11.10 Taylor and Maclaurin Series

Whole number: n
Differentiable function: $f(x)$
Remainder term: R_n

1225. Taylor Series

$$f(x)=\sum_{n=0}^{\infty} f^{(n)}(a)\frac{(x-a)^n}{n!}=f(a)+f'(a)(x-a)+\frac{f''(a)(x-a)^2}{2!}+\ldots$$
$$+\frac{f^{(n)}(a)(x-a)^n}{n!}+R_n.$$

1226. The Remainder After n+1 Terms is given by

$$R_n=\frac{f^{(n+1)}(\xi)(x-a)^{n+1}}{(n+1)!},\quad a<\xi<x.$$

1227. Maclaurin Series

$$f(x)=\sum_{n=0}^{\infty} f^{(n)}(0)\frac{x^n}{n!}=f(0)+f'(0)x+\frac{f''(0)x^2}{2!}+\ldots+\frac{f^{(n)}(0)x^n}{n!}+R_n$$