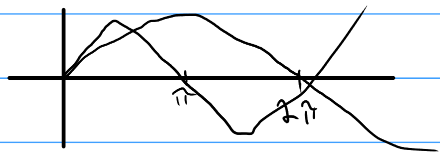
$f(x) = \frac{\sqrt{x+1}}{\sin(2x)} + \log(1-x)$

1.) $x+1 \geq 0$

2.) $\sin(2x) \neq 0$

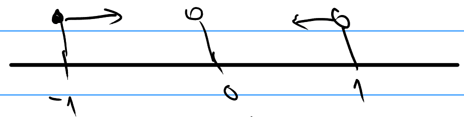
3.) $1-x > 0$



1.) $x \geq -1$

2.) $\sin(2x) \neq 0 \Rightarrow \cancel{\frac{\pi}{2}k} \ \frac{\pi}{2}k$

3.) $1-x > 0 \Rightarrow -x > -1 \Rightarrow x < 1$



$x \in \langle -1;0) \cup (0;1)$ ✓

b) $f(x) = \sqrt{3 - \log_2 x}$

$3 - \log_2 x \geq 0$

$\log_2 x \geq 3$

$\log_2 x \geq \log_2 2^3$

$\cancel{\log_2} x \geq \cancel{\log_2} 8$

$x \leq 8$

$\log_2 x > 0$

$D(f) = x \in (0;8\rangle$ ✓

c) $f(x) = \sqrt{-2 + \log_3(x-1)}$

$-2 + \log_3(x-1) \geq 0$

$\log_3(x-1) \geq 2$

$\cancel{\log_3}(x-1) \geq \cancel{\log_3} 3^2$

$x-1 \geq 9$

$x \geq 10$

$x - 1 > 0 \Rightarrow x > 1$

$D(f) = x \in \langle 10; \infty)$ ✓

d) $\sqrt{-2 + \log_{\frac{1}{3}}(x-1)} \Rightarrow -2 + \log_{\frac{1}{3}}(x-1) \geq 0$

$\log_{\frac{1}{3}}(x-1) \geq 2$

$x-1 \leq \left(\frac{1}{3}\right)^2$

$x - 1 \leq \frac{1}{9}$

$x \leq \frac{10}{9}$

$x - 1 > 0$

$x > 1$

$D(f) = x \in (1, \frac{10}{9}\rangle$ ✓

Keď zlogaritmujem číslo a súčasne log základ sa mení

e) $\frac{x+1}{\sqrt{x - x^2 + 6}}$

OP: $x - x^2 + 6 > 0$

$(-x+2)(x+3)$

$x_{1,2} = +2; -3$

	$(-\infty,-3)$	$(-3;2)$	$(2,\infty)$
$2-x$	+	+	−
$x+3$	−	+	+
	−	+	−

$D(f) = x \in (-3;2)$ ✗ zle vnútorné korene ?

f) $\frac{\sqrt{x^2 - 4x + 3}}{x}$

OP: $x^2 - 4x + 3 \geq 0 \wedge x \neq 0$

$(x-3)(x-1) \Rightarrow x_{1,2} = 1;3$

	$(-\infty,1\rangle$	$\langle 1,3\rangle$	$\langle 3,\infty)$
$x-1$	−	+	+
$x-3$	−	−	+
	+	−	+

$D(f) = x \in (-\infty;0) \cup (0;1\rangle \cup \langle 3,\infty)$ ✓

g) $\sqrt{|x-3| - 1}$

$|x-3| - 1 \geq 0$

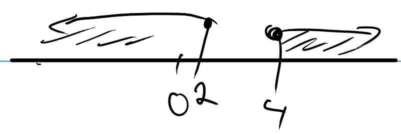
$x - 3 \geq 1 \Rightarrow x \geq 4$

$|x-3| \geq 1$

$-x+3 \geq 1$

$-x \geq -2$

$x \leq 2$



$D(f) = x \in (-\infty,2\rangle \cup \langle 4;\infty)$ ✓

h) $f(x) = \sqrt{3 - \log_2(5-x)}$ OR: $3 - \log_2(5-x) \geq 0 \wedge 5-x > 0$

$-\log_2(5-x) \geq -3$ $\quad 5-x \leq 8$ $\quad 5-x > 0$ $\quad D(f) = x \in \langle -3, 5)$ ✓

$\log_2(5-x) \leq 3$ $\quad -x \leq 3$ $\quad -x > -5$

$\log_2(5-x) \leq \log_2 2^3$ $\quad x \geq -3$ $\quad x < 5$

i) $f(x) = \sqrt{1 - \log_{\frac{1}{2}}(x-3)}$ $\quad 1 - \log_{\frac{1}{2}}(x-3) \geq 0 \wedge x-3 > 0$

$-\log_{\frac{1}{2}}(x-3) \geq -1$ $\quad x-3 \geq \frac{1}{2}$ $\quad x-3 > 0$

$\log_{\frac{1}{2}}(x-3) \leq 1$ $\quad x \geq \frac{7}{2}$ $\quad x > 3$

$\cancel{\log_{\frac{1}{2}}}(x-3) \leq \cancel{\log_{\frac{1}{2}}} \frac{1}{2}$ $\quad D(f) = x \in \langle \frac{7}{2} ; \infty)$ ✓

j) $\log_5\left(\frac{1+\sqrt{x}}{2-\sqrt{x}}\right)$ $\quad \left(\frac{1+\sqrt{x}}{2-\sqrt{x}}\right) > 0 \wedge 2-\sqrt{x} \neq 0$

$1+\sqrt{x} > 0$ $\quad D(f) = x \in \langle 0;4) \cup (4;\infty)$ ✓ ?

$\sqrt{x} > -1$ $\quad 2-\sqrt{x} \neq 0$ $\quad -x \neq -4$

$\hookrightarrow x \geq 0$ $\quad 4 - x \neq 0$ $\quad x \neq 4$

k) $f(x) = \log_3\left(\frac{2+\sqrt{x}}{2+x-x^2}\right)$ OR: $\left(\frac{2+\sqrt{x}}{2+x-x^2}\right) > 0 \wedge 2+\sqrt{x} \neq 0$

$2+x-x^2 \Rightarrow (x+1)(-x+2)$

$x_1 = -1$, $x_2 = 2$ chýb $x \geq 0$ lebo $\sqrt{x}$

	$(-\infty;-1)$	$(-1;2)$	$(2,\infty)$
$x+1$	−	+	+
$2-x$	+	+	−
	⊖	⊕	⊖

$2+\sqrt{x} \neq 0$ $\quad D(f) = x \in (-1, 2)$

$4+x \neq 0$ $\quad \langle 0;2)$ $\quad \frac{1}{2}$ ✓

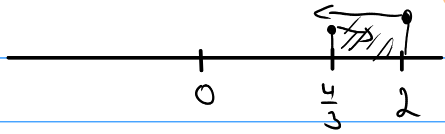
$x \neq -4$

l) $f(x) = \arcsin(3x-5)$ OR: $3x-5 \geq -1 \wedge 3x-5 \leq 1$

$3x-5 \geq -1$ $\quad 3x-5 \leq 1$ $\quad D(f) = x \in \langle \frac{4}{3} ; 2 \rangle$ ✓

$3x \geq 4$ $\quad 3x \leq 6$

$x \geq \frac{4}{3}$ $\quad x \leq 2$



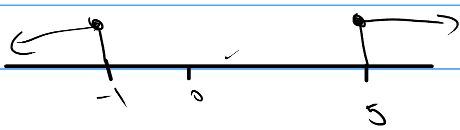
m) $f(x) = \arcsin\left(\frac{3}{x-2}\right)$ OR: $\frac{3}{x-2} \leq 1 \wedge \frac{3}{x-2} \geq -1$ $\quad -1 \geq \frac{3}{x-2} \leq 1$ ✓

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

$-x+2 \leq 3$ $\quad 3 \leq x-2$ $\quad x \neq 2$ $\quad -1 \leq \frac{3}{x-2} \leq 1$

$-x \leq 1$ $\quad x \geq 5$

$x \geq 1$



$D(f) = x \in (-\infty; -1\rangle \cup \langle 5;\infty)$ ✓

? ? ?

h) $F(x)=\arccos(x^2-2x)$ $\quad -1 \leq x(x-2) \leq 1 \quad x_{1,2}=0,2$

$-1 \leq x(x-2) \qquad x(x-2) \leq 1$

$x^2-2x+1 \geq 0 \qquad x^2-2x-1 \leq 0$

$(x-1)^2 \geq 0 \qquad -2^2-4\cdot1\cdot(-1)=4+4=\sqrt{8}$

$x_{1,2}=+1 \qquad \frac{2\pm\sqrt{8}}{2}=\underline{\underline{1\pm\sqrt{2}}}$

$(x-1)^2$	$(-\infty,1)$	$\langle 1;\infty)$
	+	+

$\Rightarrow x \in \mathbb{R}$

$\cancel{x^2+2-1}$	$(-\infty,1-\sqrt{2})$	$\langle 1-\sqrt{2};1+\sqrt{2}\rangle$	$\langle 1+\sqrt{2};\infty)$
x^2-2x-1	+	−	+

$x \in \langle 1-\sqrt{2};1+\sqrt{2}\rangle$ ✓

o) $F(x)=\operatorname{arctg}\left(\frac{\sqrt{x^2+2x+3}}{x-5}\right)$ $\quad x^2+2x+3 \geq 0 \wedge x-5 \neq 0$ $\quad D(f)=\mathbb{R}-\{5\}$ ✓

$4-4\cdot1\cdot3=4-12=-8X \qquad x \neq 5$

p) $\operatorname{arctg}\left(\sqrt{\frac{x^2-5x+6}{x^2+x+1}}\right) \qquad \frac{x^2-5x+6}{\underbrace{x^2+x+1}_{\mathbb{R}}} \geq 0 \qquad (x-2)(x-3)$

	$(-\infty,2\rangle$	$\langle 2,3)$	$\langle 3;\infty)$
$x-2$	−	+	+
$x-3$	−	−	+
	+		+

$D(f)=(-\infty,2\rangle \cup \langle 3,\infty)$ ✓

r) $\operatorname{arccotg}\frac{\sqrt{9-x^2}}{|x-1|} \qquad (3-x)(3+x)=9\ \cancel{-3x+3x}-x^2$

$9-x^2 \geq 0$

	$(-\infty,3\rangle$	$\langle 3;\infty)$
$9-x^2$		

$|x-1| \neq 0 \qquad x^2 \leq 9$

$x \neq 1 \qquad x \leq \pm 3 \Rightarrow x \in \langle -3,3\rangle$ $\quad D(f)=x \in \langle -3,1) \cup (1;3\rangle$ ✓

s) $F(x)=\operatorname{arctg}\frac{\sqrt{3+2x-x^2}}{x}$ $\quad x \neq 0 \wedge 3+2x-x^2 \geq 0$

$(x+1)(3-x) \quad x_{1,2}=-1,3$

	$(-\infty,-1\rangle$	$\langle -1,3\rangle$	$\langle 3,\infty)$
$x+1$	−	+	+
$3-x$	+	+	−
		+	

$D(f)=x \in \langle -1;0) \cup (0;3\rangle$ ✓

w) $f(x)=\sqrt{2\cos(3x)-\sqrt{3}} \qquad 2\cos(3x)-\sqrt{3} \geq 0$

$\cos(3x) \geq \frac{\sqrt{3}}{2}$

$3x \geq \frac{\frac{\pi}{6}}{\frac{3}{1}} \qquad x \geq \frac{\pi}{18} \qquad D(f)=x \in \langle \frac{\pi}{18};\infty)$?

PR 2.

$f(-x) = f(x) \Rightarrow$ Párnosť

$f(-x) = -f(x) \Rightarrow$ Nepárnosť

a) $f(x) = \dfrac{x-4}{\sqrt{x^2-x-2}}$ $\quad x^2-x-2 \geq 0$

$(x-2)(x+1) \quad x_{1,2} = 2, -1$

$D(f) = x \in (-\infty; -1\rangle \cup \langle 2; \infty)$

	$(-\infty,-1\rangle$	$\langle -1;2\rangle$	$\langle 2,\infty)$
$x-2$	$-$	$-$	$+$
$x+1$	$-$	$+$	$+$
	$\oplus$		$\oplus$

$\dfrac{-x-4}{\sqrt{-x^2+x-2}} \neq \dfrac{x-4}{\sqrt{x^2-x-2}}$ ✗

$\dfrac{-x-4}{\sqrt{x^2+x-2}} \neq \dfrac{-x+4}{\sqrt{x^2-x-2}}$ ✗

Ani párna Ani nepárna ✓

b) $f(x) = \dfrac{a^x+1}{a^x-1}$ $\quad a^x-1 \neq 0$

$D(f) = \mathbb{R} - \{0\}$

$\dfrac{a^{-x}+1}{a^{-x}-1} \neq \dfrac{a^x+1}{a^x-1}$ ✗

$\dfrac{a^{-x}+1}{a^{-x}-1} \neq \dfrac{-a^x-1}{a^x-1} = \dfrac{\frac{1}{a^x}+1}{\frac{1}{a^x}-1} = \dfrac{\frac{1+a^x}{a^x}}{\frac{1-a^x}{a^x}} = \dfrac{1+a^x}{1-a^x} = \dfrac{1+a^x}{1-a^x}$ ✓ Nepárna

c) $f(x) = 1 - \sqrt{2\cos(2x)}$ $\quad 2\cos(2x) \geq 0 \quad 2x \geq \frac{3\pi}{2}$

$D(f) = x \in \langle 3\pi; \infty)$ ✗ $\quad \cos(2x) \geq 0 \quad x \geq 3\pi$

$1-\sqrt{2\cos(-2x)} = 1-\sqrt{2\cos(2x)}$ $\quad 2x \geq \frac{\pi}{2}$

Párna ✓ $\quad x \geq \pi$

d) $f(x) = \ln\left(\dfrac{3+x}{3-x}\right)$ $\quad \left(\dfrac{3+x}{3-x}\right) > 0$

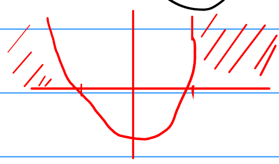
$3-x \neq 0$

$x \neq 3 \quad D(f) = x \in (-3,0) \cup (0,3)$ $\quad x \in (-3,3)$

	$(-\infty,-3)$	$(-3,0)$	$(0,3)$	$(3,\infty)$
$3+x$	$-$	$+$	$+$	$+$
$3-x$	$+$	$+$	$+$	$-$
		$\oplus$	$\oplus$	

$\ln\left(\dfrac{3-x}{3+x}\right) \neq \ln\left(\dfrac{3+x}{3-x}\right)$ ✗

$\ln\left(\dfrac{3-x}{3+x}\right) = -\ln\left(\dfrac{3+x}{3-x}\right)$ ✗ ← ✓ Matikos Vybavenos



f) $f(x) = \dfrac{x^3-x}{\sqrt{x^2-1}}$ $\quad x^2-1 \geq 0$

$x^2 \geq 1$

$x \neq \pm 1$

$\dfrac{-x^3+x}{\sqrt{-x^2-1}} \neq \dfrac{x^3-x}{\sqrt{x^2-1}}$

$D(f) = \mathbb{R} - \{\pm 1\}$ f-cia je Nepárna ✓

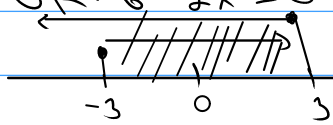
↳ $x \in (-\infty, -1\rangle \cup \langle 1, \infty)$

$\dfrac{-x^3+x}{\sqrt{+x^2-1}} = \dfrac{-x^3+x}{\sqrt{x^2-1}}$

g) $f(x) = x\sqrt{6-2|x|}$ OR: $6-2x \geq 0 \wedge 6+2x \geq 0$

$2x \leq 6$ $\quad 2x \geq -6$

$x \leq 3$ $\quad x \geq -3$



$D(f) = x \in \langle -3; 3 \rangle$ ✓

$-x\sqrt{6-2|x|} \neq x\sqrt{6-2|x|}$

$-x\sqrt{6-2|-x|} = -x\sqrt{6-2|x|}$ Nepárnosť ✓

h) $f(x) = \dfrac{\sqrt{x^2-1}}{|3x|}$ $\quad x \neq 0 \wedge x^2-1 \neq 0$

$x^2-1 \neq 0$

$x^2 \neq 1$ $\quad D(f) = \mathbb{R} - \{\pm 1, 0\}$ $\quad \dfrac{\sqrt{-x^2-1}}{|3x|} = \dfrac{\sqrt{x^2-1}}{|3x|}$ Párnosť ✓

$x \neq \pm 1$ $\quad$? v podstate áno

i) $f(x) = \dfrac{|x|}{4-\sqrt{x^2-9}}$ $\quad 4-\sqrt{x^2-9} \neq 0 \wedge x^2-9 \geq 0$

$\sqrt{x^2-9} \neq 4$ $\quad x^2-9 \geq 0$ $\quad D(f) = x \in \langle -3; \infty) - \{\pm 5\}$ $\quad x \in (-\infty, -3\rangle \cup \langle 3, \infty)$

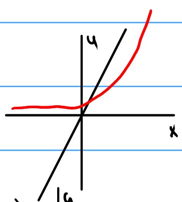
$x^2-9 \neq 16$ $\quad x^2 \geq 9$ $\quad \dfrac{|-x|}{4-\sqrt{-x^2-9}} = \dfrac{|x|}{4-\sqrt{x^2-9}}$ Párnosť ✓

$x^2 \neq 25$ $\quad x \geq \pm 3$

$x \neq \pm 5$

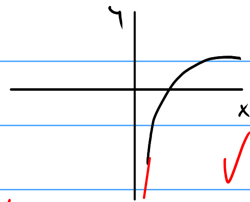
PR 3

a) $y = 2^x \rightarrow$



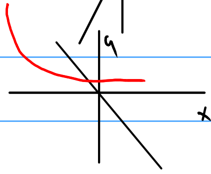
✗

$y = \log_2 x \rightarrow$

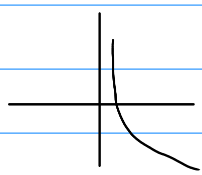


✓

b) $y = \left(\frac{1}{2}\right)^x$

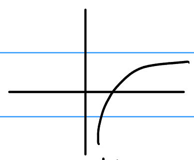


$y = \log_{\frac{1}{2}} x \rightarrow$



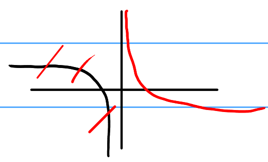
✓

d) $y = \log x$

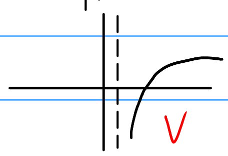


✓

$y = -\log x$

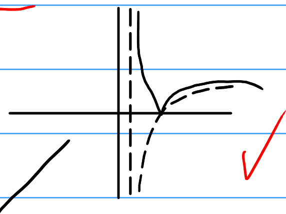


e) $y = \log(x-1)$



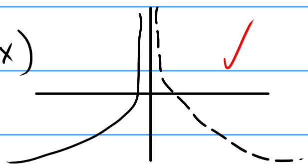
✓

f) $y = |\log(x-1)|$



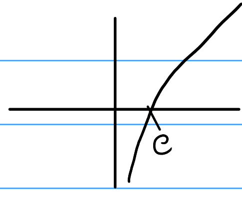
✓

g) $y = \log_{\frac{1}{2}}(-x)$

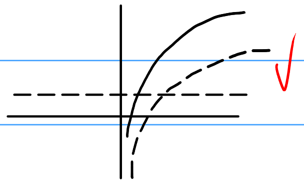


✓

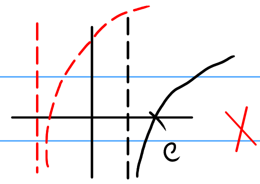
h) $y = 2\ln(x)$



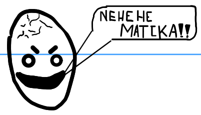
$y=\ln(x)+2$



$y=\ln(x+2)$



PR 4.



a) $y=\sqrt{1-\log_2(x-1)}$ OR: $1-\log_2(x-1)\geq 0 \wedge x-1>0$

$-\log_2(x-1)\geq -1$ $\quad x-1>0$

$\log_2(x-1)\leq 1$ $\quad x>1$ $\quad D(f)=x\in(1,3\rangle$

$(x-1)\leq 2$ $\quad$ Ani párna Ani nepárna

$\underline{\underline{x\leq 3}}$ $\quad f^{-1}(x):\ x=\sqrt{1-\log(y-1)}$

$x^2=1-\log(y-1)$ $\quad \log_{10}(y-1)=1-x^2$ $\quad$ Prepočet good, iže opísaný príklad

$x^2-1=-\log(y-1)$

$1-x^2=\log(y-1)$ $\quad 10^{1-x^2}=y-1$ $\quad y=10^{1-x^2}+1$

b) $y=3\sqrt{x}-5$ $\quad D(f)=x\in\langle 0,\infty)$ $\quad$ X Par $\quad$ X Nep

$f^{-1}(x):\ x=3\sqrt{y}-5$

$x+5=3\sqrt{y}$

$\frac{x+5}{3}=\sqrt{y}$

$\underline{\underline{\left(\frac{x+5}{3}\right)^2}}=y$ ✓

c) $y=3+\arcsin(2x+1)$ $\quad$ X X

$-1\leq 2x+1\leq 1$ $\quad f^{-1}(x):\ x=3+\arcsin(2y+1)$ $\quad \sin(x-3)-1=2y$

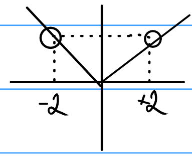
$-2\leq 2x$ $\quad x\leq 0$ $\quad x-3=\arcsin(2y+1)$ $\quad y=\frac{\sin(x-3)-1}{2}$

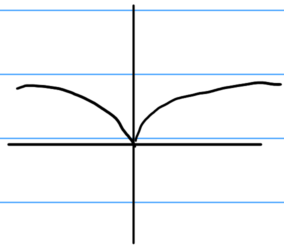
$x\geq -1$ $\quad D(f)=x\in\langle -1;0\rangle$ $\quad \sin(x-3)=2y+1$

PR 5.

$f: y = |x|\sqrt{\frac{x^2-4}{|4-x^2|}}$

$|x| \to$





OR: $|4-x^2| \neq 0$ $\qquad \frac{x^2-4}{|4-x^2|} \geq 0 \qquad D(f) = x \in (-\infty;-2) \cup (2,\infty)$

$4-x^2 \neq 0$

$-x^2 \neq -4$

$x^2 \neq 4$

$x \neq \pm 2$

	$(-\infty;-2)$	$(-2,2)$	$(2,\infty)$
x^2-4	+	−	+
$\|4-x^2\|$	+	+	+
	+		+

CVIČENIE 2.

PR 1.

a) $(\cancel{x^3}-1):(x+1) = x^2-x-1-\frac{2}{x+1}$?

$-(\cancel{x^3}+x^2)$

$\cancel{-x^2}-1$

$-(\cancel{-x^2}-x)$

$\cancel{x}-1$

$-(\cancel{x}+1)$

$\cancel{-2}$

$\cancel{-(-2)}$

b) $(\cancel{x^3}-1):(x-1) = x^2+x+1$ ✓

$-\cancel{(x^3-x^2)}-1$

$\cancel{x^2}-1$

$-(\cancel{x^2}-x)$

$x-1$

c) $(\cancel{3x^3}+5x^2+7x+5):(x+1) = 3x^2+2x+5$ ✓

$-(\cancel{3x^3}+3x^2)$

$\cancel{2x^2}+7x$

$-(\cancel{2x^2}+2x)$

$\cancel{5x+5}$

$\cancel{-(5x+5)}$

d) $(\cancel{x^5}+x^4+2x^3-3x^2-7):(x+4) = x^4-3x^3+14x^2-59x+236-\frac{951}{x+4}$ ✓

$800+120+24$

$-(\cancel{x^5}+4x^4)$

$\cancel{-3x^4}+2x^3$

$-(\cancel{-3x^4}-12x^3)$

$\cancel{14x^3}-3x^2$

$-(\cancel{14x^3}+56x^2)$

$\cancel{-59x^2}-7$

$-(\cancel{-59x^2}-236x)$

$\cancel{236x}-7$

$-(\cancel{236x}+944)$

$\cancel{-951}$

$\cancel{-(-951)}$

PR 2.

a) $x^3 - x^2 - 8x + 12 = 0$

	1	-1	-8	12

	1	-1	-8	12
2	1	1	-6	0

$(x-2)\ (x^2 + x - 6)$

Sk: $(\cancel{x^3} - x^2 - 8x + 12) : (x-2) = x^2 + x - 6$ ✓ $\Rightarrow (x+3)(x-2)$

$-(\cancel{x^3} - 2x^2)$

$\cancel{x^2} - 8x$

$-(\cancel{x^2} - 2x)$

$\cancel{-6x + 12}$

$\cancel{-(-6x + 12)}$

Výsledok: $(x-2)^2 (x+3)$

c) $x^4 - 4x^3 + 16x - 16 = 0$

	1	-4	0	16	-16
2	1	-2	-4	8	0

$(x-2)(x^3 - 2x^2 - 4x + 8)$

	1	-2	-4	8
2	1	0	-4	0

$(x-2)(x-2)(x^2-4) \Rightarrow (x-2)(x-2)(x+2)(x-2) \Rightarrow$

$\Rightarrow (x-2)^3 (x+2)$

b) $x^3 - 5x^2 + 8x - 4 = 0$

	1	-5	8	-4
2	1	-3	2	0

	1	-3	2
2	1	-1	0

$(x^2 - 3x + 2)(x-2)$

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

d) $x^4 + 6x^3 + 14x^2 + 18x + 9 = 0$

	1	6	14	18	9
-3	1	3	5	3	0

$(x+3)(x^3 + 3x^2 + 5x + 3) = 0$

	1	3	5	3
-1	1	2	3	0

$\Rightarrow \underline{\underline{(x+3)(x+1)(x^2+2x+3)}}$

	~~1~~	~~2~~	~~3~~
~~-5~~	~~1~~		

$x^2 + 2x + 3 \Rightarrow$ už nemá ďalší koreň

PR 3.

a) $\dfrac{2x-5}{x^2-5x+6} = \dfrac{2x-5}{(x-2)(x-3)}$

$2x \Rightarrow A$

$-5 \Rightarrow B$

$2x - 5 = A(x-3) + B(x-2)$

$2x - 5 = Ax - 3A + Bx - 2B$

$2x - 5 = x(A+B) - 3A - 2B$

$2 = A + B \Rightarrow B = 2 - A$

$-5 = -3A - 2B$

$-5 = -3A - 2(2-A)$

$-5 = -3A - 4 + 2A$

$-1 = -A$

$A = 1$

$B = 2 - 1 = 1$

$\dfrac{1}{(x-2)} + \dfrac{1}{x-3}$

b)

$$\frac{5}{(x-2)(x-7)}$$

$$\boxed{\frac{-1}{(x-2)} + \frac{1}{(x-7)}}$$

$0x+5 = A(x-7)+B(x-2)$

$0x+5 = Ax-7A+Bx-2B$

$0x+5 = x(A+B)-7A-2B$

$0 = A+B \Rightarrow B=-A$

$5 = -2B-7A$

$5 = 2A-7A$

$5 = -5A$

$A=-1 \qquad B=1$

c) $\frac{1}{x^3-x} = \frac{0x^2+0x+1}{x(x^2-1)}$

$0x^2+0x+1 = Ax^2(x^2-1)+Bx(x^2-1)+Cx$

$0x^2+0x+1 = Ax^4-Ax^2+Bx^3-Bx+Cx$

$0x^2+0x+1 = x^2(Bx-A+Ax^2)+x(C-B)$

$0 = C-B$

$0 =$

$\lim_{x\to 0}\frac{a^x-1}{x} = \ln(a)$!!

$\lim_{x\to\infty}\left(1+\frac{k}{x}\right)^x = e^k$

$\lim_{x\to 0}\frac{\sin(kx)}{kx} = 1$!!

PR1. Limita

a) $\lim_{x\to 1}\frac{x^3-2x^2-5x+6}{x^2+2x-3} = \frac{\cancel{(x-1)}(x^2-x-6)}{(x+3)\cancel{(x-1)}} = \frac{(x-3)(x+2)}{(x+3)} = \frac{-2\cdot 3}{4} = \frac{-6}{4} = -\frac{3}{2}$

	1	-2	-5	6
1	1	-1	-6	0

b) $\lim_{x\to 0}\left[\underbrace{\frac{\sqrt{x+4}-2}{\sin(2x)}}_{A} + \ln(1-x^2)\right] = \lim_{x\to 0}\left[\left(\frac{\frac{d}{dx}\sqrt{x+4}-2}{\frac{d}{dx}\sin(2x)}\right)+\ln(1-x^2)\right]$

$A' = \frac{\frac{1}{2\sqrt{x-4}}}{\sin(2x)} = \frac{\frac{1}{2\sqrt{x-4}}}{2\cos(2x)} = \frac{1}{2\cos(2x)\cdot 2\sqrt{x-4}}$

c) $\lim_{x\to 0}\frac{tg(5x)}{tg(6x)} = \left(\frac{\frac{\sin(5x)}{\cos(5x)}}{\frac{\sin(6x)}{\cos(6x)}}\right) = \lim_{x\to 0}\frac{\sin(5x)\cos(6x)}{\sin(6x)\cos(5x)} = \frac{5}{6}$

d) $\lim_{x\to\infty}\left(\frac{x+1}{x-2}\right)^{2x-1} = \lim_{x\to\infty}\left(\frac{x+1}{x-2}\right)^{2x}\cdot\lim_{x\to\infty}\left(\frac{x+1}{x-2}\right)^{-1} = \lim_{x\to\infty}\left(\frac{x-2+1+2}{x-2}\right)^{2x}\cdot\lim_{x\to\infty}\left(\frac{\frac{1}{1}}{\frac{x+1}{x-2}}\right) =$

$\lim_{x\to\infty}\left(1+\frac{3}{x-2}\right)^{2x} = \lim_{t\to\infty}\left(1+\frac{3}{t}\right)^{2t+4} = \lim_{t\to\infty}\left(1+\frac{3}{t}\right)^{2t}\cdot\lim_{t\to\infty}\left(1+\frac{3}{t}\right)^4 = \left(\lim_{t\to\infty}\left(1+\frac{3}{t}\right)^t\right)^2\cdot\lim_{t\to\infty}\left(1+\frac{3}{t}\right)^4 = (e^3)^2\cdot(e^3)^4$

$t = x-2 \quad t = 2x-4$

$x = t+2 \Rightarrow 2t+4$

$\boxed{\begin{array}{l} t = x+1 \\ x = t-1 \end{array}}$

$e^6\cdot\lim_{x\to\infty}\left(\frac{x-2}{x+1}\right) = \lim_{x\to\infty}\left(\frac{x-2+1-1}{x+1}\right) = \lim_{x\to\infty}\left(1+\frac{-3}{x+1}\right) = \lim_{t\to\infty}\left(1+\frac{-3}{t}\right)^{t-1} = e^{-3}\cdot e^{-3^{-1}}$

$(e^3)^2\cdot(e^3)^4\cdot e^{-3}\cdot(e^{-3})^{-1}$

e) $\lim_{x \to 0} \left(\frac{3 - 2x}{2 + 5x} \right)^{\frac{\sqrt{x+1} - 1}{x}} = \lim_{x \to 0} ($