Power Series of Standard Functions

Taylor Series Expansions of Common Functions

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \quad , \quad -1 < x < 1$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} \quad , \quad -\infty < x < \infty$$

$$\sin(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} \quad , \quad -\infty < x < \infty$$

$$\cos(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} \quad , \quad -\infty < x < \infty$$

$$\ln(1+x) = \sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^n}{n} \quad , \quad -1 < x \leq 1$$

$$\tan^{-1}(x) = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1} \quad , \quad -1 \leq x \leq 1$$

Binomial Series

$$(1+x)^r = \sum_{n=0}^{\infty} \binom{r}{n} x^n \quad , \quad -1 < x < 1 \quad , \quad \binom{r}{n} = \frac{r!}{n!(r-n)!} \quad , \quad \text{for any real number } r$$