Příklady Integrály

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1) Vypočítejte neurčitý integrál:

  A

$\int x^3 \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{x^4}{4} + c]$

$\int e^x \ \mathrm{d}x$ $\qquad\qquad$ $[e^x + c]$

$\int \frac{x+1}{x^2+2x+9} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{1}{2}\ln\left|x^2 + 2x + 9\right| + c]$

$\int \frac{1}{x^4} \ \mathrm{d}x$ $\qquad\qquad$ $[-\frac{1}{3x^3} + c]$

$\int x^4 - x^2 \sqrt[5]{x^3} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{x^5}{5} - \frac{5x^{\frac{18}{5}}}{18} + c]$

  B

$\int \frac{1}{x} \ \mathrm{d}x$ $\qquad\qquad$ $[ln|x| + c]$

$\int \frac{x+1}{x^2+2x+9} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{1}{2}\ln\left|x^2 + 2x + 9\right| + c]$

$\int \frac{1}{x^2} \ \mathrm{d}x$ $\qquad\qquad$ $[-\frac{1}{x} + c]$

$\int 3x^5 \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{x^6}{2} + c]$

$\int a + 3\cos x \ \mathrm{d}x$ $\qquad\qquad$ $[ax + 3\sin x + c]$

  C

$\int 1 \ \mathrm{d}x$ $\qquad\qquad$ $[x + c]$

$\int \sqrt{x} + \frac{1}{x-1} + 2 \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{2x^{\frac{3}{2}}}{3} + \ln|x - 1| + 2x + c]$

$\int \tan^2 x \ \mathrm{d}x$ $\qquad\qquad$ $[\tan x - x + c]$

$\int 7x^6 - 5x^4 + 2x - 1 \ \mathrm{d}x$ $\qquad\qquad$ $[x^7 - x^5 + x^2 - x + c]$

$\int \cot^2 x \ \mathrm{d}x$ $\qquad\qquad$ $[-x - \cot x + c]$

  D

$\int x^n \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{x^{n+1}}{n+1} + c, n \neq -1]$

$\int \frac{1}{2x-5} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{\ln|2x-5|}{2} + c]$

$\int \tan x \ \mathrm{d}x$ $\qquad\qquad$ $[-\ln\cos x + c]$

$\int 7e^x - \frac{5}{x} \ \mathrm{d}x$ $\qquad\qquad$ $[7e^x - 5\ln|x| + c]$

$\int \frac{x^2\sqrt{x}}{x^5} \ \mathrm{d}x$ $\qquad\qquad$ $[-\frac{2}{3x^{\frac{3}{2}}} + c]$

2) Vypočítejte neurčitý integrál metodou substituce:

  A

$\int \frac{\ln^2 x}{x} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{\ln^3 x}{3} + c]$

$\int \frac{3x}{(x^2+4)^3} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{-3}{4(x^2+4)^2} + c]$

$\int \frac{e^{2x}}{\sqrt{e^x-1}} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{2(e^x-1)^{\frac{3}{2}}}{3} + 2\sqrt{e^x-1} + c]$

  B

$\int 10x(x^2+13)^{12} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{5(x^2+13)^{13}}{13} + c]$

$\int 8x^2(x^3+2)^5 \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{4(x^3+2)^6}{9} + c]$

$\int 5xe^{x^2} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{5e^{x^2}}{2} + c]$

  C

$\int \frac{x}{x^2+1} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{\ln\left|x^2+1\right|}{2} + c]$

$\int x(x^2-1)^10 \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{(x^2-1)^11}{22} + c]$

$\int \frac{7\ln^4 x}{x} \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{7\ln^5 x}{5} + c]$

  D

$\int (3x-4)^7 \ \mathrm{d}x$ $\qquad\qquad$ $[\frac{(3x+4)^8}{24} + c]$

$\int 3x \sqrt[4]{x^2+5}\ \mathrm{d}x$ $\qquad\qquad [\frac{6(x^2+5)^{\frac{5}{4}}}{5}+c]$

$\int e^{\cos 2x} \sin x \cos x\ \mathrm{d}x$ $\qquad\qquad [-\frac{e^{\cos 2x}}{4}+c]$

3) Vypočítejte určitý integrál

A

$\int_1^3 \frac{1}{1+x}\ \mathrm{d}x$ $\qquad\qquad [1]$

$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin 2x}{\cos x}\ \mathrm{d}x$ $\qquad\qquad [\sqrt{3}-1]$

$\int_0^1 \frac{1}{\sqrt{x^2-1}}\ \mathrm{d}x$ $\qquad\qquad$ [není definován]

$\int_6^{12} \frac{x^2-13x+19}{x^2}\ \mathrm{d}x$ $\qquad\qquad [\frac{91}{12}-13\ln 2]$

B

$\int_2^5 2x+3\ \mathrm{d}x$ $\qquad\qquad [30]$

$\int_1^4 \sqrt{x}\ \mathrm{d}x$ $\qquad\qquad [\frac{14}{3}]$

$\int_0^{\frac{\pi}{4}} \frac{1}{2\cos^2 2x}\ \mathrm{d}x$ $\qquad\qquad [\frac{1}{2}]$

$\int_1^e 1-e^x+\frac{100}{x}\ \mathrm{d}x$ $\qquad\qquad [99+2e-e^e]$

C

$\int_1^3 3x^2-2x+1\ \mathrm{d}x$ $\qquad\qquad [20]$

$\int_0^5 \frac{\cos^4 x-\sin^4 x}{\cos 2x}\ \mathrm{d}x$ $\qquad\qquad [5]$

$\int_0^4 \frac{2x^2-50}{x-5}\ \mathrm{d}x$ $\qquad\qquad [56]$

$\int_{-1}^1 \frac{x^4-2x^2+1}{x-1}\ \mathrm{d}x$ $\qquad\qquad [-\frac{4}{3}]$

D

$\int_0^{\frac{\pi}{2}} \cos x\ \mathrm{d}x$ $\qquad\qquad [1]$

$\int_0^1 \frac{e^x}{1+e^x}\ \mathrm{d}x$ $\qquad\qquad [\ln \frac{1+e}{2}]$

$a^2 \int_0^{\frac{\pi}{2}} \cos^2 x\ \mathrm{d}x$ $\qquad\qquad [\frac{1}{4}]$

$\int_1^{10} \frac{1}{x^2}\ \mathrm{d}x$ $\qquad\qquad [\frac{9}{10}]$