

Introduction to Derivatives

Calculus I · Chapter 2 · Sample Notes

Definition

- The derivative measures the instantaneous rate of change of a function.
- Defined as the limit of the difference quotient as h approaches 0.

Basic Rules

- Power Rule: $\frac{d}{dx}[x^n] = n \cdot x^{(n-1)}$
- Constant Rule: $\frac{d}{dx}[c] = 0$
- Sum Rule: $\frac{d}{dx}[f(x) + g(x)] = f'(x) + g'(x)$
- Product Rule: $\frac{d}{dx}[f \cdot g] = f'g + fg'$

Applications

- Finding slopes of tangent lines.
- Determining increasing/decreasing intervals.
- Optimization problems (finding maxima and minima).