

Nedoločeni integral (Per-partes): rešene naloge + formule

3. S pomočjo delnega integriranja (per-partes) izračunaj integrale.

(a) $\int \frac{\ln x}{x^2} dx$
 (b) $\int x^2 e^{3x} dx$

(c) $\int \ln x dx$
 (d) $\int x e^{3x} dx$

(e) $\int x \ln x dx$

$$\int u dv = u \cdot v - \int du \cdot v$$

tako si predstavljamo:

$$u = f(x) \quad dv = g(x) dx \quad \int f(x)g(x) dx$$

$\int \frac{\ln x}{x^2} dx = \int \overbrace{\ln x}^u \cdot \overbrace{\frac{1}{x^2}}^{dv} dx = -\frac{1}{x} \cdot \ln x - \int -\frac{1}{x^2} dx$

malo spremeniimo zapis

$$= -\frac{1}{x} \cdot \ln x + \frac{x^{-1}}{-1} = -\frac{1}{x} \cdot \ln x - \frac{1}{x} + C$$

odv. $\left(\begin{array}{l} u = \ln x \quad dv = \frac{1}{x^2} dx \\ du = \frac{1}{x} dx \quad v = \frac{x^{-1}}{-1} = -\frac{1}{x} \end{array} \right) \text{ integr.}$

$\int x^2 \cdot e^{3x} dx = x^2 \cdot \frac{e^{3x}}{3} - \int 2x \cdot \frac{e^{3x}}{3} dx$

$$= x^2 \cdot \frac{e^{3x}}{3} - \frac{2}{3} \int x \cdot e^{3x} dx$$

↳ ponovimo per-partes

za ta del, ostalo prepišemo

$\left(\begin{array}{l} u = x \quad dv = e^{3x} \\ du = dx \quad v = \frac{e^{3x}}{3} \end{array} \right) \int$

$$= x^2 \cdot \frac{e^{3x}}{3} - \frac{2}{3} \cdot \left(x \cdot \frac{e^{3x}}{3} - \int \frac{e^{3x}}{3} dx \right) =$$

$$= x^2 \cdot \frac{e^{3x}}{3} - \frac{2}{3} \left(x \cdot \frac{e^{3x}}{3} - \frac{1}{3} \cdot \frac{e^{3x}}{3} \right) + C$$

potenco x^n vedno vzamemo da je u razen ko je v produktu z $\ln x$!

! $\ln x$ bo VEDNO u ker ga ne moremo integrirati

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

$$\int e^{kx} dx = \frac{e^{kx}}{k} + C$$

$\int \ln x dx = x \cdot \ln x - \int \frac{1}{x} dx \cdot x$

$$= x \cdot \ln x - x + C$$

$\left(\begin{array}{l} u = \ln x \quad dv = 1 dx \\ du = \frac{1}{x} dx \quad v = x \end{array} \right) \int$

Več nalog, razlag in formul na instrukcijeonline.com

