

Integralrechnung

Konstantenregel: $\int ax^n dx = a \int x^n dx$

Summenregel: $\int (f+g) dx = \int f dx + \int g dx$

Hauptregel: $\int x^n dx = \frac{x^{n+1}}{n+1} + c$

... wichtige Integrale:

$$\int dx = x + c$$

$$\int k dx = k \cdot x + c$$

$$\int x dx = \frac{x^2}{2} + c$$

$$\int e^x dx = e^x + c$$

$$\int \sqrt{x} dx = \frac{2}{3} \sqrt{x^3} + c$$

$$\int a^x dx = \frac{a^x}{\ln a} + c$$

$$\int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + c$$

$$\int 10^x dx = \frac{10^x}{\ln 10} + c$$

$$\int \frac{1}{x} dx = \ln x + c$$

Das bestimmte Integral:

Fläche

$$A = \int_a^b f(x) dx = \left| F(x) \right|_a^b = F(b) - F(a)$$

Volumen....

$$V_x = \pi \int_a^b [f(x)]^2 dx$$

$$V_y = \pi \int_a^b x^2 dy$$

Partielle Integration:

$$\int f g' dx = f g - \int f' g dx$$

$$\int f' g dx = f g - \int f g' dx$$

Substitutionsregel:

$$\int f(v) dx = \int f(v) \cdot \frac{dv}{v'}$$

... weil $dx = \frac{dv}{v'}$