Chapter 1

Rules for Finding Derivatives

Derivatives play a key role in calculus, providing us with a means of calculating rates of change and the slopes of curves. Here, we present some common rules used to calculate derivatives.

1.1 Constant Rule

The derivative of a constant is zero. If c is a constant and x is a variable, then:

$$\frac{d}{dx}c = 0 \tag{1.1}$$

1.2 Power Rule

For any real number n, the derivative of x^n is:

$$\frac{d}{dx}x^n = nx^{n-1} \tag{1.2}$$

1.3 Product Rule

The derivative of the product of two functions is:

$$\frac{d}{dx}(fg) = f'g + fg' \tag{1.3}$$

where f' and g' denote the derivatives of f and g, respectively.

1.4 Quotient Rule

The derivative of the quotient of two functions is:

$$\frac{d}{dx}\left(\frac{f}{g}\right) = \frac{f'g - fg'}{g^2} \tag{1.4}$$

1.5 Chain Rule

The derivative of a composition of functions is:

$$\frac{d}{dx}(f(g(x))) = f'(g(x)) \cdot g'(x) \tag{1.5}$$

1.6 Conclusion

These rules form the basis for calculating derivatives in calculus. Many more complex rules and techniques are built upon these fundamental rules.

Appendix A

Answers to Exercises

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