Matematika 1A (Fakulta strojní) - cvičení 12

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

Příklad 1. Vypočítejte určité integrály:

a) $\int_{-1}^{3} (x^3 - 3x^2 + 1)\,\mathrm{d}x$ $[-4]$

b) $\int_{0}^{\pi} 5\sin(4x)\,\mathrm{d}x$ $[0]$

c) $\int_{0}^{3} e^{\frac{x}{3}}\,\mathrm{d}x$ $[3e - 3]$

d) $\int_{0}^{4} \frac{x-1}{x+1}\,\mathrm{d}x$ $[4 - 2\ln 5]$

e) $\int_{-\pi/4}^{\pi/4} 4\sin^2 x\,\mathrm{d}x$ $[-2 + \pi]$

f) $\int_{-2}^{2} \frac{6}{8 + 3x^2}\,\mathrm{d}x$ $\left[\sqrt{6}\,\mathrm{arctg}\,\frac{\sqrt{6}}{2}\right]$

g) $\int_{1}^{4} 3\sqrt{x}\,\mathrm{d}x$ $[14]$

h) $\int_{-1/2}^{1/2} \mathrm{tg}\,x\,\mathrm{d}x$ $[0]$

i) $\int_{-2}^{2} \frac{x^2}{x^2 + 1}\,\mathrm{d}x$ $[4 - 2\,\mathrm{arctg}\,2]$

j) $\int_{0}^{3} xe^{-\frac{x}{2}}\,\mathrm{d}x$ $\left[-10e^{-3/2} + 4\right]$

k) $\int_{-1}^{1} 4x\,\mathrm{arctg}\,(2x)\,\mathrm{d}x$ $[5\,\mathrm{arctg}\,2 - 2]$

l) $\int_{2}^{3} \frac{e^{\frac{1}{x}}}{x^2}\,\mathrm{d}x$ $\left[-\sqrt[3]{e} + \sqrt{e}\right]$

m) $\int_{0}^{\pi} 3\sin^3 x\,\mathrm{d}x$ $[4]$

n) $\int_{1}^{2} \frac{2(1 + \ln x)}{x}\,\mathrm{d}x$ $[\ln^2 2 + 2\ln 2]$

o) $\int_{0}^{1} \frac{x}{\sqrt{4 - x^2}}\,\mathrm{d}x$ $\left[2 - \sqrt{3}\right]$

p) $\int_{1}^{2} \frac{6}{6x - 1}\,\mathrm{d}x$ $\left[\ln\frac{11}{5}\right]$

q) $\int_{-1}^{1} \frac{2}{\sqrt{16 - 4x^2}}\,\mathrm{d}x$ $\left[\frac{\pi}{3}\right]$

r) $\int_{0}^{1/2} \frac{2(1 + x^2)}{1 - x^2}\,\mathrm{d}x$ $[-1 + 2\ln 3]$

s) $\int_{0}^{2} \frac{1}{(5 + 4x)^3}\,\mathrm{d}x$ $\left[\frac{18}{4225}\right]$

t) $\int_{0}^{3} 3\sqrt{x + 1}\,\mathrm{d}x$ $[14]$

u) $\int_{-1}^{1} \frac{2}{x^2 - 4}\,\mathrm{d}x$ $[-\ln 3]$

v) $\int_{1}^{5} \frac{2\ln x}{x}\,\mathrm{d}x$ $\left[\ln^2 5\right]$