

8. cvičení - výsledky

Příklad 1.

- (a) $x, x \in \mathbb{R}$.
 (b) $\frac{5}{8}x^8 - \frac{9}{x}, x \in \mathbb{R} \setminus \{0\}$.
 (c) $\frac{2}{3}\sqrt{x^3} + \frac{1}{2}e^{2x}, x > 0$.
 (d) $-\frac{2}{3}\cos 3x - e^{-x} + 4x, x \in \mathbb{R}$.
 (e) $\frac{5}{6}x^{\frac{6}{5}} + \frac{1}{x^2}, x \in (-\infty, 0) \cup (0, +\infty)$.
 (f) $\frac{1}{3}x^3 + x^2 + x + 2\sin \frac{x}{2} + 7\log|x|, x \in \mathbb{R} \setminus \{0\}$.
 (g) $\frac{1}{5}x^5 - 2x^4 + 8x^3 - 16x^2 + 16x - \frac{32}{5} + \operatorname{arccotan} x, x \in \mathbb{R}$.
 (h) $\frac{1}{7}x^{\frac{7}{2}} + \frac{4}{3}x^{\frac{3}{2}} + x^{\frac{1}{2}}, x > 0$.
 (i) $\arcsin x, x \in (-1, 1)$.

Příklad 2.

- (a) $-2(x+1)e^{-x}, x \in \mathbb{R}$.
 (b) $\sin x - x \cos x, x \in \mathbb{R}$.
 (c) $(x^3 - \frac{2}{3}x^2 + \frac{4}{9}x + \frac{5}{27})e^{3x}, x \in \mathbb{R}$.
 (d) $\frac{1}{2}(\sin x + \cos x)e^x, x \in \mathbb{R}$.
 (e) $\frac{1}{2}(1+x^2)\arctan x - \frac{1}{2}x, x \in \mathbb{R}$.
 (f) $\frac{1}{3}x^3 \log x - \frac{1}{9}x^3, x > 0$.
 (g) $\frac{2}{3}x^{\frac{3}{2}} \log^2 x - \frac{8}{9}x^{\frac{3}{2}} \log x + \frac{16}{27}x^{\frac{3}{2}}, x > 0$.
 (h) $x \log^2 x, x > 0$.
 (i) $\frac{1}{2}x \sin(\log 2x) - \frac{1}{2}x \cos(\log 2x), x > 0$.

Příklad 3.

- (a) $\frac{1}{21}(3x-2)^7, x \in \mathbb{R}$.
 (b) $-\frac{1}{2}\cos(2x+1), x \in \mathbb{R}$.
 (c) $\arctan(x+1), x \in \mathbb{R}$.
 (d) $-\frac{1}{2(x^2+1)}, x \in \mathbb{R}$.
 (e) $-\frac{1}{\sqrt{3}}\arcsin \frac{\sqrt{3}}{2\sqrt{2}}x, -2\sqrt{\frac{2}{3}} < x < 2\sqrt{\frac{2}{3}}$.
 (f) $-\frac{3}{2}e^{-x^2}, x \in \mathbb{R}$.
 (g) $-\frac{1}{2\arctan^2 x}, x \in (-\infty, 0) \cup (0, +\infty)$.
 (h) $2\sqrt{x-1} - 2\log(\sqrt{x-1}+1), x > 1$.
 (i) $\frac{1}{4\cos^4 x} - \frac{1}{\cos^2 x} - \log|\cos x|,$
 $x \in \bigcup_{k \in \mathbb{Z}} (-\frac{\pi}{2} + k\pi, \frac{\pi}{2} + k\pi)$.

Příklad 4.

- (a) $\frac{1}{6}\sqrt{(4x-1)^3}, x > \frac{1}{4}$.
 (b) $\frac{1}{2}\log|2x+1|, x \in (-\infty, -\frac{1}{2}) \cup (\frac{1}{2}, +\infty)$.
 (c) $-\frac{2}{7}\sqrt{1-7x}, x < \frac{1}{7}$.
 (d) $\log(\sin x), x \in \bigcup_{k \in \mathbb{Z}} (k\pi, \pi + k\pi)$.
 (e) $-\frac{1}{5}\cos^5 x, x \in \mathbb{R}$.
 (f) $\log(3+e^x), x \in \mathbb{R}$.
 (g) $-\log(2+\cos x), x \in \mathbb{R}$.
 (h) $\frac{5}{8}\sin x + \frac{5}{48}\sin 3x + \frac{1}{80}\sin 5x, x \in \mathbb{R}$.
 (i) $\frac{1}{2\sqrt{2}}\arctan \frac{x^2}{\sqrt{2}}, x \in \mathbb{R}$.
 (j) $\frac{e^{2x}+1}{2}\arctan e^x - \frac{1}{2}e^x, x \in \mathbb{R}$.
 (k) $-\frac{1}{9}\cos^9 x + \frac{2}{7}\cos^7 x - \frac{1}{5}\cos^5 x, x \in \mathbb{R}$.
 (l) $-3\log(2-\cos x) - 2\cos x - \frac{1}{2}\cos^2 x, x \in \mathbb{R}$.
 (m) $-\frac{2}{3}\sqrt{\left(\frac{1+x}{x}\right)^3}, x \in (-\infty, -1) \cup (0, +\infty)$.
 (n) $\log \frac{x}{(1+\sqrt[10]{x})^{10}} + \frac{10}{\sqrt[10]{x}} - \frac{5}{\sqrt[5]{x}} + \frac{10}{3\sqrt[10]{x^3}} - \frac{5}{2\sqrt[5]{x^2}}, x > 0$.
 (o) $\frac{3}{10}(x-4)(x+1)^{\frac{2}{3}}, x \in (-\infty, -1) \cup (-1, +\infty)$.

Příklad 5.

- (a) $\frac{1}{5} \cos \frac{1}{x^5}$.
(b) $\frac{1}{4} x^4 \log 2x - \frac{1}{16} x^4$.
(c) $\frac{4}{7} x^{\frac{7}{4}} + 4x^{-\frac{1}{4}}$.
(d) $\left(-\frac{1}{2} x^4 - x^2 - 1\right) e^{-x^2}$.
(e) $2 \arctan \sqrt{x}$.
(f) $\frac{1}{2} e^{2x} - e^x + x - \log(e^x + 1)$.
(g) $x \arcsin x + \sqrt{1 - x^2}$.
(h) $-x + \tan x$.
(i) $x^3 \sin x - 3x^2 \cos x - 6x \sin x + 6 \cos x$.
(j) $\frac{1}{\sqrt{10}} \arctan \sqrt{\frac{2}{5}} x$.
(k) $2\sqrt{\sin x}$.
(l) $\frac{x^3}{3} \arccos x + \frac{1}{3} \sqrt{1 - x^2} - \frac{1}{9} (1 - x^2)^{\frac{3}{2}}$.
(m) $\sqrt{1 + e^{2x}} + \frac{1}{2} \log \frac{\sqrt{1 + e^{2x}} - 1}{\sqrt{1 + e^{2x}} + 1}$.
(n) $-\frac{5}{12} (1 - 2x)^{\frac{6}{5}}$.
(o) $\frac{1}{\sqrt{3}} \arcsin \sqrt{\frac{3}{2}} x$.
(p) $\frac{1}{4} \arcsin^4 x$.
(q) $\frac{2}{3} (1 + \log x)^{\frac{3}{2}} - 2\sqrt{1 + \log x}$.
(r) $\frac{9}{2} (x^2 - 3)^{\frac{2}{3}} - 18 \sqrt[3]{x^2 - 3} + 36 \log(\sqrt[3]{x^2 - 3} + 2)$.
(s) $x \arcsin^2 x + 2\sqrt{1 - x^2} \arcsin x - 2x$.
(t) $\frac{1}{5} (x + 2) \sqrt[3]{(3x + 1)^2}$.
(u) $2 \log(\sqrt{x + 1} - \sqrt{x - 1}) - 2 \arctan \sqrt{\frac{x+1}{x-1}}$.
(v) $2\sqrt{x} - 6\sqrt[3]{x} + 12\sqrt[6]{x} - 6 \log(1 + \sqrt[6]{x})$.
(w) $\log(1 + \sin x)$.
(x) $\frac{1}{36 \sqrt[5]{5}} (x^5 + 1)^{\frac{4}{5}} (4x^5 - 5)$.