Easy Tutorial: Basics of Calculus

1. What is Calculus?

Calculus is the branch of mathematics that studies how things change. It has two main branches: Differential Calculus (concerned with rates of change) and Integral Calculus (concerned with accumulation of quantities).

2. Limits and Continuity

Limits help us understand the behavior of functions as they approach specific points. A function is continuous at a point if its limit at that point equals the function's value.

3. Derivatives

The derivative represents the rate of change of a function. It tells you how a function is changing at any point. For example, the derivative of f(x) = x^2 is f'(x) = 2x.

4. Integrals

The integral is the reverse of the derivative. It represents the area under a curve. For example, the integral of f(x) = x is intx dx = (1/2)x^2 + C (written as 'int x dx = (1/2)x^2 + C').

5. Fundamental Theorem of Calculus

This theorem links differentiation and integration. It states that if F is the antiderivative of f, then the integral of f from a to b is F(b) - F(a).