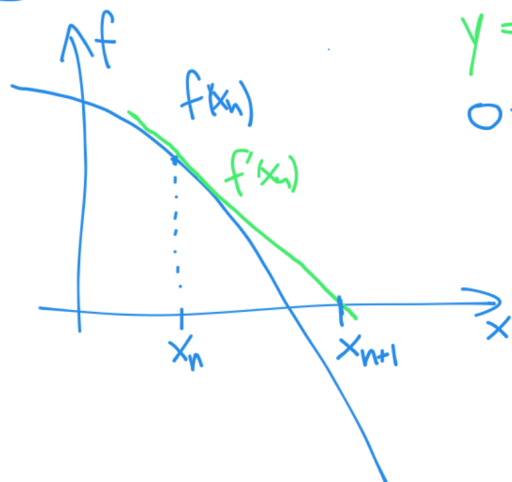


2) Newton's method. (f, f') ← AD



$$y = f(x_n) + (x - x_n)f'(x_n)$$

$$0 = f(x_n) + (x_{n+1} - x_n)f'(x_n) \quad \leftarrow$$

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

ex. $\sqrt{2} = ?$ $f(x) = x^2 - 2$ $f'(x) = 2x$

$$x_{n+1} = x_n - \frac{x_n^2 - 2}{2x_n} = \frac{x_n}{2} + \frac{1}{x_n}$$

$$x_0 = 1$$

$$x_1 = \frac{3}{2} = 1.5$$

$$x_2 = \frac{17}{12} = 1.4167...$$

$$x_3 = \frac{577}{408} = 1.4142157...$$

$$\sqrt{2} = 1.4142135...$$