A

A. Mocniny a odmocniny

Příklad 1 (4b). **Vypočítejte:**

a) $-1,9^2 = -3,61$

b) $\sqrt{0,0036} + \sqrt[3]{0,008} = 0,06 + 0,2 = 0,26$

c) $(-0,006)^2 + (-0,03)^3 = 0,000\,036 + (-0,000\,027) = 0,000\,009$

d) $\sqrt{0,0196 \cdot 225} = \sqrt{0,14^2 \cdot 15^2} = \sqrt{200^4} = \sqrt{1600\,000\,000} = 40\,000$

Příklad 2 (6b). **Vypočítejte:**

a) $\sqrt{0,5^2 - (-0,4)^2} = \sqrt{0,25 - 0,16} = \sqrt{0,09} = 0,3$

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} = 300 + 4 - \frac{11}{4} - \frac{5}{8} =$

$= \frac{2400}{8} + \frac{32}{8} - \frac{22}{8} - \frac{5}{8} = \frac{2432}{8} - \frac{27}{8} = \frac{2405}{8}$

c) $(0,2 + 0,9)^2 + \sqrt{64 \cdot 144} = (0,04 + 0,81) + 8 \cdot 12 = 0,85 + 96 = 96,85$

I.A

B

A. Mocniny a odmocniny

Příklad 1 (4b). **Vypočítejte:**

a) $-1,9^2 = -1,81$

b) $\sqrt{0,0036} + \sqrt[3]{0,008} = 0,06 + 0,2 = 0,26$

c) $(-0,006)^2 + (-0,03)^3 = \cancel{36}\ 0,000036 + (-0,000027) = 0,000009$

d) $\sqrt{0,0196 \cdot 225} = \cancel{\sqrt{11}}$

$= \sqrt{0,14} \cdot \sqrt{15} = \sqrt{0,14 \cdot 15} = \sqrt{2,10}$ ..

Příklad 2 (6b). **Vypočítejte:** 0,09

a) $\sqrt{0,5^2 - (-0,4)^2} = \sqrt{0,25 - 0,16} = 0,3$

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} = 300 + 4 - \frac{11}{8} - \frac{5}{8} =$ $\frac{16}{8}$

$300 + \left(\frac{32}{8} - \frac{11}{8} - \frac{5}{8}\right) = 300 + 2 = 302$

c) $(0,2 + 0,9)^2 + \sqrt{64 \cdot 144} = (1,1)^2 + \sqrt{4^3 \cdot 12^2} = 1,21 +$ 8 12

$\sqrt{64} \cdot \sqrt{144} = 1,21 + 196 = 197,21$

C

A. Mocniny a odmocniny

Příklad 1 (4b). Vypočítejte:

a) $-1,9^2 =$ − ~~36,1~~ 3,61

b) $\sqrt{0,0036} + \sqrt[3]{0,008} =$ 0,06 + 0,2 = 0,26

c) $(-0,006)^2 + (-0,03)^3 =$ 0,000036 + 0,000027 = 0,000063

d) $\sqrt{0,0196 \cdot 225} =$ 0,14 · 15 = 2,1

Příklad 2 (6b). Vypočítejte:

a) $\sqrt{0,5^2 - (-0,4)^2} =$ 0,25 − (0,16) = 9 … 0,1

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} =$ 300 + 4 − $\frac{11}{8}$ − $\frac{5}{8}$ = $\frac{2432}{8}$ …

c) $(0,2+0,9)^2 + \sqrt{64 \cdot 144} =$ 0,04 + 0,18 + 8 · 12 = … 96,85

D

A. Mocniny a odmocniny

Příklad 1 (4b). Vypočítejte:

a) $-1,9^2 =$ 19^2 = −3,61

b) $\sqrt{0,0036} + \sqrt[3]{0,008} =$ 0,06 + 0,2 = 0,26

c) $(-0,006)^2 + (-0,03)^3 =$ 0,000036 + 0,0027 = 0,002736

d) $\sqrt{0,0196 \cdot 225} =$ $\sqrt{0,14} \cdot \sqrt{225}$ 15 = 1,10

Příklad 2 (6b). Vypočítejte:

a) $\sqrt{0,5^2 - (-0,4)^2} =$ $\sqrt{0,25 - (0,16)} = \sqrt{0,09}$ = 0,3

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} =$ 300 + 6 − $\sqrt{121}$ …

= $\frac{306}{1} - \frac{11}{8} - \frac{5}{2} = \frac{2437}{8} - \frac{5}{2} = \frac{2417}{8}$ = 302,1

c) $(0,2+0,9)^2 + \sqrt{64 \cdot 144} =$

~~$(1,1)^2 + \sqrt{\ldots}\ 8 \cdot 12 = 1,21 + 96$~~

= 1,21 + 8 · 12 = 1,21 + 96 = 97,21

$\frac{2437}{8} - \frac{5}{2} = \frac{2437-20}{8} = \frac{2417}{8}$ $\frac{306}{1} - \frac{11}{8} = \frac{2448-11}{8}$

2417 : 8 = 302,1

E

A. Mocniny a odmocniny

Příklad 1 (4b). Vypočítejte:

a) $-1,9^2 = -3{,}61$

b) $\sqrt{0,0036} + \sqrt[3]{0,008} = 0{,}06 + 0{,}2 = 0{,}26$

c) $(-0,006)^2 + (-0,03)^3 = 0{,}000036 + 0{,}000027 = 0{,}000063$

d) $\sqrt{0,0196 \cdot 225} = \sqrt{0{,}0196} \cdot \sqrt{225} = 0{,}14 \cdot 15 = 2{,}1$

Příklad 2 (6b). Vypočítejte:

a) $\sqrt{0,5^2 - (-0,4)^2} = \sqrt{0{,}25 - 0{,}16} = \sqrt{0{,}09} = 0{,}3$

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} = 300 + 4 - \frac{11}{8} - \frac{5}{8} = \frac{304}{1} - \frac{6}{8} = \frac{2426}{8} = 303{,}25$

c) $(0,2 + 0,9)^2 + \sqrt{64 \cdot 144} = 0{,}11^2 + 96 = 0{,}0121 + 96 = 96{,}0121$

$8 \cdot 12$

$11 \cdot 11 = 121$

$1:8 = 1{,}$

$6:8 = 0{,}625$

$304 \cdot 8 = 2432$

$\frac{2426}{8}$

$2426 : 8 = 303{,}25$

F

A. Mocniny a odmocniny

Příklad 1 (4b). Vypočítejte:

a) $-1,9^2 = -3{,}61$

b) $\sqrt{0,0036} + \sqrt[3]{0,008} = 0{,}06 + 0{,}2 = 0{,}26$

c) $(-0,006)^2 + (-0,03)^3 = 0{,}000036 + 0{,}000027 = 0{,}000063$

d) $\sqrt{0,0196 \cdot 225} = \sqrt{0{,}0196} \cdot \sqrt{225} = 0{,}14 \cdot 15 = 0{,}0210$

Příklad 2 (6b). Vypočítejte:

a) $\sqrt{0,5^2 - (-0,4)^2} = \sqrt{0{,}25 - 0{,}16} = \sqrt{9} = 3$

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} = 300 + 4 + \frac{12}{8} - \frac{5}{8} = 304 + \frac{7}{8} = 304 + 8{,}75 = 312{,}75$

c) $(0,2 + 0,9)^2 + \sqrt{64 \cdot 144} = 1{,}1^2 + \sqrt{64} \cdot \sqrt{144} = 1{,}21 + 8 + 12 = 21{,}21$

20

$14 \cdot 15 = 210$

$300 \cdot 300 = 90000$

$10:8 = 1{,}25$

$1{,}25 \cdot 7 = 8{,}75$

G

A. Mocniny a odmocniny

Příklad 1 (4b). Vypočítejte:

a) $-1,9^2 = 2,61$

b) $\sqrt{0,0036} + \sqrt[3]{0,008} = 0,06 + 0,2 = 0,26$

c) $(-0,006)^2 + (-0,03)^3 = 0,000\,036 + (-0,000\,027) = 0,000\,009$

d) $\sqrt{0,0196 \cdot 225} = \sqrt{0,0196} \cdot \sqrt{225} = 0,14 \cdot 15 = 2,10$

Příklad 2 (6b). Vypočítejte:

a) $\sqrt{0,5^2 - (-0,4)^2} = \sqrt{0,25 - 0,16} = \sqrt{0,09} = 0,3$

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} = 300 + 4 - \frac{11}{8} - \frac{5}{8} = 304 - \frac{6}{8} = 304 - \frac{3}{4} = 304 - 0,75 = 303,25$

c) $(0,2 + 0,9)^2 + \sqrt{64 \cdot 144} = 1,1^2 + 4 \cdot 12 = 1,1^2 + 48 = 1,21 + 48 = 49,21$

← tento sněhulák chrání test před špatnými známkami

H

A. Mocniny a odmocniny

Příklad 1 (4b). Vypočítejte:

a) $-1,9^2 = -3,61$

b) $\sqrt{0,0036} + \sqrt[3]{0,008} = 0,06 + 0,2 = 0,26$

c) $(-0,006)^2 + (-0,03)^3 = 36 + (-0,000\,027) = 36 - 0,000\,027 = 35,999\,973$

d) $\sqrt{0,0196 \cdot 225} = \sqrt{0,0196} \cdot \sqrt{225} = 0,14 \cdot 15 = 2,1$

Příklad 2 (6b). Vypočítejte:

a) $\sqrt{0,5^2 - (-0,4)^2} = \sqrt{0,25 - (0,16)} = \sqrt{0,09} = 0,3$

b) $\sqrt{90000} + \sqrt[3]{64} - \sqrt{\frac{121}{64}} - \frac{\sqrt[3]{125}}{8} = 300 + 4 - \frac{\sqrt{121}}{\sqrt{64}} - \frac{5}{8} = 300 + 4 - \frac{11}{8} - \frac{5}{8} = \frac{300}{1} + \frac{1}{1} - \frac{6}{2} = \frac{300 + 1 - 6}{2} = \frac{301 - 6}{2} = \frac{295}{2} = 147,5$

c) $(0,2 + 0,9)^2 + \sqrt{64 \cdot 144} = 1,1^2 + \sqrt{64} \cdot \sqrt{144} = 11,11 + 8 \cdot 12 = 11,11 + 96 = 107,11$

1

a) $\int_1^2 \frac{1-\sqrt{x}}{2x}\,dx = \int_1^2 \frac{1-x^{\frac{1}{2}}}{2x}\,dx = \int_1^2 \frac{1}{2}x - x^{\frac{1}{2}}$

$\sqrt{x^3}$

$\left[\frac{1}{4}x^2 - \frac{2}{3}x^{\frac{3}{2}}\right]_1^2 = \left(\frac{1}{4}2^2 - \frac{2}{3}\sqrt{2^3}\right) - \left(\frac{1}{4} - \frac{2}{3}\right)$

$\frac{12}{12}$ $\frac{2}{3}\cdot 4\sqrt{2}$ $\frac{12\sqrt{2}}{3}$

$\left(1 - \frac{24\sqrt{2}}{3}\right) - \left(-\frac{5}{12}\right) = \frac{17}{12} - 8\sqrt{2}$

$\frac{3}{12} - \frac{8}{12} = -\frac{5}{12}$

b) $\int \frac{3x}{x^2+1}\,dx = \frac{3}{2}\int \frac{1}{x^2+1}\,\frac{2}{3}3x\,dx$

$x^2+1=t$

$\frac{2}{3}3x\,dx = dt$

$\frac{3}{2}\int \frac{1}{t}\,dt = \frac{3}{2}\ln|t| + c$

$\frac{3}{2}\ln|x^2+1| + c$

$c \in \mathbb{R}$

$uv - \int u v'$

c) $\int e^x \cdot (x+5)\,dx = \begin{vmatrix} u' = e^x & v = x+5 \\ u = e^x & v' = 1 \end{vmatrix} \Rightarrow e^x(x+5) - \int e^x\,dx$

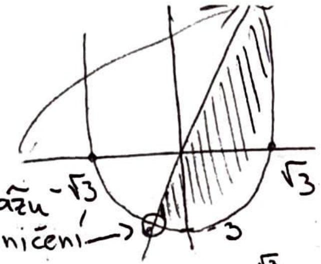
$= e^x(x+5) - e^x + C$

$= xe^x + 5e^x - e^x + C$

$= xe^x + 4e^x + C \quad C \in \mathbb{R}$

2 $y = x^2 - 3$

$y = 2x$



↳ nedokážu najít ohraničení

$0 = x^2 - 3$

$x \begin{cases} -\sqrt{3} \\ \sqrt{3} \end{cases}$

$-\int_{-\sqrt{3}}^{\sqrt{3}} x^2 - 3 = -\left[\frac{1}{3}x^3 - 3x\right]$

$-\left[\left(\frac{1}{3}\sqrt{3}^3 - 3\sqrt{3}\right) - \left(-\frac{1}{3}\sqrt{3}^3 + 3\sqrt{3}\right)\right]$

2

Př. 1

a) $\int_1^2 \frac{1-\sqrt{x}}{2x}\,dx = \int_1^2 \frac{1-x^{\frac{1}{2}}}{2x}\,dx = \int_1^2 \frac{1-t^{\frac{1}{2}}}{2t} = \frac{1}{2}\int_1^2 \frac{1-t^{\frac{1}{2}}}{t}$

metoda substituce $= \frac{1}{2}\left|\frac{x-\frac{t^{\frac{3}{2}}}{\frac{3}{2}}}{\frac{t^2}{2}}\right|_1^2 = \frac{1}{2}\cdot\left|\frac{x-\frac{2}{3}\sqrt{t^3}}{2t^2}\right|_1^2$

$t = x$

$dt = 1\,dx$

$dx = dt$ $\quad=$

$\frac{1-x^{\frac{1}{2}}\cdot 2x^{-1}}{\cancel{2x}} = 1-$

$-1+\frac{1}{2}$

$-\frac{1}{2}+\frac{1}{2}$

$(1-t^{\frac{1}{2}})\cdot 2t^{-1}$

b) $\int \frac{3x}{x^2+1}\,dx = \int \frac{3\cancel{x}}{t}\cdot\frac{dt}{2\cancel{x}} = \frac{1}{2}\int \frac{3}{t}\cdot dt = \cancel{\frac{1}{2}\,3x}$

$t = x^2+1$

$dt = 2x\,dx$

$\frac{dt}{2x} = dx$

$\frac{1}{2} - 3x\cdot\ln|t| = \underline{\frac{1}{2} - 3x\cdot\ln|x^2+1|}$

c) $\int e^x(x+5)\,dx = \left|\begin{matrix} u' = e^x & v = x+5 \\ u = e^x & v' = 1 \end{matrix}\right|$ m.p.p.

$= e^x\cdot(x+5) - \int e^x\cdot 1\,dx = e^x(x+5) - e^x + C$

$= e^x x + 5e^x - e^x + C = \underline{e^x x + 4e^x + C}$

$\int_1^2 \frac{1-\sqrt{x}}{2x}\,dx = \int_1^2 \frac{1-x^{\frac{1}{2}}}{2x}\,dx = \int_1^2$

$t = x$

$dt = 1\,dx$

$\boxed{dx = dt}$

$\int_1^2 [(2x)^{-1}\cdot(1-x^{\frac{1}{2}})] =$

$= \int_1^2 [2x^{-1} - 2x^{-1}\cdot x^{\frac{1}{2}}] = \int_1^2 [2x^{-1} - 2x^{-\frac{1}{2}}]$

$= [2t^{-1} - 2t^{-\frac{1}{2}}]_1^2$ zintegrovat dosadit 2 a 1

$\exists$ dělit 0 nejde

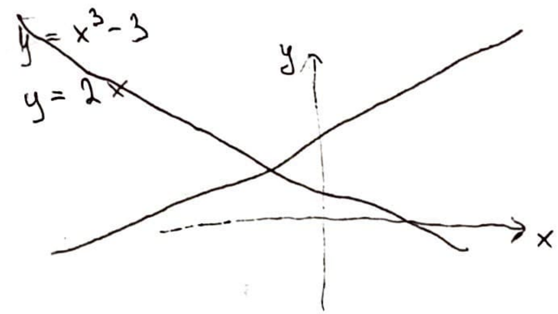
$\int_1^2 \frac{1x - \frac{x^{\frac{3}{2}}}{\frac{3}{2}}}{2\frac{x^2}{2}} = \frac{2-\frac{2}{3}\sqrt{2^3}}{2\frac{4}{2}} - \frac{1-\frac{2}{3}\sqrt{1^3}}{2\frac{1}{2}}$

$\frac{6}{3}-\frac{2}{3}\;\frac{4}{3}$ $\quad$ $\frac{1}{3}$

$= \frac{2-\frac{2}{3}\sqrt{8}}{4} - \frac{1-\frac{2}{3}}{1} = \frac{\frac{4}{3}\sqrt{8}}{4} - \frac{\frac{1}{3}}{1}$

$= \frac{\frac{4\cdot 2}{3}\sqrt{2}}{4} - \frac{1}{3} = \frac{8\cdot\sqrt{2}}{12} - \frac{1}{3} = \frac{8\sqrt{2}}{12} - \frac{4}{12}$

$= \underline{\frac{8\sqrt{2}-4}{12}}$



(3) Integrální počet

① a) $\int_1^2 \frac{1-\sqrt{x}}{2x}\,dx = \int_1^2 \frac{1-x^{\frac{1}{2}}}{2x}\,dx = \left| \begin{array}{l} 1-x^{\frac{1}{2}} = t \\ t' = dt \\ dt = \frac{1}{2}x^{-\frac{1}{2}}\,dx \\ \frac{1}{2}\frac{1}{\sqrt{x}} \end{array} \right| = \int_{1-\sqrt{2}} \frac{t}{2x}\,\frac{\cancel{2}dt\,\sqrt{x}}{1} = \int_{1-\sqrt{2}}^{0} \frac{t\sqrt{x}}{x}\,dt =$

$dx = \frac{dt}{\frac{1}{2\sqrt{x}}}$

x	1	2
t	0	$1-\sqrt{2}$

(DOLE)

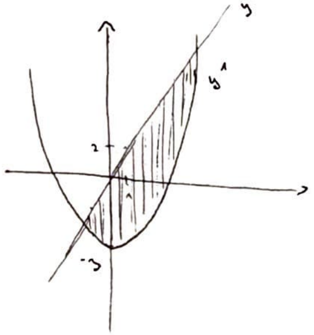
INTEGRACE $[\ldots x \ldots]_{1-\sqrt{2}}^{0} \ldots (0-(1-\sqrt{2}))\ldots$

b) $\int \frac{3x}{x^2+1}\,dx = \left| \begin{array}{l} t = x^2+1 \\ dt = 2x\,dx \\ dx = \frac{dt}{2x} \end{array} \right| = \int \frac{3x}{t}\cdot\frac{dt}{2x} = \frac{3}{2}\int \frac{1}{t}\,dt = \frac{3}{2}\ln t = \underline{\frac{3}{2}\ln|x^2+1|}$

c) $\int e^x\cdot(x+5)\,dx = \left| \begin{array}{ll} u' = e^x & v = x+5 \\ u = e^x & v' = 1 \end{array} \right| = e^x(x+5) - \int e^x\,dx = e^x(x+5) - e^x = xe^x + 5e^x - e^x =$

$= \underline{xe^x + 4e^x = e^x(x+4)}$

② $y = x^2-3,\ y = 2x$



$S = \int 2x - (x^2-3)\,dx = \int 2x - x^2 + 3\,dx = \int 2x\,dx - \int x^2\,dx + c$

$= \frac{\cancel{2}x^2}{\cancel{2}} - \frac{x^3}{3} + c = \frac{3x^2}{3} - \frac{x^3}{3} + c = \frac{3x^2-x^3}{3} + c =$

$= \underline{\frac{x^2(3-x)}{3} + c}$

1 a)

$= \int_1^2 \frac{1}{2x} - \frac{\sqrt{x}}{2x}\,dx = \int_1^2 \frac{1}{2x} - \int_1^2 \frac{1}{2\sqrt{x}}\,dx = [\ln 2x]_1^2 - [\ln 2\sqrt{x}]_1^2 =$

$= (\ln 4 - \cancel{\ln 2}) - (\ln 2\sqrt{2} - \cancel{\ln 2}) = \underline{\ln 4 - \ln 2\sqrt{2}}$

(1') (4)

(1) $\int_1^2 \frac{1-\sqrt{x}}{2x}\,dx = \frac{1}{2}\int_1^2 \frac{1-x^{1/2}}{x} = \frac{1}{2}\left(\int_1^2 \frac{1}{x}\,dx - \int_1^2 \frac{\cancel{x}^{1/2}}{x^{1/2}}\,dx\right) =$

$= \frac{1}{2}\left(\left[\frac{1}{1} - \frac{1}{4}\right]_1^2 - \left[\frac{2^{3/2}}{2^{3/2}} - \frac{1}{2\cdot 2^{1/2}}\right]_1^2\right) = \frac{1}{2}\left(1 - \frac{1}{2} + 1 + \frac{1}{2^{3/2}}\right)$

~~$= -\frac{1}{4} - \frac{1}{2}\cdot\frac{1}{2^{3/2}} - \frac{1}{4} \quad \frac{1}{2^{5/2}}$~~ $= -\frac{1}{2^2} - \frac{1}{2^{5/2}}$

b) $\int \frac{3x}{x^2+1}\,dx = \underline{\ln|x^2+1| + C}$

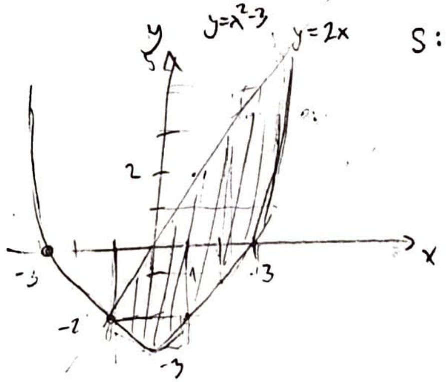
$(x^2+1)' = 3x$

c) $\int e^x\cdot(x+5)\,dx = \left| \begin{array}{l} t = x+5 \\ dt = dx \end{array} \right| = \int e^{t-5}\cdot t\,dt = \left| \begin{array}{ll} u' = e^{t-5} & v = t \\ u = e^{t-5} & v' = 1 \end{array} \right| =$

$x = t-5$

$= te^{t-5} - \int e^{t-5}\,dt = te^{t-5} - e^{t-5} + C = \underline{(x+5)e^x - e^x + C}$

② $y = x^2-3 \qquad y = 2x$



např. $(x^2-2x-3) = -(x+1)(x-3)$

$S: \int_{-2}^{5} (2x-(x^2-3))\,dx = \int_{-2}^{5} (2x - x^2 + 3)\,dx =$

$= -\left[(-2+1)(-2-3) - (5+1)(5-3)\right]_{-2}^{5} =$

$= \underline{-7\,j^2}$

6

a) $\int_1^2 \frac{x\sqrt[4]{x}}{2\sqrt{x}}\,dx = \int_1^2 \frac{x^{\frac44+\frac14-\frac24}}{2}dx = \frac12\int_1^2 x^{\frac34}dx = \frac{1}{2}\left[\frac{4x^{\frac74}}{7}\right]_1^2 =$

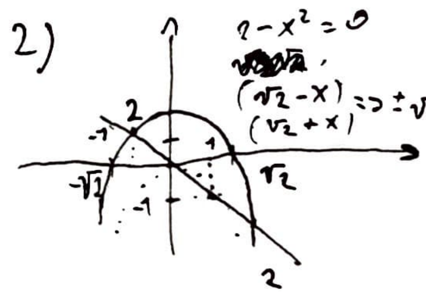
$\frac12\cdot\frac{4\cdot 2^{\frac74}}{7} - \frac12 4\cdot\frac{1^{\frac74}}{7} = \frac27\cdot 2^{\frac74} - \frac27\cdot 1^{\frac74}$

b) $\int \frac{x}{x^2+1}\,dx = \frac12\int\frac{2x}{x^2+1}dx = \frac12 \ln|x^2+1| + C$

c) $\int 5x\cos x\,dx = 5\begin{vmatrix} u' = \cos x & v = x \\ u = \sin x & v' = 1\end{vmatrix} =$

$5(\sin x\cdot x - \int \sin x\,dx) = 5(\sin x\cdot x + \cos x) + C$

2)



$2-x^2=0$

$(\sqrt2-x)$ $(\sqrt2+x)$ $\Rightarrow \pm\sqrt2$

$S = \int_{-1}^{2}[2-x^2-(-x)]\,dx$

$S = \int_{-1}^{2}(2-x^2+x)\,dx$

$S = \left[2x - \frac{x^3}{3} + \frac{x^2}{2}\right]_{-1}^{2}$

$S = 2\cdot2 - \frac83 + \frac42 - (-2 + \frac13 - \frac12)$

$S = 4 - \frac83 + \frac42 + 2 - \frac13 + \frac12$

$S = 8 - 3 + \frac12 = 5{,}5\ j^2$

$y_1 = y_2$

$2 - x^2 = -x$ $\quad +x^2 - 2$

$-x^2 + x + 2 = 0$

$(x+2)(x-1) = 0$

$-2 \quad 1$

$x^2 - x - 2 = 0$

$(x-2)(x+1)$

$2 \quad -1$

5

1. a) $\int_1^2 \frac{1}{2x} - \frac{\sqrt{x}}{2x}\,dx = \int_1 \frac{1}{2x} - \frac{x^{\frac12}}{2x^{\frac12}}$

$\frac12\int_1^2 \frac{1-\sqrt{x}}{x}dx = \frac12\int_1^2 \frac1x - \frac{1}{x^{\frac12}}dx = \frac12\,[\ln|x| -$

$\frac{dx}{x} = \ln|x|$

b) $\int \frac{3x}{x^2+1}dx = \begin{vmatrix} t = x^2+1 \\ dt = 2x\,dx \\ dx = \frac{dt}{2x}\end{vmatrix} = \int \frac{3x}{t}\cdot\frac{dt}{2x} = \int \frac32\cdot\frac{dt}{t} = \frac32 \ln|x^2+1| + C$

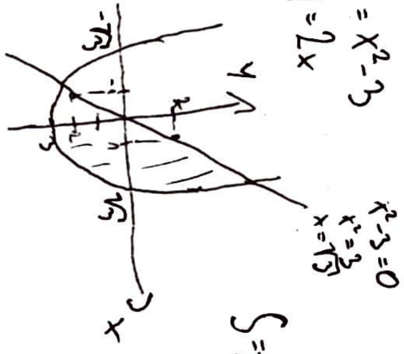
c) $\int e^x\cdot(x+5)\,dx = \begin{vmatrix} u' = e^x & v = x+5 \\ u = e^x & v' = 1\end{vmatrix} = 1\cdot e^x - \int e^x(x+5)\,dx =$

cyklický integrál

$e^x - \int e^x\cdot 1\,dx = e^x - e^x = 1 - 1;$ $+C$

2. $y = x^2 - 3$
$y = 2x$

$x^2 - 3 = 0$
$x^2 = 3$
$x = \sqrt3$



$S = \pi\int_a^b f_{(x)}^2 - \int_a^b f_{(g)}^2$

$S = \pi\int_a^b (x^2-3)^2 - \int (2x)^2 = \left[\frac{(x^2-3)^3}{3}\right]_0^{\sqrt3} - \left[\frac{(2x)^3}{3}\right]$

1.) a) $\int_1^2 \frac{x\sqrt[4]{x}}{2\sqrt{x}}\,dx = \frac{1}{2}\int_1^2 \frac{x^{\frac{5}{4}}}{x^{\frac{1}{2}}} =$

$= \frac{1}{2}\int_1^2 x^{\frac{3}{4}} = \frac{1}{2}\left[\frac{x^{\frac{7}{4}}}{\frac{7}{4}}\right]_1^2 = 2^{\frac{7}{4}}\cdot\frac{2}{7} - 1^{\frac{7}{4}}\cdot\frac{2}{7}$

b) $\int \frac{x}{x^2+1}\,dx = \left| \begin{matrix} t = x^2+1 \\ dt = 2\,dx \\ dx = \frac{dt}{2} \end{matrix} \right| = \int \frac{x}{t}\cdot\frac{dt}{2} =$

$= \frac{1}{2}\int x\cdot dt = \frac{1}{2}\cdot\frac{x^2}{2} + C = \frac{x^2}{4} + C$

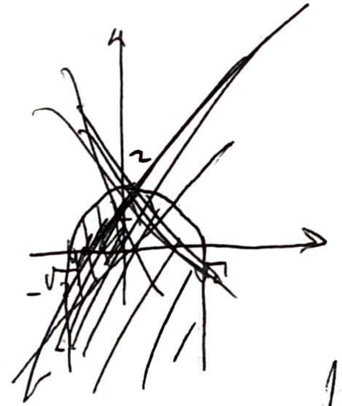
c) $\int 5x\cdot\cos x\,dx = \left| \begin{matrix} u = 5x & u' = 5 \\ v' = \cos x & v = \sin x \end{matrix} \right| = 5\cos x - \int 5\cdot\sin x\,dx =$

$= 5\cos x - 5\int \sin x\,dx = 5\cos x + 5\cos x + C = 10\cos x + C$

b) $\int \frac{x}{x^2+1}\,dx = \left| \begin{matrix} t = x^2+1 \\ dt = 2\,dx \end{matrix} \right| = \int \frac{x}{t}\cdot\frac{dt}{2} =$

$= \frac{1}{2}\int x\cdot t^{-1}\cdot dt = \frac{1}{2}\frac{x^2}{2} + C = \frac{x^2}{4} + C$

2.)

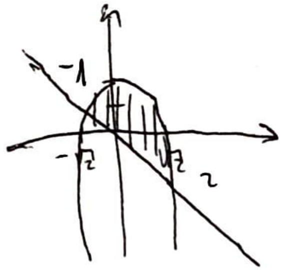


$y = x^2 - 2$

$(x-\sqrt{2})\ (x+\sqrt{2})$

$\sqrt{2}$ $-\sqrt{2}$

Průsečíky: $x_1 = -1$, $x_2 = 2$



$S = \int_{-1}^{2} (2 - x^2)\,dx =$

$= \int_{-1}^{2} 2\,dx - \int_{-1}^{2} x^2\,dx =$

$= [2x]_{-1}^{2} - \left[\frac{x^3}{3}\right]_{-1}^{2} =$

$= [4+2] - \left[\frac{8}{3} + \frac{1}{3}\right] =$

$= 6 - \frac{9}{3} = 3$