LECTURER3

The limits

Assume f is defined in a neighborhood of c and let c and L be real numbers. The function f has limit L as x approaches c if, given any positive number ε, there is a positive number d δ such that for all x, $0 \prec |x-c| \prec \delta \Rightarrow |f(x)-L| \prec \varepsilon$

We write $\lim\limits_{x \to c} f(x) = L$

The sentence limx→c fx L is read, "The limit of f of x as x approaches c equals L." The notation means that the values f (x) of the function f approach or equal L as the values of x approach (but do not equal) c.

Ex(3):

If $f(x) = \dfrac{x^2-3x+2}{x-2}, x \neq 2$ find $\underset{x\to 2}{Lim} f(x)$

Solution: $\underset{x\to 2}{Lim} f(x) = \underset{x\to 2}{Lim} \dfrac{x^2-3x+2}{x-2} = \underset{x\to 2}{Lim} \dfrac{(x-2)(x-1)}{(x-2)} = \underset{x\to 2}{Lim}(x-2) = 2-1 = 1$

Limits at Infinity

We note that when the limit of a function f(x) exist as approachs infinity, we write $\underset{x\to \infty}{Lim} f(x) = L$

Also, we write $\underset{x\to +\infty}{Lim} f(x) = L$ for +ive values of x and $\underset{x\to -\infty}{Lim} f(x) = L$ for

-ive values of x

For one sided and Tow sided limits,we have $\underset{x\to \infty}{Lim} f(x) = L$ iff $\underset{x\to +\infty}{Lim} f(x) = L$

and $\underset{x\to -\infty}{Lim} f(x) = L$