$$e^x=1+x+\frac{x^2}{2!}+\ldots+\frac{x^n}{n!}+o\left(x^n\right)=\sum_{k=0}^{n}\frac{x^k}{k!}+o\left(x^n\right)$$

$$a^x=1+\frac{\ln a}{1!}x+\frac{\ln^2 a}{2!}x^2+\ldots+\frac{\ln^n a}{n!}x^n+o\left(x^n\right)=\sum_{k=0}^{n}\frac{x^k\ln^n a}{k!}+o\left(x^n\right)$$

$$\sin x=x-\frac{x^3}{3!}+\frac{x^5}{5!}+\ldots+\left(-1\right)^{n+1}\frac{x^{2n-1}}{\left(2n-1\right)!}+o\left(x^{2n-1}\right)=\sum_{k=1}^{n}\frac{\left(-1\right)^{k+1}x^{2k-1}}{\left(2k-1\right)!}+o\left(x^{2n-1}\right)$$

$$\cos x=1-\frac{x^2}{2!}+\frac{x^4}{4!}+\ldots+\left(-1\right)^n\frac{x^{2n}}{\left(2n\right)!}+o\left(x^{2n}\right)=\sum_{k=0}^{n}\frac{\left(-1\right)^k x^{2k}}{\left(2k\right)!}+o\left(x^{2n}\right)$$

$$\left(1+x\right)^\alpha=1+\alpha x+\frac{\alpha\left(\alpha-1\right)x^2}{2!}+\ldots+\frac{\alpha\left(\alpha-1\right)\ldots\left(\alpha-\left(n-1\right)\right)x^n}{n!}+o\left(x^n\right)=1+\sum_{k=1}^{n}\frac{\alpha\left(\alpha-1\right)\ldots\left(\alpha-\left(k-1\right)\right)x^k}{k!}+o\left(x^n\right)$$

$$\frac{1}{1-x}=1+x+x^2+\ldots+\left(-1\right)^n x^n+o\left(x^n\right)=\sum_{k=0}^{n}x^k+o\left(x^n\right)$$

$$\frac{1}{1+x}=1-x+x^2+\ldots+\left(-1\right)^n x^n+o\left(x^n\right)=\sum_{k=0}^{n}\left(-1\right)^k x^k+o\left(x^n\right)$$

$$\ln\left(1+x\right)=x-\frac{x^2}{2}+\frac{x^3}{3}-\ldots+\frac{\left(-1\right)^{n-1}x^n}{n}+o\left(x^n\right)=\sum_{k=1}^{n}\frac{\left(-1\right)^{k+1}x^k}{k}+o\left(x^n\right)$$

$$\operatorname{arctg} x=x-\frac{x^3}{3}+\frac{x^5}{5}-\ldots+\left(-1\right)^n\frac{x^{2n+1}}{2n+1}+o\left(x^{2n+1}\right)=\sum_{k=1}^{n}\frac{\left(-1\right)^{k+1}x^{2k-1}}{2k-1}+o\left(x^{2n+1}\right)$$

$$\arcsin x=x+\frac{x^3}{6}+\frac{3x^5}{40}+\ldots+\frac{\left(2n\right)!x^{2n+1}}{2^{2n}\left(n!\right)^2\left(2n+1\right)}+o\left(x^{2n+1}\right)=\sum_{k=0}^{n}\frac{\left(2k\right)!x^{2k+1}}{2^{2k}\left(k!\right)^2\left(2k+1\right)}+o\left(x^{2n+1}\right)$$