Power Series for Elementary Functions	**Interval of Convergence**
$\dfrac{1}{1-x} = \sum\limits_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots$	$(-1,\ 1)$
$\ln x = \sum\limits_{n=1}^{\infty} (-1)^{n-1} \dfrac{(x-1)^n}{n} = (x-1) - \dfrac{(x-1)^2}{2} + \dfrac{(x-1)^3}{3} - \dfrac{(x-1)^4}{4} + \cdots$	$(0,\ 2]$
$e^x = \sum\limits_{n=0}^{\infty} \dfrac{x^n}{n!} = 1 + \dfrac{x}{1!} + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \cdots$	$(-\infty,\ \infty)$
$\sin x = \sum\limits_{n=0}^{\infty} (-1)^n \dfrac{x^{2n+1}}{(2n+1)!} = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} - \dfrac{x^7}{7!} + \cdots$	$(-\infty,\ \infty)$
$\cos x = \sum\limits_{n=0}^{\infty} (-1)^n \dfrac{x^{2n}}{(2n)!} = 1 - \dfrac{x^2}{2!} + \dfrac{x^4}{4!} - \dfrac{x^6}{6!} + \cdots$	$(-\infty,\ \infty)$
$\tan^{-1} x = \sum\limits_{n=0}^{\infty} (-1)^n \dfrac{x^{2n+1}}{2n+1} = x - \dfrac{x^3}{3} + \dfrac{x^5}{5} - \dfrac{x^7}{7} + \cdots$	$[-1,\ 1]$
$\sin^{-1} x = \sum\limits_{n=0}^{\infty} \dfrac{(2n)!\,x^{2n+1}}{(2^n n!)^2 (2n+1)} = x + \dfrac{x^3}{2\cdot 3} + \dfrac{1\cdot 3 x^5}{2\cdot 4\cdot 5} + \dfrac{1\cdot 3\cdot 5 x^7}{2\cdot 4\cdot 6\cdot 7} + \cdots$	$[-1,\ 1]$

Taylor's Theorem

If a function f is differentiable through order $n+1$ in an interval I containing c, then, for each x, in I, there exists z between x and c such that

$$f(x) = f(c) + f'(c)(x-c) + \frac{f''(c)}{2!}(x-c)^2 + \cdots + \frac{f^{(n)}(c)}{n!}(x-c)^n + R_n(x)$$

Where $R_n(x) = \dfrac{f^{(n+1)}(z)}{(n+1)!}(x-c)^{n+1}$.

Lagrange Form of the Remainder

$$\left| R_n(x) \right| \le \frac{\left| x-c \right|^{n+1}}{(n+1)!} \max \left| f^{(n+1)}(z) \right|$$

Where $\left| f^{(n+1)}(z) \right|$ is the maximum value of $f^{(n+1)}(z)$ between x and c.