

Rules of Integration

For any function f and g and any constant value k :

Multiplicative constant: $\int kf(x)dx = k \int f(x)dx$

Addition rule: $\int (f(x) \pm g(x))dx = \int f(x)dx \pm \int g(x)dx$

Integration by part (to integrate products of functions):

$$\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx$$

Definite Integral

The definite integral is written: $\int_a^b f(x)dx$ and is equal to:

$$\int_a^b f(x)dx = [F(x)]_a^b = F(b) - F(a)$$

where F is a primitive of f . The definite integral is a measure of the area between the x -axis and the curve of f , between the points $x = a$ and $x = b$.

$x^{0.5}$	$= x^{1/2} =$	\sqrt{x}
$x^{1/n}$	$=$	$\sqrt[n]{x}$
x^{-n}	$=$	$\frac{1}{x^n}$
x^{n+m}	$=$	$x^n x^m$
x^{n-m}	$=$	$\frac{x^n}{x^m}$

Table 1: Reminder on index laws.

Table of Integrals

$f(x)$	$\int f(x)dx$
$x^n, \quad n \neq -1$	$\frac{x^{n+1}}{n+1} + C$
$f'(x)f(x)$	$\frac{1}{2}(f(x))^2 + C$
$(ax + b)^n$	$\frac{1}{a} \frac{(ax + b)^{n+1}}{n+1} + C$
$f'(x)(f(x))^n$	$\frac{1}{n+1}(f(x))^{n+1} + C$
e^x	$e^x + C$
e^{ax+b}	$\frac{e^{ax+b}}{a} + C$
$f'(x)e^{f(x)}$	$e^{f(x)} + C$
$\frac{1}{x}$	$\ln x + C$
$\frac{1}{ax + b}$	$\frac{\ln(ax + b)}{a} + C$
$\frac{f'(x)}{f(x)}$	$\ln(f(x)) + C$

Table 2: Integral of functions commonly used in Economics and Business Studies.

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For the help you need to support your course

Integration for Economics and Business Studies

This leaflet is an overview of the rules of integration and their applications in Economics and Business Studies.

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Indefinite Integral

Integration is the opposite of differentiation, and the **indefinite integral** of a function is the opposite of the derivative of a function. The indefinite integral of a function f is written $\int f(x)dx$. For any function f :

$$\int f(x)dx = F(x) + C \text{ with } F'(x) = f(x)$$

C is a **constant of integration**. The indefinite integral is always defined with a constant of integration because all functions that differ by a constant have the same derivative:

$$\frac{d(F(x) + C)}{dx} = \frac{dF(x)}{dx} = f(x)$$

The functions $F(x) + C$ are called primitives of the function f .

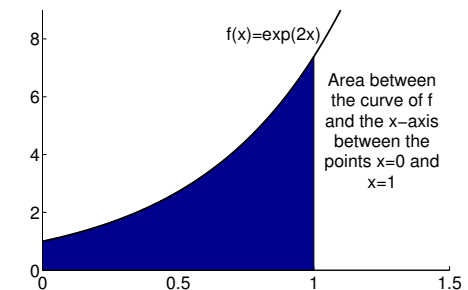


Figure 1: The definite integral of a function is the area between its graph and the x -axis between two specific values of x .

