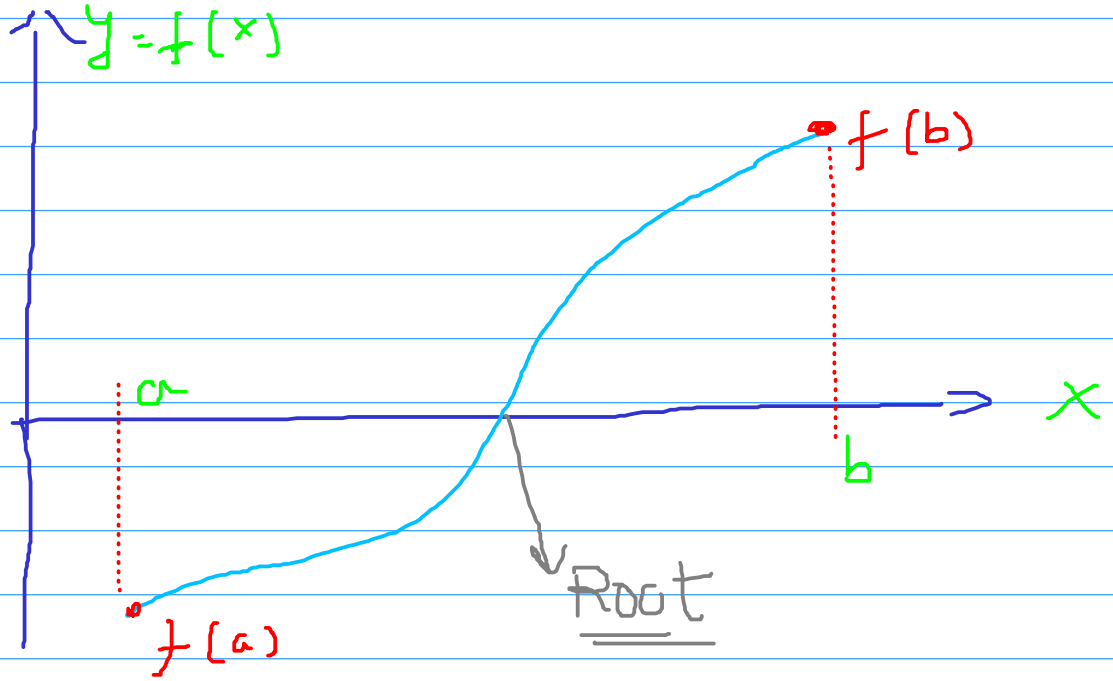
BISECTION METHOD

1 $f(x)$ → Given



① We find a & b such that $f(a) \Delta f(b)$ → opp. sign

② Find 1.st approximation

$$x_1 = \frac{a+b}{2}$$

Now check whether $f(x_1)$ < +ve / −ve

& on its basis sign we take certain points & root lies b/w them.

x_1 & a / x_1 & b

→ similarly we do same thing till we get accuracy

Code

① Defining macro → f(x) ______ Fn

② x_1 & x_2 y_1 y_2
↓ ↓
$f(x_1)$ $f(x_2)$

③ We ask user to enter any value of x_1 & x_2 such that we get –

y_1 < +ve, –ve y_2 < –ve, +ve

④ Take a value upto which accuracy is needed.

decimal ←

$$decimal = \frac{1}{(10)^{decimal}}$$

eg:– upto 4 decimal
⇒ i.e 4.4452 6 7
4.4432 8 7

10^{-7} x

Required = 0.0001

(4) We see whether y_1 < +ve / -ve | y_2 < -ve / +ve

(5) If

$y_1 \to +ve$

$x_1 = a$

$f_c y_1$ → +ve

$f_c x_1$ → a

$y_2 \to -ve$

$x_2 = b$

$f_c y_2$ → -ve

$f_c x_2$ → b

$$x = \frac{f_c x_1 + f_c x_2}{2} \Rightarrow \frac{a+b}{2}$$

$f_c y \to +ve$	$f_c y \to -ve$
$f_c y_1$ ↶ y	$f_c y_2$ ↶ y
$f_c x_1$ ↶ (x) → $\frac{a+b}{2}$	$f_c x_2$ ↶ x
$f_c x_1$ → a	$f_c x_2$ → b
⇒ Next iteration	
$x = \frac{x_1 + x_2}{2}$	$x = \frac{x_1 + x_2}{2}$
$x = \frac{\frac{a+b}{2} + b}{2}$	$x = \frac{a + \frac{a+b}{2}}{2}$

#1 $y_1 \rightarrow$ -ve $y_2 \rightarrow$ +ve

$y_1 = a$ $x_2 = b$

$f_c y_1 \Rightarrow$ +ve $f_c y_2 \rightarrow$ -ve

$f_c x_1 \Rightarrow a$ $f_c x_2 \rightarrow b$

$$x = \frac{a+b}{2}$$

$f_c y$ = +ve	$f_c y \rightarrow$ -ve
$f_c y_1 = f_c y$ → y_2	
$f_c x_1$ → x → $\frac{a+b}{2}$ → x_1	

Basically we have to change that (1) at which y is -ve