* Bisection method to find roots of polynomial

→ In general we do Optimization Over here to find The root

Ex:- Find root of eqⁿ $x^3 - 4x - 9 = 0$

→ $f(x) = x^3 - 4x - 9$

$x = 0$, $f(0) = 0 - 0 - 9 = -9$

$x = 1$, $f(1) = 1 - 4 - 9 = -12$

$x = 2$, $f(2) = 8 - 8 - 9 = -9$

$x = 3$, $f(3) = 27 - 12 - 9 = 6$

a ↓
b

$f(a)$

→ As we see
$\left\{ \begin{array}{c} -ve \& +ve \end{array} \right\}$

$f(b)$

if we get
-ve combinely
+ve we
do take
so the interval that interval

∴ interval $(2,3)$
a,b

Now let us take any value b/w $2,3 \to 2.5$

$x = 2.5$ $f(2.5) = 15.625 - 10 - 9 = -3.375$

Now if this value is negative change
Change a if +ve Change b

interval $(2,3) \longrightarrow (2.5, 3) \Rightarrow$ interval $(2.5, 3)$

Now let x in b/w this interval

$x = 2.75$ $f(2.75) = \cancel{20.796}$ $(2.75)^3 - 4(2.75) - 9$

$= 20.79 - 11 - 9$

$= 0.79$

↓ +ve so change b

⟹ interval $(2,3) \Rightarrow (2.5,3) \Rightarrow (2.5, 2.75)$

Now iterate Then we get· root as 2.7065||

Note in Optimize. bisect $(f, f(a) f(b))$ $f(a)$ & $f(b)$ should be one
-ve value & one +ve value