1) $4x+7-7\cdot(x-6)+5=0 \qquad \vee \mathbb{R}$

$4x+7-7x+42+5=0$

$-3x+54=0 \qquad /-54$

$-3x=-54 \qquad \boxed{x=+18}$

2) $\dfrac{4x-7}{2}-\dfrac{x-4}{6}\geq 2x-3 \qquad /\cdot 6 \quad \vee \mathbb{R}$

$\cancel{12x}-21-x+4\geq \cancel{12x}-18 \qquad /\underline{-12x}$

$-x-17\geq -18 \qquad /+17$

$-x\geq -1 \qquad /\cdot(-1)$

$x\leq 1$

$x\in(-\infty, 1\rangle$

3) $\dfrac{x}{2}-\dfrac{x-\frac{x}{2}}{2}-\dfrac{x-\frac{x}{2}-\frac{1}{2}\cdot\frac{2+\frac{x}{2}}{2}}{2}=\frac{1}{2}\left(x-\frac{x}{2}\right)\cdot\frac{1}{2}$

$(x=4)$

4) $(x-1)^2-(x+1)^2<8 \quad v\ \mathbb{R}$

$-2x-(2x)<8$

$-4x<8 \quad / :(-4)$

$x>-2$

$x\in(-2;\infty)$ ✓

5) $(x-6)\cdot(x+2)>0 \quad v\ \mathbb{R}$

$(x-6)\cdot(x+2)=0$

$x_1=6$

$x_2=-2$

$-\ -$		$-\ +$		$+\ +$	
$+$	-2	$-$	6	$+$	$\mathbb{R}$

$\boxed{x\in(-\infty,-2)\cup(6,\infty)}=\underline{A}$

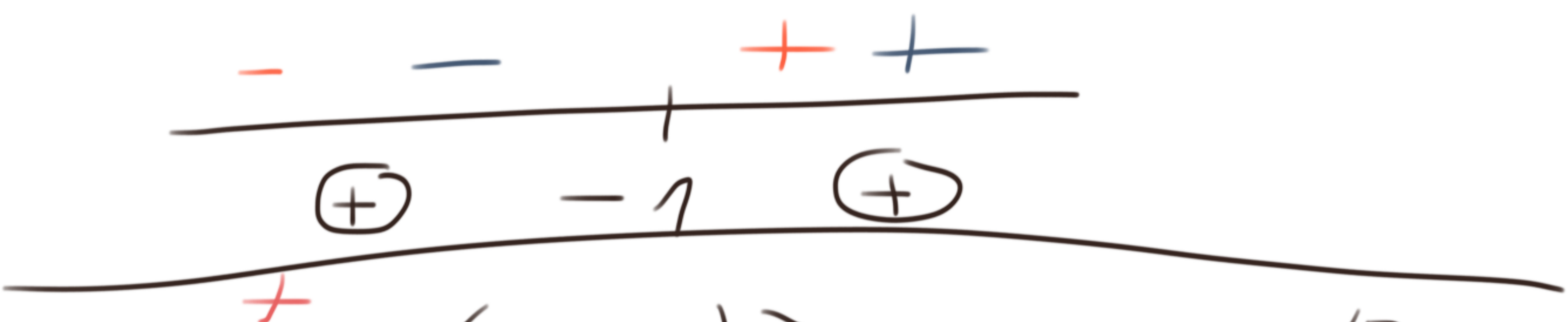
riešte $v\ \underline{\mathbb{R}^+=M}$

$x\in(6,\infty)=M\cap A$

$x^2+2x+1<0$

$(x+1)^2<0$

$(x+1)\cdot(x+1)<0$



6) $(x^2+2)(x+7)\geq 0$ u $\mathbb{R}$

$x^3+\ldots$

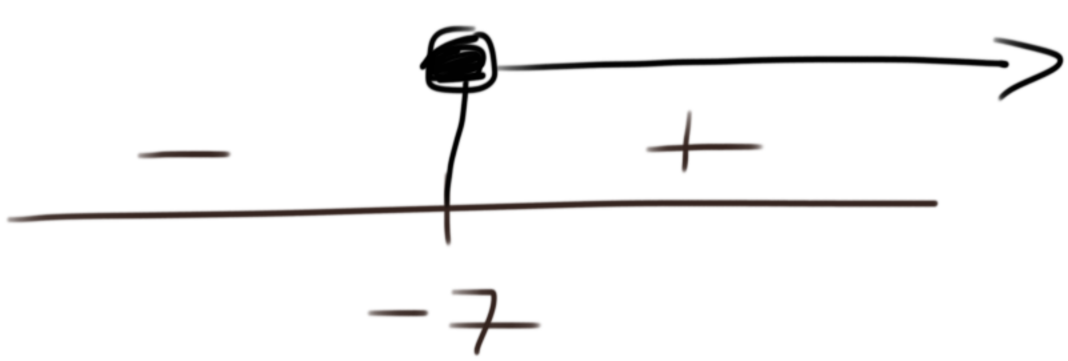
$x^2+2=0$

$x^2=-2 \rightarrow$ nema korien u $\mathbb{R}$

$x=0$: $x^2+2=2>0$

$x^2+2>0 \quad \forall x\in\mathbb{R}$

$x+7$



$x\in\langle -7,\infty)$ ✓

9) $4x^2+x=0$ $\boxed{c=0}$

$x(4x+1)=0$

$4\cdot x\left(x+\frac{1}{4}\right)=0$

$x_1=0$

$x_2=-\frac{1}{4}$

$x_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$x_{1,2}=\frac{-1\pm\sqrt{1}}{8}$

$=\begin{cases}0\\-\frac{1}{4}\end{cases}$

---

10) $2x^2-5=0 \quad /:2$ $\boxed{b=0}$

$x^2-\frac{5}{2}=0$

A^2-B^2

a) $\left(x+\sqrt{\frac{5}{2}}\right)\cdot\left(x-\sqrt{\frac{5}{2}}\right)=0$

$x_{1,2}=\pm\sqrt{\frac{5}{2}}$

b) $x^2=\frac{5}{2}$

$\sqrt{a}\geq 0$

$x=\pm\sqrt{\frac{5}{2}}$

$D=b^2-4ac$

$x_{1,2}=\frac{-b\pm\sqrt{D}}{2a}$

$4x^2-4x+1=0 \quad =4\cdot\left(x-\frac{1}{2}\right)^2$

$D=16-4\cdot4\cdot1=0$

$x_{1,2}=-\frac{b}{2a}=\frac{4}{2\cdot4}=\underline{\underline{\frac{1}{2}}}$

13) $3x^2 + x + 2 = 0$

$$D = 1 - 4 \cdot 3 \cdot 2 = 1 - 24 = -23$$

$\longrightarrow$ nemá řešení v $\mathbb{R}$.

14) $\overset{A^2}{x^2} + \overset{2 \cdot AB}{2x} - 1 = 0$

$$\underbrace{(x+1)^2}_{A+B} - 1 - \underbrace{1}_{-B^2} = 0$$

$$(x+1)^2 - \sqrt{2}^2 = 0$$

$$(x + 1 + \sqrt{2}) \cdot (x + 1 - \sqrt{2}) = 0$$

$x_1 = -1 - \sqrt{2}$ $\quad$ $x_2 = -1 + \sqrt{2}$

---

15) $x^2 - 2x - 15 \geq 0$ v $\mathbb{R}$

$x_1 + x_2 = +2$

$x_1 \cdot x_2 = -15$

$x_1 = 5$

$x_2 = -3$

$$(x - 5) \cdot (x + 3) \geq 0$$

$- \; -$		$- \; +$		$+ \; +$
$\oplus$	-3	$\ominus$	5	$\oplus$

$$x \in (-\infty, -3\rangle \cup \langle 5, \infty)$$

17) $\dfrac{x+3}{x-1} \leq \dfrac{x+3}{x}$ v $\mathbb{R}$ $\quad / \cdot x \cdot (x-1)$ $\quad x \neq 0, 1$

"$(x+3) \cdot x \leq (x+3) \cdot (x-1)$"

$x \cdot (x-1)$: $\quad - \; - \qquad + \; - \qquad + \; +$

$\oplus \quad 0 \quad \ominus \quad 1 \quad \oplus$

I $\qquad$ II $\qquad$ III

I) $x \in (-\infty, 0)$

$(x+3) \cdot x \leq (x+3)(x-1)$

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

$0 \leq -x - 3$

$x \leq -3$

$x \in (-\infty, -3\rangle$

III) $x \in (1, \infty)$

$x \leq -3$

NŘ

II) $x \in (0, 1)$

$x \geq -3$ $\Big\} \cap$

$x \in (0, 1)$

I + II + III

$x \in (-\infty, -3\rangle \cup (0, 1)$

18) $\dfrac{8}{x^2+4x+1} \leq 0 \qquad \checkmark\ \mathbb{R}$

$$8 \neq 0 \quad \forall x \in \mathbb{R}, \Leftarrow$$

$$\frac{8}{x^2+4x+1} \neq 0 \quad \forall x \in \mathbb{R}$$

$$\boxed{\begin{aligned} \sqrt{12} &= \sqrt{3\cdot 4} \\ &= \sqrt{4}\cdot\sqrt{3} \\ &= 2\sqrt{3} \end{aligned}}$$

$$x^2+4x+1=0$$

$$x_{1,2} = \frac{-4 \pm \sqrt{16-4\cdot 1}}{2}$$

$$= \frac{-4 \pm \sqrt{12}}{2} = \frac{-4 \pm 2\sqrt{3}}{2} = \underline{\underline{-2 \pm \sqrt{3}}}$$

$$x \neq -2 \pm \sqrt{3} \qquad \sqrt{3} \doteq 1{,}7\ldots$$

$- \ -$ $\quad | \quad$ $- \ +$ $\quad | \quad$ $+ \ +$

$\oplus \quad -2-\sqrt{3} \quad \ominus \quad -2+\sqrt{3} \quad \oplus$

$$\boxed{x \in \left(-2-\sqrt{3},\ -2+\sqrt{3}\right)}$$

19) $\sqrt{x} + x = 2 \quad /^2 \qquad$ w $\mathbb{R}$

$x + \underline{2\sqrt{x}} \cdot x + x^2 = 4$ ✗

$\sqrt{x} = 2 - x \quad /^2$

$x = 4 - 4x + x^2 \quad / -x$

$0 = x^2 - 5x + 4$

$0 = (x-4)\cdot(x-1)$

$x_1 = 4 \qquad x_2 = 1$

Zb: $x_1 \qquad LS = \sqrt{4} + 4 = 6 \qquad LS \neq PS$ ✗

$PS = 2$

$x_2 = \; LS = \sqrt{1} + 1 = 2 \qquad LS = PS$ ✓

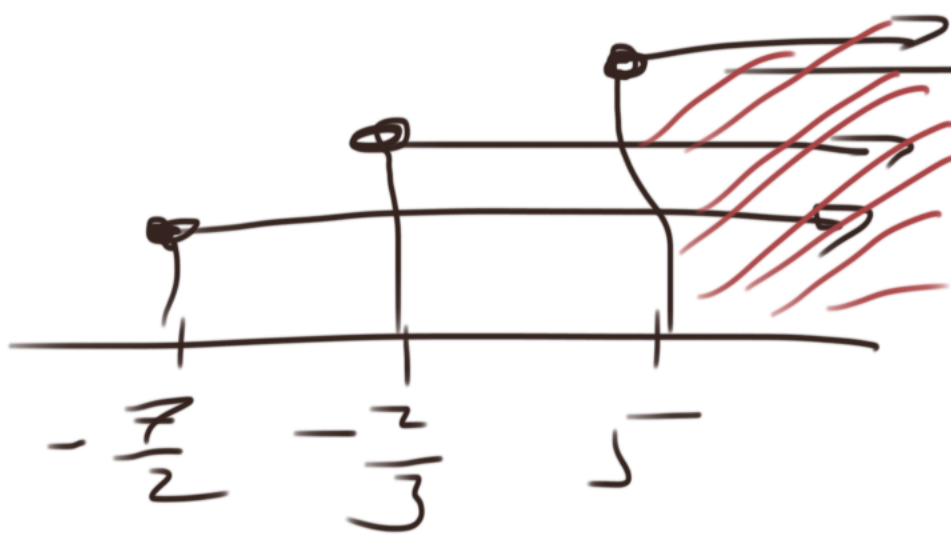
$PS = 2$

$$\boxed{x = 1}$$

20) $\sqrt{2x+7}+\sqrt{x-5}=\sqrt{3x+2} \quad /^2$

$\sqrt{x}: x \geq 0$

$$2x+7 \geq 0$$
$$x-5 \geq 0$$
$$3x+2 \geq 0$$



$$\begin{cases} x \geq -\frac{7}{2} \\ x \geq 5 \\ x \geq -\frac{2}{3} \end{cases}$$

$$\underbrace{x \in \langle 5, \infty)}$$

$$\cancel{2x}+\cancel{7}+2\sqrt{(2x+7)\cdot(x-5)}+\cancel{x}-\cancel{5}=\cancel{3x}+\cancel{2}$$

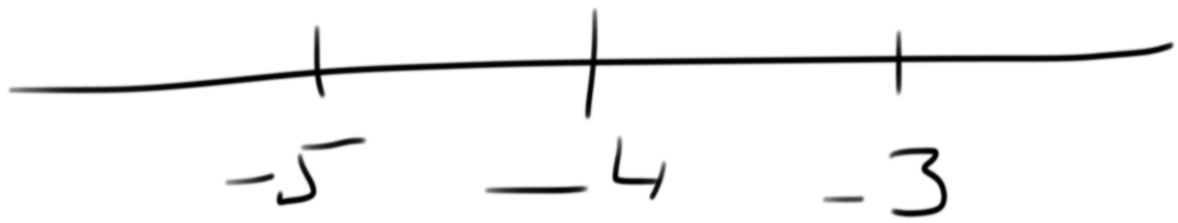
$$2\sqrt{\underbrace{(2x+7)}_{=0 \iff \cancel{x=-\frac{7}{2}}}\cdot\underbrace{(x-5)}_{=0 \iff \boxed{x=5}}}=0$$

Zk: $LS=\sqrt{10+7}=\sqrt{17} \qquad LS=PS$

$PS=\sqrt{15+2}=\sqrt{17} \qquad \checkmark$

Z1) $|x+4| = 1$

$|x-(-4)|$ ... vzdálenost x od -4



$\boxed{x = -3, -5}$

Z2) $|2x-3| = x$

$|2\cdot(x-\frac{3}{2})| = x$

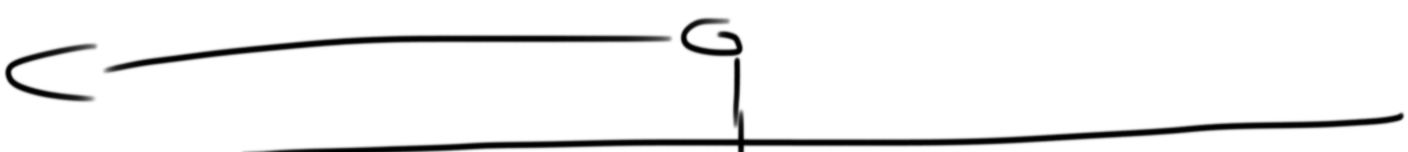
$|2|\cdot|(x-\frac{3}{2})| = x \quad / :2$

$|x-\frac{3}{2}| = \frac{x}{2}$

$2x-3=0$

$2x=3$

$x=\frac{3}{2}$



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

$|2x-3| = -(2x-3)$

$-2x+3 = x$

$3 = 3x$

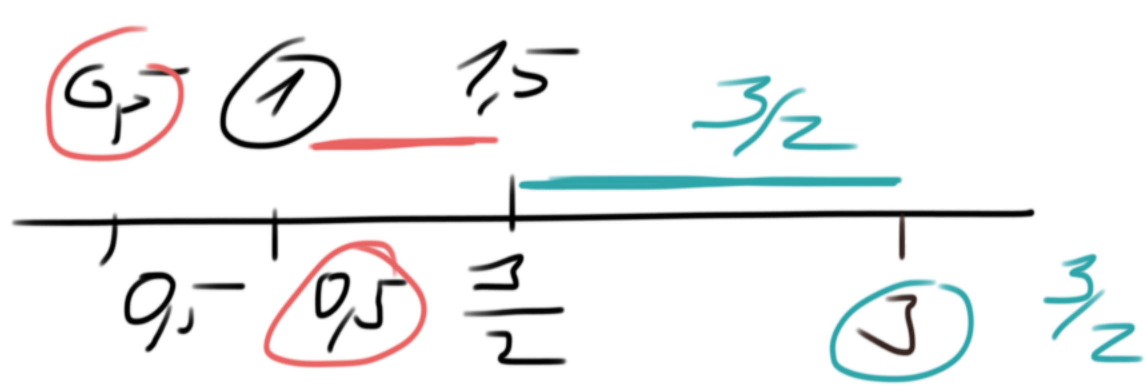
$\boxed{x=1}$

$2x-3>0$

$|2x-3| = 2x-3$

$2x-3 = x$

$\boxed{x=3}$



24) $7x - 3y = 15 \quad / \cdot 2$

$5x + 6y = 27$

$$\left.\begin{aligned} 14x - 6y &= 30 \\ 5x + 6y &= 27 \end{aligned}\right\} \oplus$$

$19x + 0 = 57$

$\boxed{x = 3}$

$21 - 3y = 15$

$\boxed{y = 2}$

25) $$\left.\begin{aligned} x - 5y &= 7 \\ x - 5y &= 6 \end{aligned}\right\} \ominus$$

$0 = 1$

NŘ

26) $2x - 3y = 5$

$4x - 6y = 10$

$x = \frac{5 + 3y}{2}$

$4 \cdot \frac{5 + 3y}{2} - 6y = 10$

$10 + 6y - 6y = 10$

$10 = 10$

$0 = 0$

má ∞ řešení

$$|x^2-4|-|9-x^2|=5$$

± 2 $\qquad$ ± 3

$$|(x+2)\cdot(x-2)| - |(3-x)\cdot(3+x)| = 5$$

I	-3	II	-2	III	2	IV	3	V
$- - = +$		$- - = +$		$+ - = -$		$+ + = +$		$+ + = +$
$+ - = -$		$+ + = +$		$+ + = +$		$+ + = +$		$- + = -$

I) $x \in (-\infty, -3)$

$x^2-4>0 \qquad |x^2-4| = x^2-4$

$9-x^2<0 \qquad |9-x^2| = x^2-9$

$$x^2-4-(x^2-9)=5$$

$$5=5 \qquad \checkmark$$

$$x \in (-\infty, -3) \qquad \checkmark$$