

# 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:

$$\frac{d}{dx}c = 0 \quad (1.1)$$

### 1.2 Power Rule

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

$$\frac{d}{dx}x^n = nx^{n-1} \quad (1.2)$$

### 1.3 Product Rule

The derivative of the product of two functions is:

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

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:

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

## 1.5 Chain Rule

The derivative of a composition of functions is:

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

## 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.

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*This is a draft chapter from the Kontinua Project. Please see our website (<https://kontinua.org/>) for more details.*

# Answers to Exercises





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