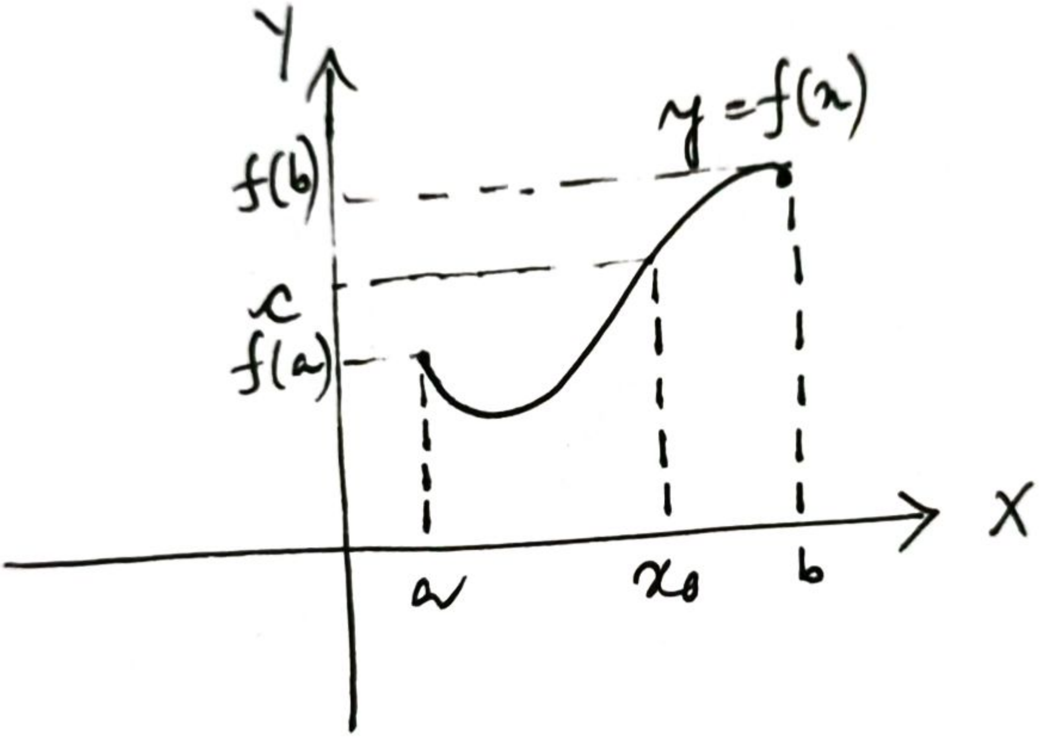
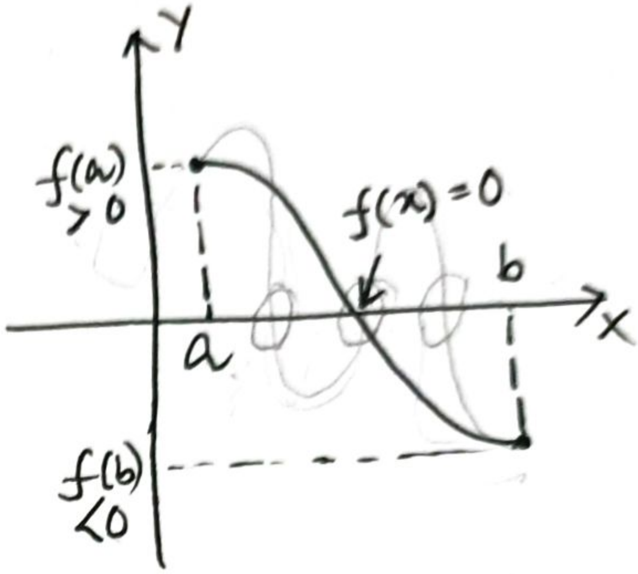
§ INTERMEDIATE VALUE THEOREM

Statement: If $f(x)$ is a continuous function in the interval $[a, b]$, and c is a value in the interval $(f(a), f(b))$, then $\exists$ at least one x_0 in (a, b) such that $f(x_0) = c$.



§ Consequence of the Intermediate Value Theorem

Theorem: If f is continuous on $[a, b]$ and if $f(a)$ and $f(b)$ are nonzero and have opposite signs, then there is at least one solution of the equation $f(x)=0$ in the interval (a,b).



<u>Proof</u>:- Since $f(a)$ and $f(b)$ have opposite signs, so 0 is between $f(a)$ and $f(b)$. Thus by intermediate value theorem there is at least one number x in the interval $[a,b]$ such that $f(x)=0$.

However, $f(a)$ and $f(b)$ are nonzero, so x must lie in the interval (a,b).

This completes the proof. //