CALCULUS: DEFINITION

Calculus is a mathematical science in which things are changed. It concerns:

Change rates (derivatives)

Integral summation of quantities (Integrals)

It is separated into two major components:

Differential Calculus – concentrates on determining rates of change, slopes (derivatives).

Integral Calculus -concentrates on finding area beneath the curves or accumulation (integrals).

DERIVATIVE: DEFINITION

A derivative indicates the nature of change in a function at any point- it provides the gradient of a function at a point.

Simply put: when something is moving the rate of change of things can be applied to position and this would give you speed.

General Formulae of Derivatives:

Common Derivative Formulas:

Function	**Derivative**
f(x)=cf(x) = cf(x)=c	f′(x)=0f'(x) = 0f′(x)=0
f(x)=xnf(x) = x^nf(x)=xn	f′(x)=nxn−1f'(x) = nx^{n-1}f′(x)=nxn−1
f(x)=sin⁡xf(x) = \sin xf(x)=sinx	f′(x)=cos⁡xf'(x) = \cos xf′(x)=cosx
f(x)=cos⁡xf(x) = \cos xf(x)=cosx	f′(x)=−sin⁡xf'(x) = -\sin xf′(x)=−sinx
f(x)=exf(x) = e^xf(x)=ex	f′(x)=exf'(x) = e^xf′(x)=ex
f(x)=ln⁡xf(x) = \ln xf(x)=lnx	f′(x)=1xf'(x) = \frac{1}{x}f′(x)=x1

INTEGRAL: DEFINITION

A derivative is the integration of something. It also assists us to identify:

Extent of an area under a curve

Cumulative amount of stock.

Some important calculus.

Area of Use	How Calculus Helps
Physics & Engineering	Motion, force, waves, electricity
Economics	Maximizing profit, minimizing cost
Computer Science	Algorithms, graphics, machine learning
Biology	Modeling population growth, medicine dosage
Architecture	Design curves, loads, structural strength
Everyday Life	Speed, distance, area – in real-world calculations