- Theorem : **Intermediate value property**

- statement:Let f be a continuous on $[a, b]$and let $f(a) < f(b)$ (S is a value which is intermediate between two value which is intermediate between two values taken by f) then there exists x such that $a < x < b$ and $f(x) = s$.

- Proof :

- Let $S = \{x \in [a, b] : f(x) \leq s\}$.Since $a \in S$,we have $S \neq \varnothing$ and S is bounded above by b .Let c be the least upper bound of S.

- We claim that $f(c) = s$. Since c is the least upper bound of S,there exist a sequence$\{x_n\}$from S such that $x_n \to c$.By the continuity of f. $f(x_n) \to f(c)$.Since for all n, we have $f(c) \leq s$.Note that $b > c$.Consider a sequence $y_n = c + (b - c)/n$. As y_n
It follows that $f(c) = s$.