

Matematika 1A (Fakulta strojní) - cvičení 10

KMD/M1A a KMD/M1A-P (2012/2013)

Příklad 1. Integrujte pomocí substituční metody dané funkce:

$$\text{a) } \int \sin^3 x \cos x \, dx \quad \left[\frac{1}{4} \sin^4 x \right]$$

$$\text{b) } \int 6x \sin(3x^2) \, dx \quad [-\cos(3x^2)]$$

$$\text{c) } \int -4xe^{-2x^2} \, dx \quad [e^{-2x^2}]$$

$$\text{d) } \int \frac{2x}{(1+x^2)^2} \, dx \quad \left[\frac{-1}{1+x^2} \right]$$

$$\text{e) } \int \frac{3 \cos x}{\sin^4 x} \, dx \quad \left[-\frac{1}{\sin^3 x} \right]$$

$$\text{f) } \int 6 \operatorname{tg}(3x) \, dx \quad [-2 \ln |\cos(3x)|]$$

$$\text{g) } \int \frac{1}{x\sqrt{1-\ln^2 x}} \, dx \quad [\arcsin(\ln x)]$$

$$\text{h) } \int \frac{2 \operatorname{arctg} x}{1+x^2} \, dx \quad [\operatorname{arctg}^2 x]$$

$$\text{i) } \int \sqrt{1+2x} \, dx \quad \left[\frac{(1+2x)^{3/2}}{3} \right]$$

$$\text{j) } \int x\sqrt{2x^2+7} \, dx \quad \left[\frac{(2x^2+7)^{3/2}}{6} \right]$$

$$\text{k) } \int \frac{4x}{\sqrt[3]{8-x^2}} \, dx \quad [-3(8-x^2)^{2/3}]$$

$$\text{l) } \int \frac{x}{x^2-1} \, dx \quad \left[\frac{1}{2} \ln |x^2-1| \right]$$

$$\text{m) } \int \frac{12}{(3x-7)^5} \, dx \quad \left[-\frac{1}{(3x-7)^4} \right]$$

$$\text{n) } \int \frac{1}{x^2-6x+9} \, dx \quad \left[-\frac{1}{x-3} \right]$$

$$\text{o) } \int \frac{1}{\sqrt{4x+9}} \, dx \quad \left[\frac{\sqrt{4x+9}}{2} \right]$$

$$\text{p) } \int \sin(2x-5) \, dx \quad \left[-\frac{1}{2} \cos(2x-5) \right]$$

$$\text{q) } \int \frac{1}{\sin^2(3x-7)} \, dx \quad \left[-\frac{1}{3} \operatorname{cotg}(3x-7) \right]$$

$$\text{r) } \int \frac{e^{2x}-1}{e^x} \, dx \quad \left[e^x + \frac{1}{e^x} \right]$$

$$\text{s) } \int \frac{1}{x^2+4x+5} \, dx \quad [\operatorname{arctg}(x+2)]$$

$$\text{t) } \int \frac{2}{x^2-2x+5} \, dx \quad \left[\operatorname{arctg} \frac{x-1}{2} \right]$$

$$\text{u) } \int \frac{2}{\sqrt{3+2x-x^2}} \, dx \quad \left[2 \arcsin \frac{x-1}{2} \right]$$

$$\text{v) } \int \frac{1}{\sqrt{-2x-x^2}} \, dx$$