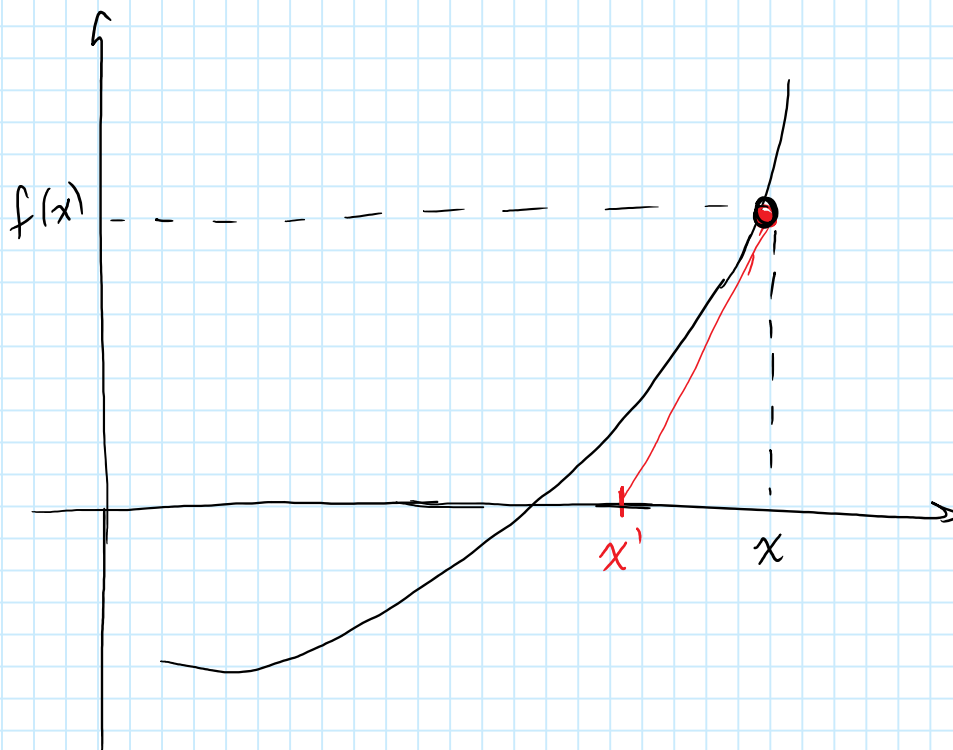


## Newton's Method

We start with a guess  $x$  and then use the slope at that position to extrapolate and make another guess  $x'$ , which is usually better than the first guess.



We can denote the slope of the line joining the points  $(x', 0)$  and  $(x, f(x))$

$\frac{f(x) - 0}{x - x'}$

as m, or as more precise  $f'(x)$

$$m = f'(x) = \frac{f(x) - 0}{x - x'}$$

so

$$x' = x - \frac{f(x)}{f'(x)}$$

⇒ The catch with this approach is to obtain the derivative  $f'(x)$ .

⇒ This method converges faster than the relaxation, bisection, and regula falsi methods.

⇒ But the method does not always converge

