

List of Taylor expansion of familiar functions

$$e^x = 1 + x + \frac{x^2}{2!} + \dots + \frac{x^n}{n!} + \dots$$

$$e^{ax} = \sum_{n=0}^{\infty} \frac{a^n}{n!} x^n$$

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

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

$$\log(1-x) = -\left(1 + \sum_{n=1}^{\infty} \frac{x^n}{n}\right)$$

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

so

$$\frac{1}{x-a} = -\frac{1}{a} \sum_{n=0}^{\infty} \frac{x^n}{a^n}$$

$$\frac{1}{1+x} = \sum_{n=0}^{\infty} (-1)^n x^n$$