

# Exponential Functions and Derivatives

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# Chapter 1

## 1.1 Exponential Functions

A function in the form

$$y = C^x$$

example:

$$y = 5^x$$

Where:

$$f(x) = 5^x$$

$$g(x) = x + 1$$

$$f[g(x)] = 5^{x+1}$$

The derivative of such a function:

$$y' = C^x \times x' \times \ln(C)$$

**Example 1.1.1** ( $y = 5^{-x}$ )

$$y' = -5^{-x} \ln(5)$$

**Example 1.1.2** ( $y = 5^{-2x}$ )

$$y' = -10^{-2x} \ln(5)$$