

11.10 Taylor and Maclaurin Series

Whole number: n

Differentiable function: $f(x)$

Remainder term: R_n

1225. Taylor Series

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

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

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