

Leibnitz's Theorem.

G.W. Leibnitz, a German mathematician gave a method for evaluating the n th differential coefficient of the product of two functions. This method is known as Leibnitz's theorem.

Statement of the theorem – If u and v are two functions of x such that their n th derivative exist then $D^n(u.v.) = {}^n C_0 (D^n u)v + {}^n C_1 D^{n-1}u.Dv + {}^n C_2 D^{n-2}u.D^2v + \dots \dots \dots + {}^n C_r D^{n-r}u.D^r v + \dots \dots \dots + u.(D^n v)$.

Note: The success in finding the n th derivative by this theorem lies in the proper selection of first and second function. Here first function should be selected whose n th derivative can be found by standard formulae. Second function should be such that on successive differentiation, at some stage, it becomes zero so that we need not to write further terms.