

V úlohách 1.3.5 – 1.3.8 určte definičný obor daných funkcií.

1.3.5 a) $f_1: y = \frac{\sqrt{x+1}}{x-4}$ d) $f_4: y = \frac{\sqrt{2x+10}}{16-x^2}$

b) $f_2: y = \sqrt{\frac{-3}{x^2-5x+4}}$ e) $f_5: y = \frac{1}{\sqrt{x}} + \sqrt{x^2-5}$

c) $f_3: y = \frac{-3}{\sqrt{x^2-3x}}$ f) $f_6: y = \frac{\sqrt{15+2x-x^2}}{8-2x}$

1.3.6 a) $f_1: y = 4^{\log(2x^2-5x-3)}$ d) $f_4: y = \log x^2 + \log(4-x^2)$

b) $f_2: y = \ln \sqrt{\frac{3x-1}{x+4}}$ e) $f_5: y = \sqrt{1-\log(x^2+7x+10)}$

c) $f_3: y = \frac{-1}{\ln(2x-x^2)}$ f) $f_6: y = \frac{\sqrt{\ln(x-1)}}{x-2}$

1.3.7 a) $f_1: y = \arcsin \frac{2x+4}{x}$ d) $f_4: y = \frac{1}{x} + \arccos(x^2-1)$

b) $f_2: y = \operatorname{arccotg} \frac{x^2}{x^2-2}$ e) $f_5: y = \frac{x}{\operatorname{arctg}(12-4x)}$

c) $f_3: y = \arccos \frac{1}{x^2}$ f) $f_6: y = \sqrt{\arcsin(x-4)}$

1.3.8 a) $f_1: y = \log(1-2x) - 3 \arcsin \frac{3x-1}{2}$

b) $f_2: y = 5 \log \left(\frac{x+1}{x-5} \right) - \frac{\sqrt{5x-10}}{x^2-36}$

c) $f_3: y = \arccos(3+2x) + \sqrt{\frac{x-2}{x+3}}$

d) $f_4: y = \frac{\sqrt{x^2-5x+6}}{\ln(2x-5)} - \sqrt{5-x}$

e) $f_5: y = \frac{\sqrt{x^2-x-2}}{\ln x} - 4 \cdot \arcsin \frac{1-2x}{4}$

f) $f_6: y = \sqrt{\log \frac{5x-x^2}{4}} + \frac{1}{\log_2 x-2}$

g) $f_7: y = \arccos \frac{3}{2x-5} + \ln(6+11x-2x^2)$

h) $f_8: y = \frac{14-x}{\ln(x^2-4)} + \arccos(3x+7)$

1.3.5) a) $f_1: y = \frac{\sqrt{x+1}}{x-4}$; $D(f_1): x+1 \geq 0 \wedge x-4 \neq 0$
 $x \geq -1 \wedge x \neq 4 \Rightarrow D(f_1) = (-1; 4) \cup (4; \infty)$

b) $f_2: y = \sqrt{\frac{-3}{x^2-5x+4}}$; $D(f) = \frac{-3}{x^2-5x+4} \geq 0$
 $-3 < 0$ vtedy
 teda musí platit:
 $x^2-5x+4 < 0$
 $(x-4)(x-1) < 0$

$$x^2-5x+4 \neq 0 \quad | \quad D = 25-4 \cdot 4 = 9 \\ x_{1,2} = \frac{5 \pm 3}{2} = \begin{cases} 4 \\ 1 \end{cases} \\ (x-4)(x-1) \neq 0 \quad | \quad x \neq 4 \wedge x \neq 1$$

$ax^2+bx+c = a(x-x_1)(x-x_2)$
 $a, b, c \in \mathbb{R} \rightarrow$ číslo
 x_1, x_2 - kořeny rovnice

$$(x-4 < 0 \wedge x-1 > 0) \vee (x-4 > 0 \wedge x-1 < 0) \\ (x < 4 \wedge x > 1) \vee (x > 4 \wedge x < 1) \Rightarrow D(f) = (1; 4)$$

c) $f_3: y = \frac{-3}{\sqrt{x^2-3x}}$; $D(f): x^2-3x \geq 0 \wedge \sqrt{x^2-3x} \neq 0 /^2$
 $x \cdot (x-3) \geq 0 \wedge x^2-3x \neq 0 \Rightarrow x \cdot (x-3) > 0$

$$(x > 0 \wedge x-3 > 0) \vee (x < 0 \wedge x-3 < 0) \\ (x > 0 \wedge x > 3) \vee (x < 0 \wedge x < 3)$$



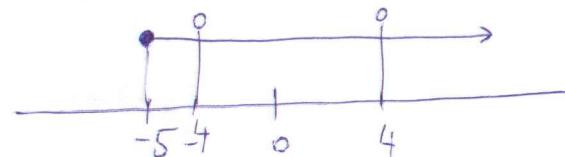
$D(f) = (3; \infty) \cup (-\infty; 0)$

①b

$$\textcircled{1.3.5} \quad \text{d)} \quad f_4: y = \frac{\sqrt{2x+10}}{16-x^2}$$

$$D(f): \begin{aligned} 2x+10 &\geq 0 \quad \wedge \quad 16-x^2 \neq 0 \\ 2x &\geq -10 \quad \wedge \quad (4+x)(4-x) \neq 0 \end{aligned}$$

$$\boxed{x \geq -5} \quad \wedge \quad \boxed{x \neq \pm 4}$$



$$\Rightarrow D(f) = \underline{(-5; -4) \cup (-4; 4) \cup (4; \infty)}$$

$$\textcircled{1.3.6} \quad \text{a)} \quad f_1: y = 4^{\log(2x^2-5x-3)}$$

$$D(f): 2x^2-5x-3 > 0$$

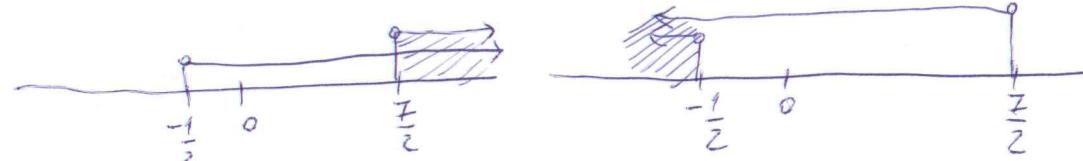
$$D = 25 + 4 \cdot 2 \cdot 3 = 49$$

$$x_{1,2} = \frac{5 \pm \sqrt{49}}{4} = \begin{cases} \frac{14}{4} = \frac{7}{2} \\ -\frac{8}{4} = -\frac{1}{2} \end{cases}$$

$$2 \cdot \left(x - \frac{7}{2}\right) \cdot \left(x + \frac{1}{2}\right) > 0$$

$$\left(x - \frac{7}{2} > 0 \wedge x + \frac{1}{2} > 0\right) \vee \left(x - \frac{7}{2} < 0 \wedge x + \frac{1}{2} < 0\right)$$

$$\left(x > \frac{7}{2} \wedge x > -\frac{1}{2}\right) \vee \left(x < \frac{7}{2} \wedge x < -\frac{1}{2}\right)$$



$$\Rightarrow D(f) = \underline{\left(\frac{7}{2}; \infty\right) \cup \left(-\infty; -\frac{1}{2}\right)}$$

13.5 e) $f_5: y = \frac{1}{\sqrt{x}} + \sqrt{x^2 - 5} \rightarrow x^2 - 5 \geq 0$ podľa výrovnácia $(a+b)(a-b) = a^2 - b^2$ možeme napišať:

$$\downarrow \\ x \geq 0 \wedge \sqrt{x} \neq 0$$

$$\boxed{x > 0}$$

$$(x+\sqrt{5})(x-\sqrt{5}) = x^2 - 5$$

$$\Rightarrow x^2 - 5 \geq 0 \Leftrightarrow_{\text{práve vtedy}} (x+\sqrt{5})(x-\sqrt{5}) \geq 0$$

$$(x+\sqrt{5} \geq 0 \wedge x-\sqrt{5} \geq 0) \vee (x+\sqrt{5} \leq 0 \wedge x-\sqrt{5} \leq 0)$$

$$(x \geq -\sqrt{5} \wedge x \geq \sqrt{5}) \vee (x \leq -\sqrt{5} \wedge x \leq \sqrt{5})$$



ale zároveň $\boxed{x > 0}$ a teda $\underline{\underline{D(f)}} = (\sqrt{5}, \infty)$

f) $f_6: y = \frac{\sqrt{15+2x-x^2}}{8-2x} \rightsquigarrow 15+2x-x^2 \geq 0 \wedge 8-2x \neq 0$

$$-x^2+2x+15 \geq 0$$

$$D = b^2 - 4ac$$

$$D = 4 - 4 \cdot 15 \cdot (-1)$$

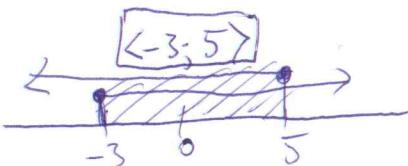
$$D = 64$$

$$x_{1,2} = \frac{-2 \pm \sqrt{64}}{2 \cdot (-1)}$$

$$8 \neq 2x$$

$$2x \neq 8 \quad | :2$$

$$\boxed{x \neq 4}$$



a teda $\underline{\underline{D(f)}} = (-\infty, -3) \cup (-3, 4) \cup (4, 5) \cup (5, \infty)$

$$x_{1,2} = \frac{-2 \pm 8}{-2} = \begin{cases} 5 \\ -3 \end{cases}$$

$$\begin{aligned} ax^2 + bx + c &= a(x-x_1)(x-x_2) \\ -x^2 + 2x + 15 &= -(x-5)(x+3) \geq 0 \quad | :(-1) \Rightarrow \text{záporným číslom sa} \\ (x-5)(x+3) &\leq 0 \quad \text{otáča nerovnosť} \\ (x-5 \leq 0 \wedge x+3 \geq 0) &\vee (x-5 \geq 0 \wedge x+3 \leq 0) \\ (x \leq 5 \wedge x \geq -3) &\vee (x \geq 5 \wedge x \leq -3) \end{aligned}$$

pri násobení a delení

záporným číslom sa otáča nerovnosť

1.3.6

$$b) f_2: y = \ln \sqrt{\frac{3x-1}{x+4}}$$

$$\ln x = \log_e x$$

Plati:

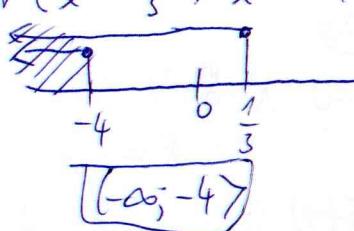
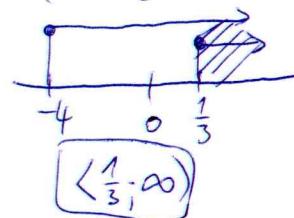
1. $\sqrt{f(x)} \Rightarrow f(x) \geq 0$
2. $\frac{1}{f(x)} \Rightarrow f(x) \neq 0$
3. $\log_a f(x) \Rightarrow f(x) > 0$

(2)

1. $\sqrt{\frac{3x-1}{x+4}} > 0 \rightsquigarrow$ pre každú hodnotu platí, že je ≥ 0
 Musíme teda vylúčiť iba prípad $\sqrt{\frac{3x-1}{x+4}} = 0 \Leftrightarrow \frac{3x-1}{x+4} = 0 \Leftrightarrow 3x-1=0 \Leftrightarrow 3x=1 \Leftrightarrow x=\frac{1}{3}$

2. $x+4 \neq 0$
 $x \neq -4$

3. $\frac{3x-1}{x+4} \geq 0 \Leftrightarrow (3x-1 \geq 0 \wedge x+4 \geq 0) \vee (3x-1 \leq 0 \wedge x+4 \leq 0)$
 $(x \geq \frac{1}{3} \wedge x \geq -4) \vee (x \leq \frac{1}{3} \wedge x \leq -4)$

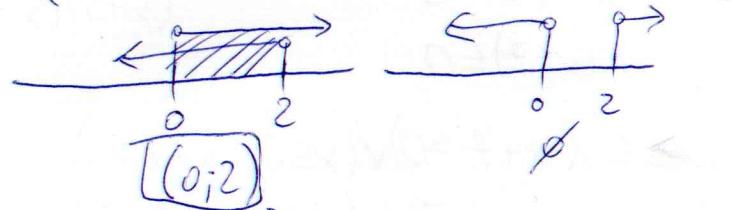
všetko dokopy: $x \neq \frac{1}{3}$ $x \neq -4$ $x \in (-\infty; -4) \cup \left(\frac{1}{3}; \infty\right)$

$$D(f) = (-\infty; -4) \cup \left(\frac{1}{3}; \infty\right)$$

103.6 c) $f_3: y = \frac{-1}{\ln(2x-x^2)}$ $\Rightarrow 2x-x^2 > 0 \wedge \ln(2x-x^2) \neq 0 \wedge x(2-x) > 0 \wedge 2x-x^2 \neq 1$ $\Rightarrow \boxed{\ln X = 0 \Leftrightarrow X = 1}$!

$$(x > 0 \wedge 2-x > 0) \vee (x < 0 \wedge 2-x < 0) \wedge (-x^2+2x-1 \neq 0) \wedge (-1)$$

$$(x > 0 \wedge x < 2) \vee (x < 0 \wedge x > 2) \wedge (x^2-2x+1 \neq 0)$$



$$D = 4 - 4 = 0$$

$$x_{1,2} = \frac{2 \pm 0}{2} = 1$$

$$x^2 - 2x + 1 = (x-1)(x-1) = (x-1)^2 \neq 0$$

$\boxed{x \neq 1}$

$$\underline{D(f) = (0; 1) \cup (1; 2)}$$

d) $f_4: y = \log x^2 + \log(4-x^2)$

$$x^2 > 0 \wedge 4-x^2 > 0$$

↓

platí vždy okrem

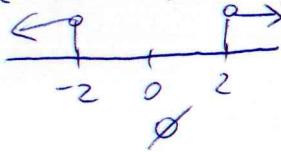
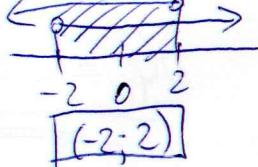
pripadu $\boxed{x \neq 0}$

(kdečé číslo umocnené
na 2. je kladné alebo 0)

$$(2-x)(2+x) > 0$$

$$(2-x > 0 \wedge 2+x > 0) \vee (2-x < 0 \wedge 2+x < 0)$$

$$(x < 2 \wedge x > -2) \vee (x > 2 \wedge x < -2)$$



$$\underline{D(f) = (-2; 0) \cup (0; 2)}$$

(1.3.6.) e) $f_5: y = \sqrt{1 - \log(x^2 + 7x + 10)}$

$$\Rightarrow 1 - \log(x^2 + 7x + 10) \geq 0 \quad \wedge \quad x^2 + 7x + 10 > 0$$

$$\log(x^2 + 7x + 10) \leq 1 \quad \wedge \quad D = 49 - 4 \cdot 10 = 9$$

$$x_{1,2} = \frac{-7 \pm 3}{2} = \begin{cases} -5 \\ -2 \end{cases}$$

! $\boxed{\log_a x = y \Leftrightarrow a^y = x}$!

$$\log x = \log_{10} x$$

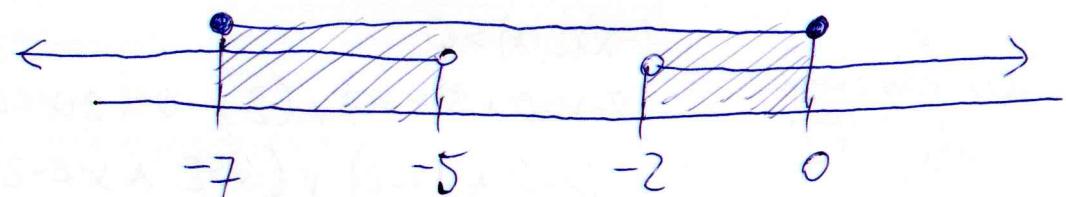
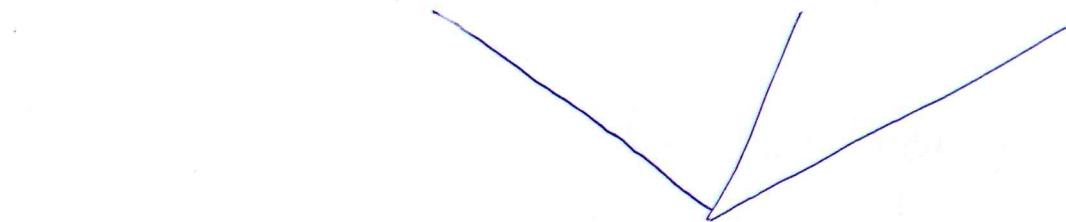
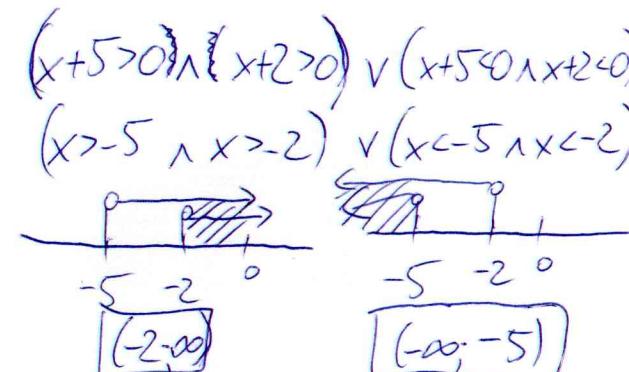
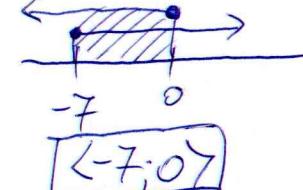
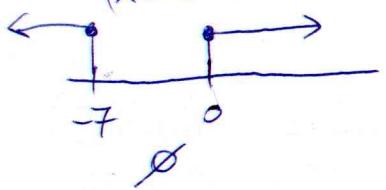
$$x^2 + 7x \leq 0$$

$$x(x+7) \leq 0$$

$$(x+5)(x+2) > 0$$

$$(x \geq 0 \wedge x+7 \leq 0) \vee (x \leq 0 \wedge x+7 \geq 0)$$

$$(x \geq 0 \wedge x \leq -7) \vee (x \leq 0 \wedge x \geq -7)$$



$$\underline{D(f) = (-7, -5) \cup (-2, 0)}$$

(4)

(5)

1.3.6 f)

$$f_6: y = \frac{\sqrt{\ln(x-1)}}{x-2} \Rightarrow \ln(x-1) \geq 0 \wedge x-1 > 0 \wedge x-2 \neq 0$$

$$\log_e(x-1) \geq 0 \wedge x > 1 \wedge x \neq 2$$

$$x-1 \geq e^0$$

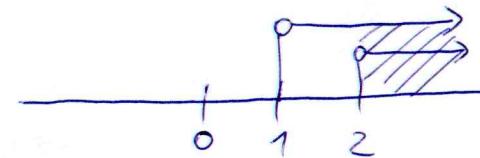
$$(1; \infty)$$

$$x-1 \geq 1$$

$$x \geq 2$$

$$(2; \infty)$$

! $x=1$
pre všetky x !



$$\underline{\underline{D(f) = (2; \infty)}}$$

1.3.7 a)

$$f_7: y = \arcsin \frac{2x+4}{x}$$

$$\boxed{x \neq 0}$$

~~$$\begin{aligned} -1 \leq \frac{2x+4}{x} \leq 1 \\ x \leq 2x+4 \leq x \end{aligned}$$~~

Dalsie podmienky pre Definičný obor (arcusy):

$$4. \arcsin X \Rightarrow X \in [-1; 1]$$

$$5. \arccos X \Rightarrow X \in [-1; 1]$$

$$\frac{2x+4}{x} \leq 1 / -1 \quad \wedge \quad \frac{2x+4}{x} \geq -1 / +1$$

$$\frac{2x+4}{x} - 1 \leq 0 \quad \wedge \quad \frac{2x+4}{x} + 1 \geq 0$$

$$\frac{2x+4}{x} - \frac{x}{x} \leq 0 \quad \wedge \quad \frac{2x+4}{x} + \frac{x}{x} \geq 0$$

$$\frac{2x+4-x}{x} \leq 0 \quad \wedge \quad \frac{2x+4+x}{x} \geq 0$$

$$\frac{x+4}{x} \leq 0 \quad \wedge \quad \frac{3x+4}{x} \geq 0$$

$$(x+4 \leq 0 \wedge x \geq 0) \vee (x+4 \geq 0 \wedge x \leq 0)$$

$$(x \leq -4 \wedge x \geq 0) \vee (x \geq -4 \wedge x \leq 0)$$

$$\begin{array}{c} \bullet \rightarrow \\ -4 \\ \emptyset \\ \bullet \leftarrow \end{array} \quad \begin{array}{c} \bullet \rightarrow \\ -4 \\ \bullet \leftarrow \\ -4 \end{array} \quad \begin{array}{c} \bullet \rightarrow \\ -4 \\ \bullet \leftarrow \\ -4 \end{array}$$

$$(3x+4 \geq 0 \wedge x \geq 0) \vee (3x+4 \leq 0 \wedge x \leq 0)$$

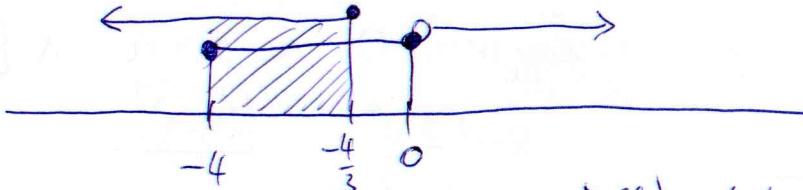
$$\left(x \geq -\frac{4}{3} \wedge x \geq 0 \right) \vee \left(x \leq -\frac{4}{3} \wedge x \leq 0 \right)$$

$$\begin{array}{c} \bullet \rightarrow \\ -\frac{4}{3} \\ \emptyset \\ \bullet \leftarrow \\ -\frac{4}{3} \end{array} \quad \begin{array}{c} \bullet \rightarrow \\ -\frac{4}{3} \\ \bullet \leftarrow \\ -\frac{4}{3} \end{array}$$

dohromady: $x \neq 0$

$$\langle -4; 0 \rangle$$

$$\langle 0; \infty \rangle \cup \left(-\infty; -\frac{4}{3}\right)$$



$$\underline{\underline{D(f) = \langle -4; -\frac{4}{3} \rangle}}$$

(13.7) b) $f_2: y = \operatorname{arccos} \frac{x^2}{x^2 - 2}$

chtátk! pre arctg a arccos neplatia
žiadne obmedzenia pre def. dom!

$$x^2 - 2 \neq 0$$

$$x^2 \neq 2 \Rightarrow x \neq \pm \sqrt{2} \Rightarrow \underline{\underline{D(f) = (-\infty; -\sqrt{2}) \cup (-\sqrt{2}; \sqrt{2}) \cup (\sqrt{2}, \infty)}}$$

c) $f_3: y = \arccos\left(\frac{1}{x^2}\right)$

$$x^2 \neq 0 \Leftrightarrow \boxed{x \neq 0}$$

$$\frac{1}{x^2} \leq 1 \quad \wedge \quad \frac{1}{x^2} \geq -1$$

$$\frac{1}{x^2} - 1 \leq 0 \quad \wedge \quad \frac{1}{x^2} + 1 \geq 0$$

$$\frac{1}{x^2} - \frac{x^2}{x^2} \leq 0 \quad \wedge \quad \frac{1}{x^2} + \frac{x^2}{x^2} \geq 0$$

$$\frac{1-x^2}{x^2} \leq 0 \quad \wedge \quad \frac{1+x^2}{x^2} \geq 0$$

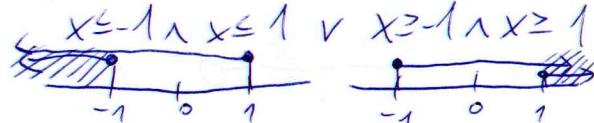
z prvej podmienky vieme, že $x \neq 0$
a tiež platí $x^2 \geq 0$ všetky (druhá mocnina nikdy nie je záporná)

$\frac{1+x^2}{x^2} \geq 0$ teda platí všetky, lebo $\frac{1+ \text{kladné č.}}{\text{kladné č.}}$ je vždy kladné

Dalej, $\frac{1-x^2}{x^2} \leq 0 \Leftrightarrow 1-x^2 \leq 0$ (lebo v menovateli je $x^2 \geq 0$)

podľa vzorca $a^2 - b^2 = (a+b)(a-b)$ platí: $1-x^2 \leq 0 \Leftrightarrow (1+x)(1-x) \leq 0$
 $(1+x \leq 0 \wedge 1-x \geq 0) \vee (1+x \geq 0 \wedge 1-x \leq 0)$

$$\underline{\underline{D(f) = (-\infty; -1) \cup (1; \infty)}}$$



(13.7) d)

$$f_4: y = \frac{1}{x} + \arccos(x^2 - 1)$$

$$\boxed{x \neq 0}$$

$$x^2 - 1 \leq 1$$

$$x^2 \leq 2$$

$$x^2 \geq 0$$

$$(x+1)(x-1) \leq 0$$

$$(x+\sqrt{2} \leq 0 \wedge x-\sqrt{2} \geq 0) \vee (x+\sqrt{2} \geq 0 \wedge x-\sqrt{2} \leq 0)$$

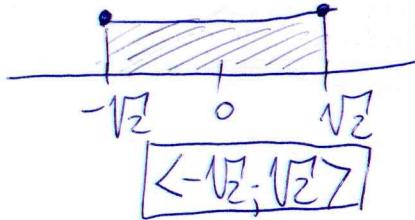
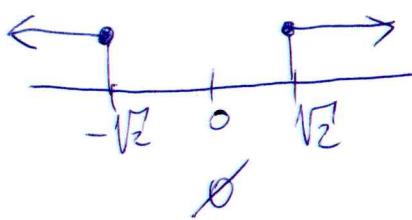
$$(x \leq -\sqrt{2} \wedge x \geq \sqrt{2}) \vee (x \geq -\sqrt{2} \wedge x \leq \sqrt{2})$$

\wedge

$$x^2 - 1 \geq -1 \Leftrightarrow$$

$$x^2 \geq 0 \rightarrow \text{platí vždy}$$

$$\Rightarrow \underline{D(f) = (-\sqrt{2}; 0) \cup (0; \sqrt{2})}$$



$$e) f_5: y = \frac{x}{\arctg(12-4x)}$$

$$\arctg(12-4x) \neq 0$$

$$12-4x \neq 0$$

$$\boxed{x \neq 3}$$

platí: $\arctg X = 0 \Leftrightarrow X = 0$

(dá sa najst v tabuľkach)

$$\underline{D(f) = (-\infty; 3) \cup (3; \infty)}$$

1.3.7

$$f_6: y = \sqrt{\arcsin(x-4)}$$

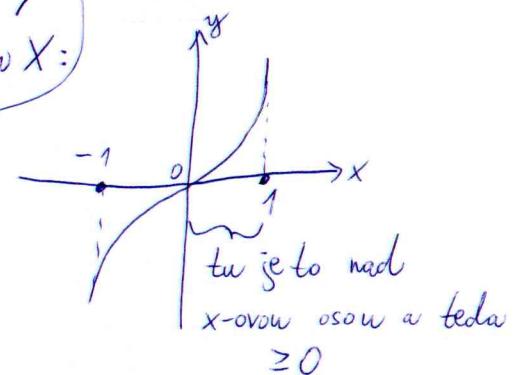
$$-1 \leq x-4 \leq 1 \quad |+4 \quad \wedge \quad \arcsin(x-4) \geq 0$$

$$3 \leq x \leq 5$$

$$0 \leq x-4 \leq 1 \quad |+4$$

$$\arcsin X \geq 0 \Leftrightarrow X \in [0; 1]$$

toto vidiel = grafu $\arcsin X$:



$$4 \leq x \leq 5$$

$$\boxed{[4; 5]}$$

môžeme pôčítať
takto náraz, ak tam
máme iba x a nie x^2
a ak x nie je v menovateli



$$\underline{D(f) = [4; 5]}$$

1.3.8

$$a) f_7: y = \log(1-2x) - 3\arcsin \frac{3x-1}{2}$$

$$1-2x > 0 \quad \wedge \quad -1 \leq \frac{3x-1}{2} \leq 1 \quad | \cdot 2$$

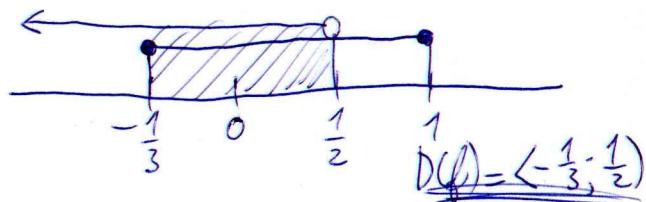
$$\boxed{x < \frac{1}{2}}$$

$$-2 \leq 3x-1 \leq 2 \quad |+1$$

$$-1 \leq 3x \leq 3 \quad |:3$$

$$-\frac{1}{3} \leq x \leq 1$$

$$\boxed{[-\frac{1}{3}; 1]}$$



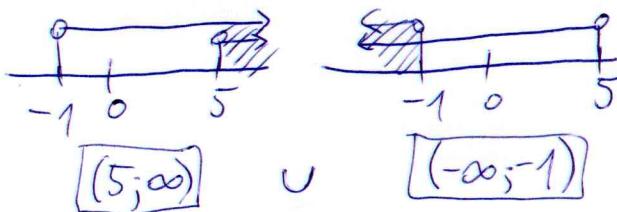
(103.8) b)

$$f_2: y = 5 \cdot \log\left(\frac{x+1}{x-5}\right) - \frac{\sqrt{5x-10}}{x^2-36}$$

$$\frac{x+1}{x-5} > 0 \quad \wedge \quad x-5 \neq 0 \quad \wedge \quad 5x-10 \geq 0 \quad \wedge \quad x^2-36 \neq 0$$

$$(x+1>0 \wedge x-5>0) \vee (x+1<0 \wedge x-5<0) \quad \boxed{x \neq 5}$$

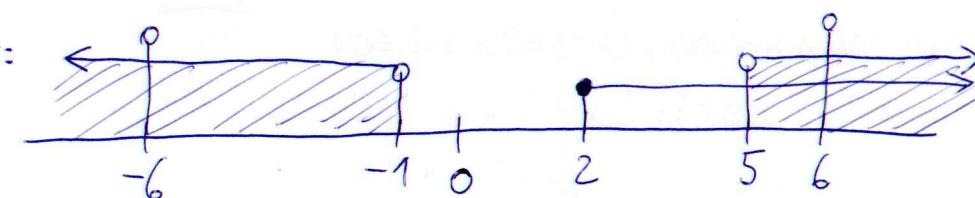
$$(x>-1 \wedge x>5) \vee (x<-1 \wedge x<5)$$



$$5x \geq 10 \quad \wedge \quad (x-6)(x+6) \neq 0$$

$\boxed{x \geq 2} \quad \boxed{x \neq \pm 6}$

všechno dokopy:



$$D(f) = (-\infty; -6) \cup (-6; -1) \cup (5; 6) \cup (6; \infty)$$

$$0) f_3: y = \arccos(3+2x) + \sqrt{\frac{x-2}{x+3}}$$

$$-1 \leq 3+2x \leq 1 \quad | -3 \quad \wedge \quad x+3 \neq 0$$

$$-4 \leq 2x \leq -2 \quad | :2 \quad \boxed{x \neq -3}$$

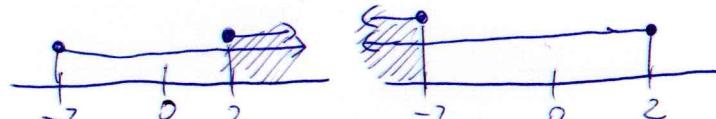
$$-2 \leq x \leq -1$$

$$\boxed{[-2; -1]}$$

$$\wedge \quad \frac{x-2}{x+3} \geq 0$$

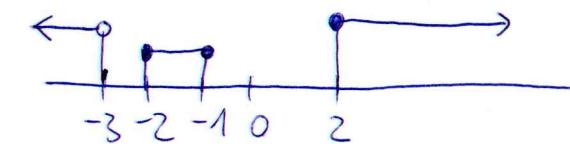
$$(x-2 \geq 0 \wedge x+3 \geq 0) \vee (x-2 \leq 0 \wedge x+3 \leq 0)$$

$$(x \geq 2 \wedge x \geq -3) \vee (x \leq 2 \wedge x \leq -3)$$



$$\boxed{[2; \infty) \cup (-\infty; -3]}$$

Doklomady:



$$\boxed{D(f) = \emptyset}$$

(9)

10

103.8 d) $f_4: y = \frac{\sqrt{x^2 - 5x + 6}}{\ln(2x-5)} - \sqrt{5-x}$

$$x^2 - 5x + 6 \geq 0 \quad \wedge \quad \ln(2x-5) \neq 0 \quad \wedge \quad 2x-5 > 0 \quad \wedge \quad 5-x \geq 0$$

$$D = 25 - 24 = 1$$

$$x_{1,2} = \frac{5 \pm 1}{2} = \begin{cases} 3 \\ 2 \end{cases}$$

$$(x-3)(x-2) \geq 0$$

$$(x-3 \geq 0 \wedge x-2 \geq 0) \vee (x-3 \leq 0 \wedge x-2 \leq 0)$$

$$(x \geq 3 \wedge x \geq 2) \vee (x \leq 3 \wedge x \leq 2)$$



$$\boxed{[3; \infty) \cup (-\infty; 2]}$$

$$\log_e(2x-5) \neq 0$$

$$2x-5 \neq e^0$$

$$2x-5 \neq 1$$

$$\begin{array}{c} 2x \neq 6 \\ \boxed{x \neq 3} \end{array}$$

$$2x > 5$$

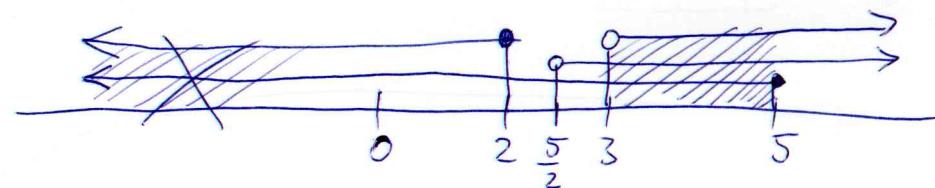
$$x > \frac{5}{2}$$

$$\boxed{(\frac{5}{2}; \infty)}$$

$$\nexists x \leq 5$$

$$\boxed{(-\infty; 5)}$$

Dohromady:



$$\underline{D(f) = (3; 5)}$$

(13.8)

$$e) f_5: y = \frac{\sqrt{x^2 - x - 2}}{\ln x} - 4 \cdot \arcsin \frac{1-2x}{4}$$

$$x^2 - x - 2 \geq 0 \wedge \ln x \neq 0$$

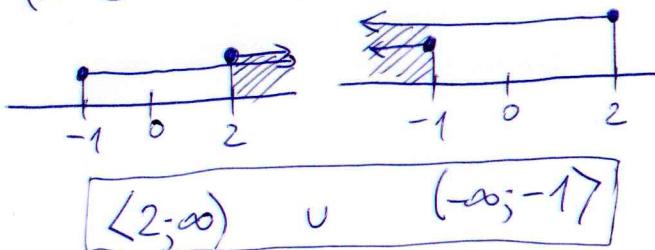
$$D = 1+4 \cdot 2 = 9$$

$$x_{1,2} = \frac{1 \pm 3}{2} = \begin{cases} 2 \\ -1 \end{cases}$$

$$(x-2)(x+1) \geq 0$$

$$(x-2 \geq 0 \wedge x+1 \geq 0) \vee (x-2 \leq 0 \wedge x+1 \leq 0)$$

$$(x \geq 2 \wedge x \geq -1) \vee (x \leq 2 \wedge x \leq -1)$$



$$x > 0 \wedge -1 \leq \frac{1-2x}{4} \leq 1 \quad | \cdot 4$$

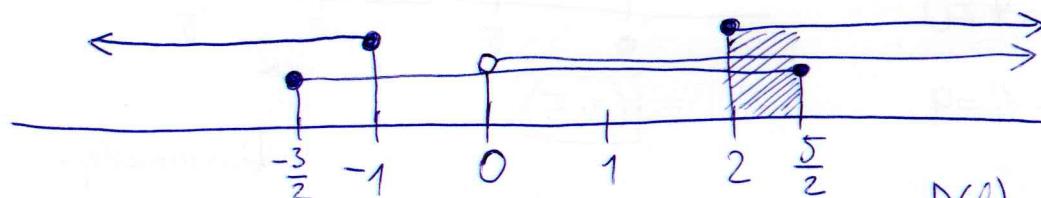
$$-4 \leq 1-2x \leq 4 \quad | -1$$

$$-5 \leq -2x \leq 3 \quad | :(-2)$$

$$\frac{5}{2} \geq x \geq -\frac{3}{2}$$

$$\left\langle -\frac{3}{2}; \frac{5}{2} \right\rangle$$

Dohromady:



$$\underline{D(f) = \left\langle 2; \frac{5}{2} \right\rangle}$$

(11)

1.3.8

$$f_6: y = \sqrt{\log \frac{5x-x^2}{4}} + \frac{1}{\log_2 x - 2}$$

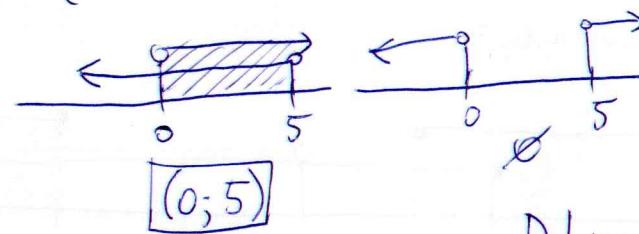
$$\log \frac{5x-x^2}{4} \geq 0 \quad \wedge \quad \frac{5x-x^2}{4} > 0 \quad \wedge \quad \log_2 x - 2 \neq 0 \quad \wedge \quad x > 0$$

$$\frac{5x-x^2}{4} \geq 10^0 \quad \uparrow \quad \log_2 x \neq 2 \quad (0; \infty)$$

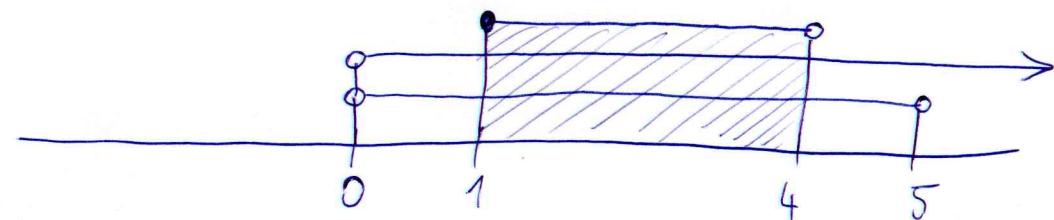
$$\frac{5x-x^2}{4} \geq 1/4 \quad x(5-x) > 0 \quad x \neq 4$$

$$(x>0 \wedge 5-x>0) \vee (x<0 \wedge 5-x<0)$$

$$(x>0 \wedge x<5) \vee (x<0 \wedge x>5)$$

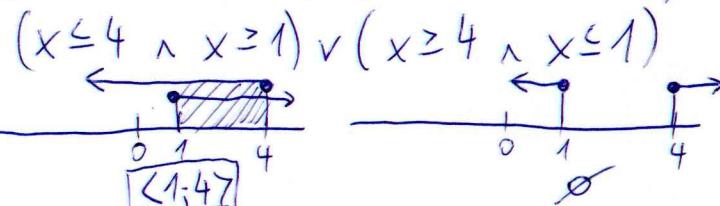


Dohromady:



$$\underline{D(f) = (1; 4)}$$

$$(x-4 \leq 0 \wedge x-1 \geq 0) \vee (x-4 \geq 0 \wedge x-1 \leq 0)$$



(13.8)

$$g) f \neq: y = \arccos \frac{3}{2x-5} + \ln(6+11x-2x^2)$$

$$\frac{3}{2x-5} \geq -1$$

$$\wedge \quad \frac{3}{2x-5} \leq 1$$

$$\wedge \quad -2x^2 + 11x + 6 > 0$$

$$\wedge \quad 2x-5 \neq 0$$

$$\frac{3}{2x-5} + 1 \geq 0$$

$$\frac{3}{2x-5} - 1 \leq 0$$

$$D = 121 + 4 \cdot 2 \cdot 6 = 169$$

$$x_{1,2} = \frac{-11 \pm \sqrt{169}}{-4} = \begin{cases} -\frac{1}{2} \\ 6 \end{cases}$$

$$\frac{3}{2x-5} + \frac{2x-5}{2x-5} \geq 0$$

$$\frac{3}{2x-5} - \frac{2x-5}{2x-5} \leq 0$$

$$-2(x-6)(x+\frac{1}{2}) > 0 \quad /:(-2)$$

$$\frac{3+2x-5}{2x-5} \geq 0$$

$$\frac{3-2x+5}{2x-5} \leq 0$$

$$(x-6)(x+\frac{1}{2}) < 0$$

$$\frac{2x-2}{2x-5} \geq 0 \quad /:2$$

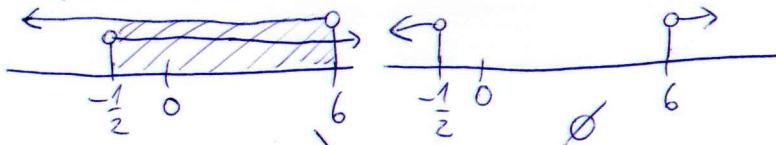
$$\frac{8-2x}{2x-5} \leq 0 \quad /:2$$

$$(x-6 \leq 0 \wedge x+\frac{1}{2} > 0) \vee (x-6 > 0 \wedge x+\frac{1}{2} < 0)$$

$$\frac{x-1}{2x-5} \geq 0$$

$$\frac{4-x}{2x-5} \leq 0$$

$$(x < 6 \wedge x > -\frac{1}{2}) \vee (x > 6 \wedge x < -\frac{1}{2})$$



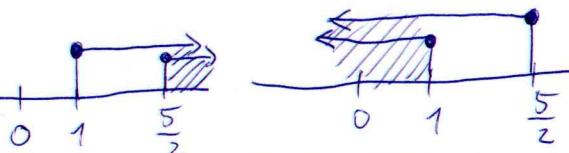
$$(-\frac{1}{2}; 6)$$

$$(x-1 \geq 0 \wedge 2x-5 \geq 0) \vee (x-1 \leq 0 \wedge 2x-5 \leq 0)$$

$$(4-x \leq 0 \wedge 2x-5 \geq 0) \vee (4-x \geq 0 \wedge 2x-5 \leq 0)$$

$$(x \geq 1 \wedge x \geq \frac{5}{2}) \vee (x \leq 1 \wedge x \leq \frac{5}{2})$$

$$(x \geq 4 \wedge x \geq \frac{5}{2}) \vee (x \leq 4 \wedge x \leq \frac{5}{2})$$

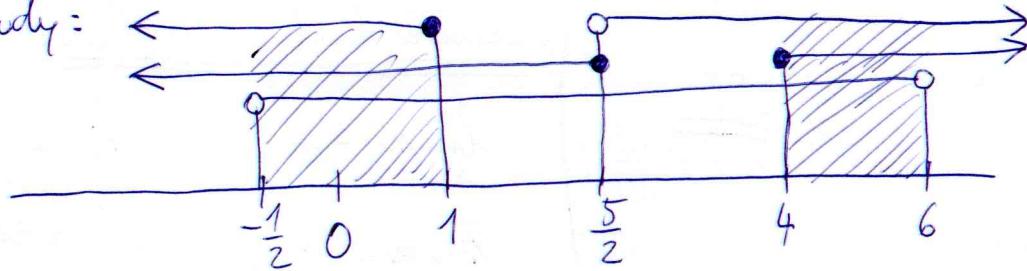


$$\left(\frac{5}{2}; \infty\right) \cup (-\infty; 1]$$

$$\left(4; \infty\right) \cup \left(-\infty; \frac{5}{2}\right)$$

(13)

Dohromady:



$$D(f) = \left(-\frac{1}{2}; 1\right] \cup <4; 6)$$

1.3.8

h) $f_8: y = \frac{14-x}{\ln(x^2-4)} + \arccos(3x+7)$

$$\ln(x^2-4) \neq 0 \wedge x^2-4 > 0 \wedge -1 \leq 3x+7 \leq 1 \rightsquigarrow -8 \leq 3x \leq -6 \quad | :3$$

$$x^2-4 \neq 1 \quad (x-2)(x+2) > 0$$

$$x^2 \neq 5$$

$$x \neq \pm\sqrt{5}$$

$$(x-2 > 0 \wedge x+2 > 0) \vee (x-2 < 0 \wedge x+2 < 0)$$

$$(x > 2 \wedge x > -2) \vee (x < 2 \wedge x < -2)$$

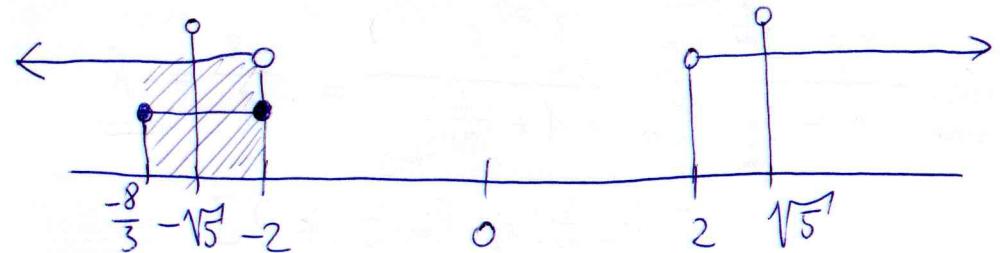


$$(2; \infty) \cup (-\infty; -2)$$

$$-\frac{8}{3} \leq x \leq -2$$

$$\left[-\frac{8}{3}; -2\right]$$

Dohromady:



$$D(f) = \left[-\frac{8}{3}; -15\right] \cup (-15; -2)$$