FORMULA SHEET

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \ldots = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} x^{2n+1}, \quad \text{for all } x.$$

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} \ldots = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!} x^{2n}, \quad \text{for all } x.$$

$$e^x = \sum_{n=0}^{\infty} \frac{1}{n!} x^n, \text{ for all } x.$$

$$(1+x)^k = 1 + kx + \frac{k(k-1)}{2!}x^2 + \frac{k(k-1)(k-2)}{3!}x^3 + \ldots \frac{k(k-1)(k-2)\ldots(k-n+1)}{n!}x^n \ldots$$
for $|x| < 1$.

If $f(x) = \sum_{n=0}^{\infty} C_n (x-a)^n$, for $|x-a| < R$, then $\int_a^x f(t)\, dt = \sum_{n=0}^{\infty} \frac{C_n}{n+1}(x-a)^{n+1}$ for $|x-a| < R$.

If $f(x) = \sum_{n=0}^{\infty} C_n (x-a)^n$, for $|x-a| < R$, then $f'(x)\, dt = \sum_{n=1}^{\infty} nC_n (x-a)^{n-1}$ for $|x-a| < R$.