

Calc

Tester

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1 Introduction to Calculus

Calculus is a branch of mathematics focused on limits, functions, derivatives, integrals, and infinite series. This document provides an introduction to derivatives, a fundamental concept in calculus.

2 Derivatives

The derivative of a function $f(x)$ is defined as:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

Theorem 1 (Power Rule). *If $f(x) = x^n$, then $f'(x) = nx^{n-1}$.*

3 Example

Consider $f(x) = x^2$. Then:

- $f'(x) = 2x$
- At $x = 3$, the slope is $f'(3) = 6$

4 Key Properties

1. **Linearity:** $(af + bg)' = af' + bg'$
2. **Product Rule:** $(fg)' = f'g + fg'$
3. **Chain Rule:** $(f \circ g)' = (f' \circ g) \cdot g'$