

THE DERIVATIVE OF A FUNCTION

Derivative is the **slope of a tangent line**, wherein for each x in the domain of f , $f'(x)$ is the slope tangent to the graph of f at the point $(x, f(x))$.

Derivative Notation

•The derivative function $y=f(x)$ can be denoted in several ways. Such as: $f'(x)$, y' , $\frac{dy}{dx}$, $\frac{df(x)}{dx}$.

DIFFERENTIATION RULE REVIEWER

Introduction

Differentiation is a process used in calculus to find the derivative of a function. The derivative represents the rate of change of a function with respect to a variable.

1. Constant Rule

The derivative of a constant is zero.

Formula:

$\frac{d}{dx}(c) = 0$
where C is a constant.

2. Identity Rule

The derivative of the variable X is one.

Formula:

$\frac{d}{dx}(x) = 1$

3. Power Rule

To differentiate a power of x , multiply by the exponent and reduce the exponent by one.

Formula:

$\frac{d}{dx}(x^n) = n \cdot x^{n-1}$

4. Constant Multiple Rule

A constant multiplied by a function remains multiplied after differentiation.

Formula:

$$d/dx [c \cdot f(x)] = c \cdot f'(x)$$

5. Sum Rule

The derivative of a sum is the sum of the derivatives.

Formula:

$$d/dx [f(x) + g(x)] = f'(x) + g'(x)$$

6. Difference Rule

The derivative of a difference is the difference of the derivatives.

Formula:

$$d/dx [f(x) - g(x)] = f'(x) - g'(x)$$

7. Product Rule

Used when differentiating the product of two functions.

Formula:

$$d/dx [f(x) \cdot g(x)] = f(x) \cdot g'(x) + g(x) \cdot f'(x)$$

8. Quotient Rule

Used when differentiating one function divided by another.

Formula:

$$d/dx [f(x)/g(x)] = (g(x) \cdot f'(x) - f(x) \cdot g'(x)) / [g(x)]^2$$

9. Chain Rule

Used when differentiating composite functions.

Formula:

$$d/dx [f(g(x))] = f'(g(x)) \cdot g'(x)$$

End of Reviewer 

