# 8. cvičení - výsledky

**Příklad 1.**

(a) $\mathcal{D}_f = [0,\infty)$; $f'(x) = \frac{\sqrt{3}}{2\sqrt{x}} - 51x^2 + 5x^4$; $\mathcal{D}_{f'} = (0,\infty)$

(b) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = e^x(1+x^2)$; $\mathcal{D}_{f'} = \mathbb{R}$

(c) $\mathcal{D}_f = [0,\infty)$; $f'(x) = 1 + \frac{1}{4x^{3/4}} + \frac{1}{\sqrt{x}}$; $\mathcal{D}_{f'} = (0,\infty)$

(d) $\mathcal{D}_f = (0,\infty)$; $f'(x) = \log(x) + 1 + \log_3(x) + \frac{1}{\log(3)} + 2e^x$; $\mathcal{D}_{f'} = (0,\infty)$

(e) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = \log(\frac{3}{2})(\frac{3}{2})^x$; $\mathcal{D}_{f'} = \mathbb{R}$

(f) $\mathcal{D}_f = \mathbb{R}\setminus\{0\}$; $f'(x) = \frac{9-4x-x^2}{x^4}$; $\mathcal{D}_{f'} = \mathbb{R}\setminus\{0\}$

(g) $\mathcal{D}_f = \mathbb{R}\setminus\{-6,1\}$; $f'(x) = \frac{-23-26x+7x^2}{(x-1)^2(6+x)^2)}$; $\mathcal{D}_{f'} = \mathbb{R}\setminus\{-6,1\}$

(h) $\mathcal{D}_f = (0,\infty)$; $f'(x) = \frac{1}{x} - \frac{\sin x}{\pi}$; $\mathcal{D}_{f'} = (0,\infty)$

(i) $\mathcal{D}_f = (0,\infty)\setminus\{1\}$; $f'(x) = \frac{2+x\cos(x)(-1+\log(x))-x^2\log(x)\sin(x)}{x\log^2(x)}$; $\mathcal{D}_{f'} = (0,\infty)\setminus\{1\}$

(j) $\mathcal{D}_f = \mathbb{R}\setminus(\pi/2+\pi\mathbb{Z})$; $f'(x) = \frac{1}{\cos^2(x)} - \cos(x)$; $\mathcal{D}_{f'} = \mathcal{D}_f$

(k) $\mathcal{D}_f = \mathbb{R}\setminus(\pi/2+\pi\mathbb{Z})$; $f'(x) = \cos^2(x) - \sin^2(x) - \frac{1}{\cos^2(x)}$; $\mathcal{D}_{f'} = \mathcal{D}_f$

(l) $\mathcal{D}_f = [-1,1]$; $f'(x) = \frac{1}{\sqrt{1-x^2}} - \frac{3}{(1+x^2)}$; $\mathcal{D}_{f'} = (-1,1)$

(m) $\mathcal{D}_f = [-1,1]$; $f'(x) = -\frac{5}{\sqrt{1-x^2}} + \frac{2}{1+x^2}$; $\mathcal{D}_{f'} = (-1,1)$

**Příklad 2.**

(a) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = 78(x^2+50x+12)^{77}(2x+50)$; $\mathcal{D}_{f'} = \mathbb{R}$

(b) $\mathcal{D}_f = \mathbb{R}\setminus\{7\}$; $f'(x) = -\frac{3x^2(x+2)^7(31x+14)}{(x-7)^{-12}}$; $\mathcal{D}_{f'} = \mathbb{R}\setminus\{7\}$

(c) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = -\frac{1}{1+4x^2}\cdot 2$; $\mathcal{D}_{f'} = \mathbb{R}$

(d) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = \frac{3+4x-3x^2}{(1+x^2)^2}$; $\mathcal{D}_{f'} = \mathbb{R}$

(e) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = \frac{2x+1}{x^2+x+2}$; $\mathcal{D}_{f'} = \mathbb{R}$

(f) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = -\sin(x^3-x+2)^9 \cdot 9(x^3-x+2)^8\cdot(3x^2-1)$; $\mathcal{D}_{f'} = \mathbb{R}$

(g) $\mathcal{D}_f = [-2,2]$; $f'(x) = -\frac{x}{\sqrt{4-x^2}}$; $\mathcal{D}_{f'} = (-2,2)$

(h) $\mathcal{D}_f = (-3,3)$; $f'(x) = 9\cdot(9-x^2)^{-\frac{3}{2}}$; $\mathcal{D}_{f'} = (-3,3)$

(i) $\mathcal{D}_f = \mathbb{R}\setminus\{-1\}$; $f'(x) = \frac{x(1-x)^2\left(2-4x^2-4x\right)}{(1+x)^2}$; $\mathcal{D}_{f'} = \mathbb{R}\setminus\{-1\}$

(j) $\mathcal{D}_f = \mathbb{R} \setminus \{0\}$; $f'(x) = 2e^{-\frac{1}{x^2}} \frac{1}{x^3}$; $\mathcal{D}_{f'} = \mathbb{R} \setminus \{0\}$

(k) $\mathcal{D}_f = (0, \infty)$; $f'(x) = x^x \cdot (\log x + 1)$; $\mathcal{D}_{f'} = (0, \infty)$

(l) $\mathcal{D}_f = (0, \infty)$; $f'(x) = \left(\frac{1}{x}\right)^{\frac{1}{x}} \cdot \left(\frac{-\log x}{x^2} + 1\right)$; $\mathcal{D}_{f'} = (0, \infty)$

(m) $\mathcal{D}_f = \bigcup_{k \in \mathbb{Z}} (2k\pi, \pi + 2k\pi)$; $f'(x) = e^{\cos x \cdot \log \sin x} \cdot \left(-\sin x \log \sin x + \frac{\cos^2 x}{\sin x}\right)$; $\mathcal{D}_{f'} = \bigcup_{k \in \mathbb{Z}} (2k\pi, \pi + 2k\pi)$

(n) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = \frac{-\sin x}{\sqrt{1 - \cos^2 x}}$; $\mathcal{D}_{f'} = \mathbb{R} \setminus \{k\pi, k \in \mathbb{Z}\}$

(o) $\mathcal{D}_f = [-1, 1)$; $f'(x) = \frac{1}{\arccos x} \cdot \frac{-1}{\sqrt{1 - x^2}}$; $\mathcal{D}_{f'} = (-1, 1)$

(p) $\mathcal{D}_f = \mathbb{R} \setminus \{0\}$; $f'(x) = \frac{1}{2 + x^2}$; $\mathcal{D}_{f'} = \mathbb{R} \setminus \{0\}$

(q) $\mathcal{D}_f = \mathbb{R}$; $f'(x) = e^{x^2 - x + 1} \cdot (2x + 1) - \sqrt{\frac{e^{2x} + 1}{e^{2x}}} \cdot \frac{e^{2x}}{(e^{2x} + 1)^2}$; $\mathcal{D}_{f'} = \mathbb{R}$

(r) $\mathcal{D}_f = (1, \infty)$; $f'(x) = \frac{x \log x}{(x^2 - 1)^{\frac{3}{2}}}$; $\mathcal{D}_{f'} = (1, \infty)$

(s) $\mathcal{D}_f = [-1, 1]$; $f'(x) = \left(\arcsin\left(x^3\right)\right)^2 + 2x \cdot \arcsin\left(x^3\right) \cdot \frac{3x^2}{\sqrt{1 - x^6}}$; $\mathcal{D}_{f'} = (-1, 1)$