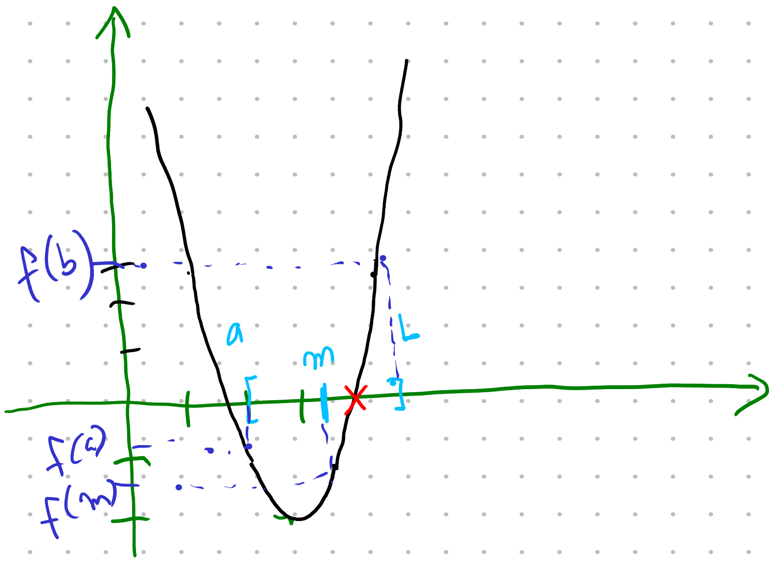
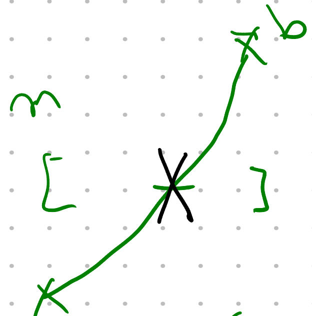
Bisection Method.



$$f(x) = (x-3)^2 - 2$$

$$f(x) = x^2 - 6x + 9 - 2$$
$$= x^2 - 6x + 7$$

$$x^2 - 6x + 7 = 0$$




```
def bisection(f, a, b):
    m = (a+b)/2
    if( f(m)f(b) < 0):
        a = m
        b = b
    else:
        a = a
        b = m
    return a, b
```

$$\text{Sign}(f(m)) \neq \text{Sign}(f(b))$$

$$f(m)f(b) < 0$$

$a, b \to [m, b]$
[ ]

$[a, b] \to [a, m]$

[[[x]]   ]

a_0 a_1 a_2 b_2 b_1 b_0

m

```
def root(f, a, b):
    ε = 0.0001
    while(b - a > ε):
        a, b = bisection(f, a, b)
    return a
```

$$b_n - a_n \to 0$$

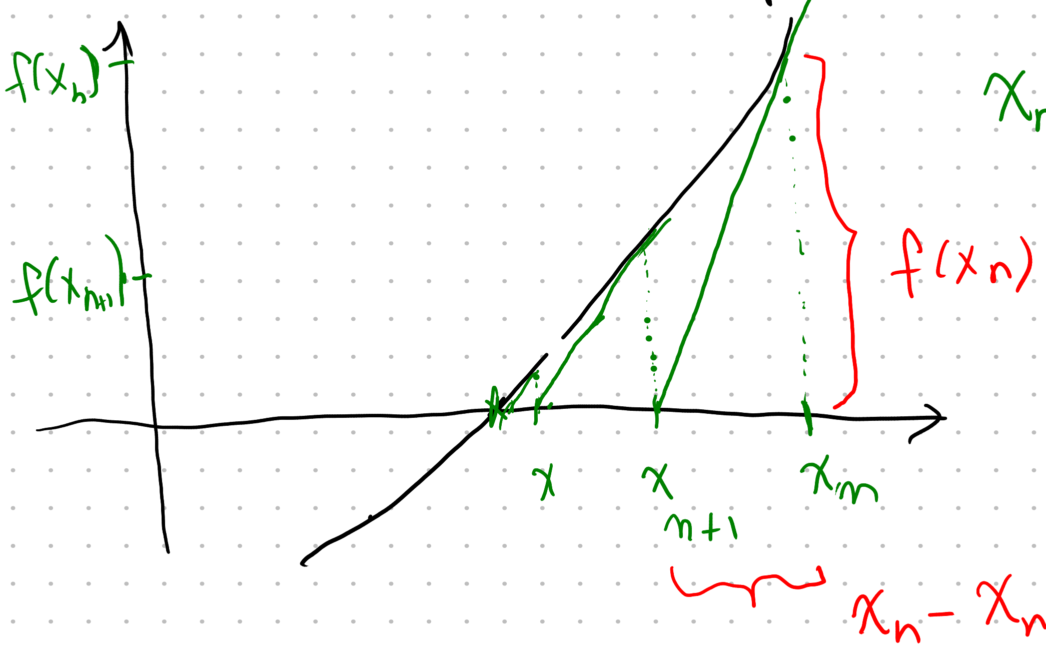
$$a_n \to \text{raiz}$$

$$\left\{ \begin{array}{l} [a, b] \\ \to [m, b] \\ \to [a_2, b_2] \end{array} \right.$$

```
def root (f, a, b)
    for (i in range(10))
        a, b = bisection(f, a, b)
    return a
```

$\frac{1}{2^{n}} = 0.000001$

Newton Raphson



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

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

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

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