### Definitions
- A power series centered at \( x = a \) is a series of the form
  \[
  \sum_{n=0}^{\infty} c_n(x-a)^n
  \]
  The constants \( c_n \) are the coefficients.
- For a function \( f(x) \), its Taylor series centered at \( x = a \) is
  \[
  f(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!}(x-a)^n
  \]
- A Taylor series centered at zero is called a Maclauren series:
  \[
  f(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(0)}{n!}x^n
  \]

### Important Theorems
- There are three possibilities for convergence of power series centered at \( x = a \):
  1. The series converges only at \( x = a \)
  2. The series converges for all \( x \)
  3. The series converges when \(|x-a| < R\) and diverges when \(|x-a| > R\). Here \( R \) is the “radius of convergence”. Use the ratio test to find \( R \).