6.1 Power Series - Review

Power series - infinite series of form $\sum_{n=0}^{\infty} c_n(x-a)^n$

a is called centre.

eg $\sum_{n=0}^{\infty} (x+1)^n$ is power series centred at $a=-1$

eg 2 $\sum_{n=0}^{\infty} 2^n x^n$ is " " " at $a=0$.

Facts:

1) A power series is convergent at a specified value of x if its sequence of partial sums $\{S_N(x)\}$ converges.

$$S_N = \sum_{n=0}^{N} c_n (x-a)^n$$

That is if

$$\lim_{N\to\infty} S_N(x) = \lim_{N\to\infty} \sum_{n=0}^{N} c_n(x-a)^n \text{ exists.}$$

If the limit D.N.E. at x, then the series is said to be divergent at x.

2) Interval of convergence

Every power series has an interval of convergence.

This is the set of x for which the series converges.

The centre of the interval of convergence is the centre of the series.