

# Integrali

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**Esercizio 1.** Risolvere i seguenti integrali:

$$\begin{aligned} & \text{(i)} \int x^\alpha dx \quad \text{(ii)} \int \frac{1}{x} dx \quad \text{(iii)} \int \sin x dx \quad \text{(iv)} \int \frac{1}{\cos^2 x} dx \\ & \text{(v)} \int \frac{1}{\sin^2 x \cos^2 x} dx \quad \text{(vi)} \int \frac{1}{\sin^2 x} dx \quad \text{(vii)} \int 2e^x - 5 \cos x dx \quad \text{(viii)} \int a^x dx \\ & \text{(ix)} \int \frac{1}{\sqrt{1-x^2}} dx \quad \text{(x)} \int \frac{1}{1+x^2} dx \quad \text{(xi)} \int (x^3 - 4x^2 + \frac{3}{5}x + 2) dx \quad \text{(xii)} \int \frac{x^5 + 1}{x + 1} dx \\ & \text{(xiii)} \int \frac{3x + 1}{x^3 - 4x} dx \quad \text{(xiv)} \int \frac{x^5 - 6x^3 + 2x^2 + 5}{x^3 + 3x^2 - x - 3} dx \quad \text{(xv)} \int \frac{dx}{x^3(x^2 + 1)^2} \end{aligned}$$

**Esercizio 2.** Risolvere i seguenti integrali per sostituzione:

$$\begin{aligned} & \text{(i)} \int \frac{\sqrt{x}}{2 + \sqrt{x}} dx \quad \text{(ii)} \int \sqrt{2^x - 1} dx \quad \text{(iii)} \int \frac{\sin x}{1 + \cos^2 x} dx \\ & \text{(iv)} \int \frac{1}{1 + e^x} dx \quad \text{(v)} \int \frac{1}{x\sqrt{x+4}} dx \quad \text{(vi)} \int \frac{\tan x}{1 + \sin^2 x} dx \\ & \text{(vii)} \int \frac{1}{x + \sqrt{1+x^2}} dx \quad \text{(viii)} \int \frac{1}{\sqrt{-x^2 - 2x + 3}} dx \end{aligned}$$

**Esercizio 3.** Risolvere i seguenti integrali per parti:

$$\begin{aligned} & \text{(i)} \int x \sin x dx \quad \text{(ii)} \int \sqrt{1-x^2} dx \quad \text{(iii)} \int \frac{\sin x}{e^x} dx \\ & \text{(iv)} \int \frac{x}{\cos^2 x} dx \quad \text{(v)} \int \arcsin^2 x dx \quad \text{(vi)} \int \sqrt{x^2 + 4} dx \\ & \text{(vii)} \int e^x \sin x dx \quad \text{(viii)} \int e^x \sin^3 x dx \quad \text{(ix)} \int \ln x dx \quad \text{(x)} \int \sin^3 x dx \end{aligned}$$