Maclaurin Series

$$e^x = 1 + x + \frac{1}{2}x^2 + o(x^2) = \sum_{n=0}^{\infty} \frac{1}{n!}x^n,\ x \in (-\infty, +\infty)$$

$$\sin x = x - \frac{1}{6}x^3 + o(x^3) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!}x^{2n+1},\ x \in (-\infty, +\infty)$$

$$\overset{\text{Derivation}}{\Longrightarrow} \cos x = 1 - \frac{1}{2}x^2 + o(x^3) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!}x^{2n},\ x \in (-\infty, +\infty)$$

$$\arcsin x = x + \frac{1}{6}x^3 + o(x^3) = \sum_{n=0}^{\infty} \frac{(2n)!}{4^n (n!)^2 (2n+1)}x^{2n+1},\ x \in [-1, +1]$$

$$\tan x = x + \frac{1}{3}x^3 + o(x^3) = \sum_{n=1}^{\infty} \frac{B_{2n}(-4)^n(1-4^n)}{(2n)!}x^{2n-1},\ x \in \left(-\frac{\pi}{2}, +\frac{\pi}{2}\right)$$

$$\arctan x = x - \frac{1}{3}x^3 + o(x^3) = \sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1}x^{2n+1},\ x \in [-1, +1]$$

$$(1+x)^\alpha = 1 + \alpha x + \frac{\alpha(\alpha-1)}{2}x^2 + o(x^2) = \sum_{n=0}^{\infty} C_\alpha^n x^n,\ x \in (-1, +1)$$

$$\ln(1+x) = x - \frac{1}{2}x^2 + o(x^2) = \sum_{n=0}^{\infty} \frac{(-1)^n}{n+1}x^{n+1},\ x \in (-1, +1]$$

$$\overset{\text{Derivation}}{\Longrightarrow} \frac{1}{1+x} = 1 - x + x^2 + o(x^2) = \sum_{n=0}^{\infty} (-x)^n,\ x \in (-1, +1)$$

$$\overset{x \to (-x)}{\Longrightarrow} \frac{1}{1-x} = 1 + x + x^2 + o(x^2) = \sum_{n=0}^{\infty} x^n,\ x \in (-1, +1)$$