

1. cvičení - výsledky

Příklad 1.

(a)

$$F(x) = \begin{cases} -\frac{1}{2}x^2 + c, & x < 0 \\ c, & x = 0 \\ \frac{1}{2}x^2 + c, & x > 0. \end{cases}$$

(b)

$$F(x) = \begin{cases} -x^2 + c, & x < -1 \\ -1 + c, & x = -1 \\ 2x + 1 + c, & -1 < x < 1 \\ 3 + c, & x = 1 \\ x^2 + 2 + c, & x > 1. \end{cases}$$

(c)

$$F(x) = \begin{cases} \frac{1}{3}x^3 - \frac{2}{3} + c, & x < -1 \\ -1 + c, & x = -1 \\ x + c, & -1 < x < 1 \\ 1 + c, & x = 1 \\ \frac{1}{3}x^3 + \frac{2}{3} + c, & x > 1. \end{cases}$$

(d)

$$F(x) = \begin{cases} e^x + c, & x < 0 \\ 1 + c, & x = 0 \\ -e^{-x} + 2 + c, & x > 0. \end{cases}$$

(e)

$$F(x) = \begin{cases} -\cos x + c, & x \in [0, \pi) \\ (-1)^{k-1} \cos x + 2k + c, & x \in [k\pi, (k+1)\pi), k \in \mathbb{N} \\ (-1)^{-k-1} \cos x - 2k + c, & x \in [(-k)\pi, (-k+1)\pi), k \in \mathbb{N} \end{cases}$$

(f)

$$F(x) = \begin{cases} \frac{1}{\sqrt{2}} \arctan(\sqrt{2} \tan x) + c + k \frac{\pi}{\sqrt{2}}, & x \in \left(-\frac{\pi}{2} + k\pi, \frac{\pi}{2} + k\pi\right) \\ c + (1 + 2k) \frac{\pi}{2\sqrt{2}}, & x = \frac{\pi}{2} + k\pi. \end{cases}$$

(g)

$$F(x) = \begin{cases} \sqrt{2} \arctan \frac{\tan \frac{x}{2} + 1}{\sqrt{2}} + c + k\pi\sqrt{2}, & x \in (-\pi + 2k\pi, \pi + 2k\pi) \\ c + k\pi\sqrt{2} + \frac{\pi}{2}\sqrt{2}, & x = \pi + 2k\pi. \end{cases}$$

(h)

$$F(x) = \begin{cases} \frac{1}{\sqrt{3}} \arctan \frac{\tan x + 1}{\sqrt{3}} + c + k \frac{\pi}{\sqrt{3}}, & x \in \left(-\frac{\pi}{2} + k\pi, \frac{\pi}{2} + k\pi\right) \\ \frac{\pi}{2\sqrt{3}} + c + k \frac{\pi}{\sqrt{3}}, & x = \frac{\pi}{2} + k\pi. \end{cases}$$

(i)

$$F(x) = \begin{cases} \frac{1}{\sqrt{2}} \arctan \frac{\tan x + 2}{\sqrt{2}} + c + k \frac{\pi}{\sqrt{2}}, & x \in \left(-\frac{\pi}{2} + k\pi, \frac{\pi}{2} + k\pi\right) \\ \frac{\pi}{2\sqrt{2}} + c + k \frac{\pi}{\sqrt{2}}, & x = \frac{\pi}{2} + k\pi. \end{cases}$$

Příklad 2.

(a) 550.

(i) $20\sqrt{2}$.

(b) $\frac{5}{2}$.

(j) $\frac{29}{270}$.

(c) 2π .

(k) $\frac{\pi}{2\sqrt{6}}$.

(d) $2 - \frac{2}{e}$.

(l) $\frac{2\pi}{\sqrt{3}} - \frac{\pi}{\sqrt{2}}$.

(e) $\frac{\pi}{12}(3 + 2\pi^2)$.

(m) $2\sqrt{2}\pi$.

(f) $\frac{2}{3}\pi - \frac{\sqrt{3}}{2}$.

(g) $\frac{1}{2} + \frac{1}{2}e^{\frac{\pi}{2}}$.

(n) 0.

(h) $\frac{3}{4} - \frac{\log 2}{2}$.

(o) $-\frac{1}{2} \log 3$.

Příklad 3.

(a) $\frac{1}{2} \log |\cos x + 1| - \frac{1}{2} \log |\cos x + 2| + \frac{1}{6} \log |\cos x + 3| - \frac{1}{6} \log |\cos x|$.

(b) $\frac{2}{\sqrt{3}} \arctan \left(\frac{2 \tan \frac{x}{2} + 1}{\sqrt{3}} \right)$.

(c) $\log \left| \sqrt{\frac{x+1}{x+4}} + 1 \right| + \frac{1}{2} \log \left| 2\sqrt{\frac{x+1}{x+4}} - 1 \right| - \frac{1}{2} \log \left| 2\sqrt{\frac{x+1}{x+4}} + 1 \right| - \log \left| \sqrt{\frac{x+1}{x+4}} - 1 \right|$.

(d) $\frac{e^{3x}}{78} (6 \sin(2x) + 9 \cos(2x) + 13)$.

(e) $\frac{1}{\sqrt{5}} \arctan \left(\frac{3 \tan \frac{x}{2} + 1}{2\sqrt{5}} \right) - \frac{1}{5} (3 \log |\sin x + 2 \cos x + 5| + x)$ na $(-\pi, \pi)$.

(f) $\frac{\log x((x-2)\log x - 4) - 4}{2x}$.

(g) $-4 \log |\tan x + 1| - \frac{8}{\tan x + 1} + \frac{4}{(\tan x + 1)^2} - \frac{4}{3(\tan x + 1)^3} + \tan x$.

(h) $\frac{1}{16} (\log(\sqrt{x} + 2)) + 2 \arctan \frac{\sqrt{x}}{2} - \log |\sqrt{x} - 2|$.

(i) $\log |\log x - 1| - \frac{1}{2} (\log(\log^2 x + \log x + 1)) + \frac{1}{\sqrt{3}} \arctan \left(\frac{2 \log x + 1}{\sqrt{3}} \right) + \log x$.

(j) $\log |e^x - 3| - \frac{2}{\sqrt{7}} \arctan \frac{2e^x - 1}{\sqrt{7}} + \log(e^x + 1)$.

(k) $\frac{4}{3} \log \left| x^{\frac{3}{4}} + 3\sqrt[4]{x} - 4 \right|$.

- (l) $\frac{2}{\sqrt{3}} \arctan \frac{\tan \frac{x}{2}}{\sqrt{3}} - \frac{1}{\sqrt{2}} \arctan \frac{\tan \frac{x}{2}}{\sqrt{2}}.$
- (m) $\frac{1}{4} \log \left(1 + \frac{2}{\log^2 2} \right).$
- (n) $\frac{\pi}{3} \left(\frac{1}{\sqrt{2}} + \frac{2}{\sqrt{3}} \right).$
- (o) $-\frac{14}{3} + \frac{3}{2}\pi + \log 2.$
- (p) $\frac{2\pi}{\sqrt{3}}.$