

Cvilení 1

$$1) 4x + 7 - 7(x-6) + 5 = 0$$

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

$$-3x + 54 = 0 \quad |+3x$$

$$54 = 3x \quad |:3$$

$$\underline{x = 18}$$

$$2) \frac{4x-7}{2} - \frac{x-4}{6} \geq 2x-3 \quad | \cdot 6$$

$$12x - 21 - (x-4) \geq 12x - 18 \quad |-12x \\ +21$$

$$-x + 4 \geq 3 \quad |-4$$

$$-x \geq -1 \quad |\cdot (-1)$$

$$x \leq 1 \quad | \square$$

$$x \in (-\infty, 1) \quad \checkmark$$

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

$$4) \quad (x-1)^2 - (x+1)^2 < 8$$

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

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

$$x > 2$$

$$x \in (2, \infty)$$

$$\left[(A-B)^2 = (A+B) \cdot (A-B) \right]$$

$$[(x-1)+(x+1)] \cdot [(x-1)-(x+1)] < 8$$

$$[2x] \cdot [-2] < 8$$

$$-4x < 8$$

$$5) \quad (x-6) \cdot (x+2) > 0 \quad \text{Reste } \underline{R}$$

$$\underline{(x-6)} \cdot \underline{(x+2)} = 0 \quad x_1 = 6, x_2 = -2$$

$$\begin{array}{ccccccc} - & - & + & + & + & + \\ \hline & & & & & & \\ \oplus & -2 & \ominus & 6 & \oplus & & \end{array}$$

$$x \in (-\infty, -2) \cup (6, \infty) \quad \checkmark$$

$$(x-6)(x+1) > 0 \quad \text{Reste } \vee \underline{\mathbb{R}^+}$$

$$\begin{array}{c} \hline + - - 2 - 6 + \\ \hline \end{array} \quad x \in (-\infty, -2) \cup (6, \infty) = M$$

$\mathbb{P} \vee \mathbb{R}^+ \rightarrow \mathbb{R}^+ \cap M$

$$x \in (6, \infty) = M \cap \mathbb{R}^+$$

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

$$x^2 + \dots \geq 0$$

$$(x+7) : \begin{array}{c} - + \\ \hline -7 \end{array} \quad \oplus$$

$$x^2 + 2 : \begin{array}{c} + \\ \hline \end{array}$$

$$\begin{array}{l} x^2 + 2 = 0 \\ x^2 = -2 \end{array} \quad \text{Nach Koeffizienten } \mathbb{R}$$

$$\rightarrow x \in (-7, \infty) \quad \checkmark$$

$$8) \frac{2x-5}{x+3} = 0$$

$\cancel{(x+3)}^R$

$x \neq -3$

$$2x-5=0$$

✓

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

$$9) 4x^2 + x = 0$$

$$x(4x+1) = 0$$

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

$$x_1 = 0 \quad x_2 = -\frac{1}{4}$$

$c = 0$

$$x_{1,2} = \frac{-1 \pm \sqrt{1-4 \cdot 4 \cdot 0}}{8}$$

$$= \frac{-1 \pm \sqrt{1}}{8}$$

$$= \cancel{0}$$

$$-\frac{1}{8} = -\frac{1}{4}$$

$$10) Lx^2 - 5 = 0 \quad | :2$$

$$A^2 - B^2$$

$b = 0$

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

$$(x + \sqrt{\frac{5}{2}})(x - \sqrt{\frac{5}{2}}) = 0$$

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

$$12) 4x^2 - 4x + 1 = 0$$

$$D = b^2 - 4 \cdot a \cdot c \\ D = 16 - 4 \cdot 4 \cdot 1 = 0$$

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

$$13) 3x^2 + x + 1 = 0$$

$$D = 1 - 4 \cdot 3 \cdot 2 = 1 - 24 = -23 < 0$$

Nemá řešení v R

$$14) x^2 + 2x - 1 = 0$$

$$(A+B)^2 = A^2 + 2AB + B^2$$

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

$$A = x+1 \quad B = 1$$

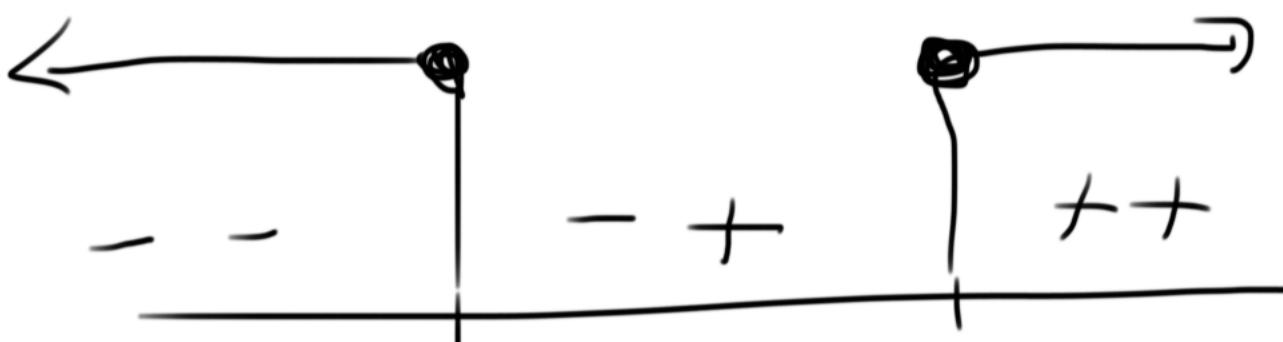
$$(x+1)^2 - 2^2 = 0 \quad k^2 - B^2$$

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

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

$$\begin{array}{|c|c|c|} \hline 1 & 2 & 1 \\ \hline (x+1) & & \\ \hline x^2 + 2x + 1 & & \\ \hline \end{array}$$

$$\begin{array}{ll} \text{15)} x^2 - 2x - 15 \geq 0 & x_1 + x_2 = 2 \\ (x - 5)(x + 3) \geq 0 & x_1 \cdot x_2 = -15 \\ \leftarrow \begin{array}{c} \bullet \\ \text{---} \\ \bullet \end{array} \quad \begin{array}{c} \rightarrow \\ \text{---} \\ \bullet \end{array} & \begin{array}{l} 5 + (-3) = 2 \\ 5 \cdot (-3) = -15 \end{array} \end{array}$$

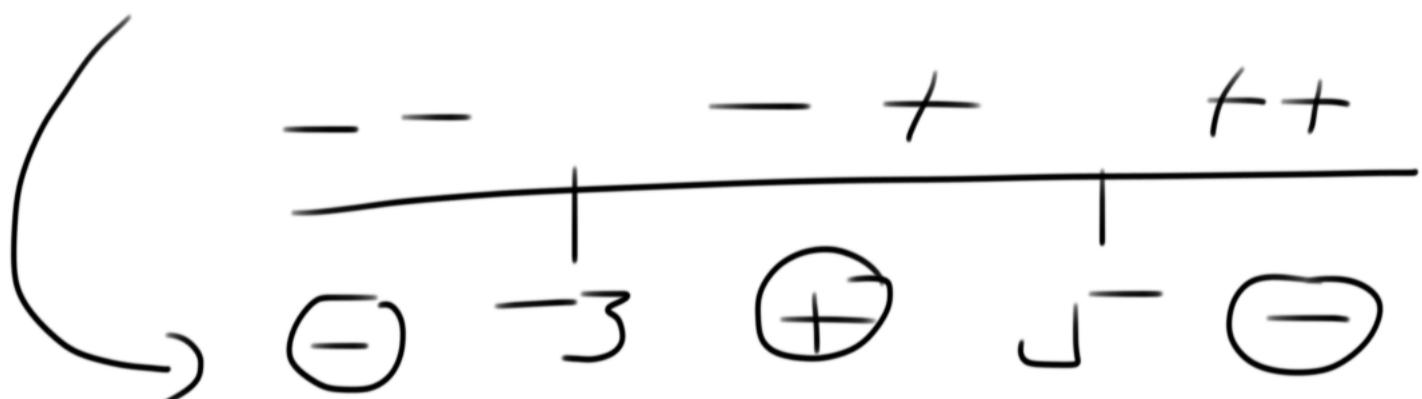


+ - ⊖ + 5 ⊕ ♂

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

$$-x^2 + 2x + 15 \geq 0 \quad ((\cdot -1))$$

$$\underbrace{-1}_{a= -1} (x-5) \cdot (x+3) \geq 0$$



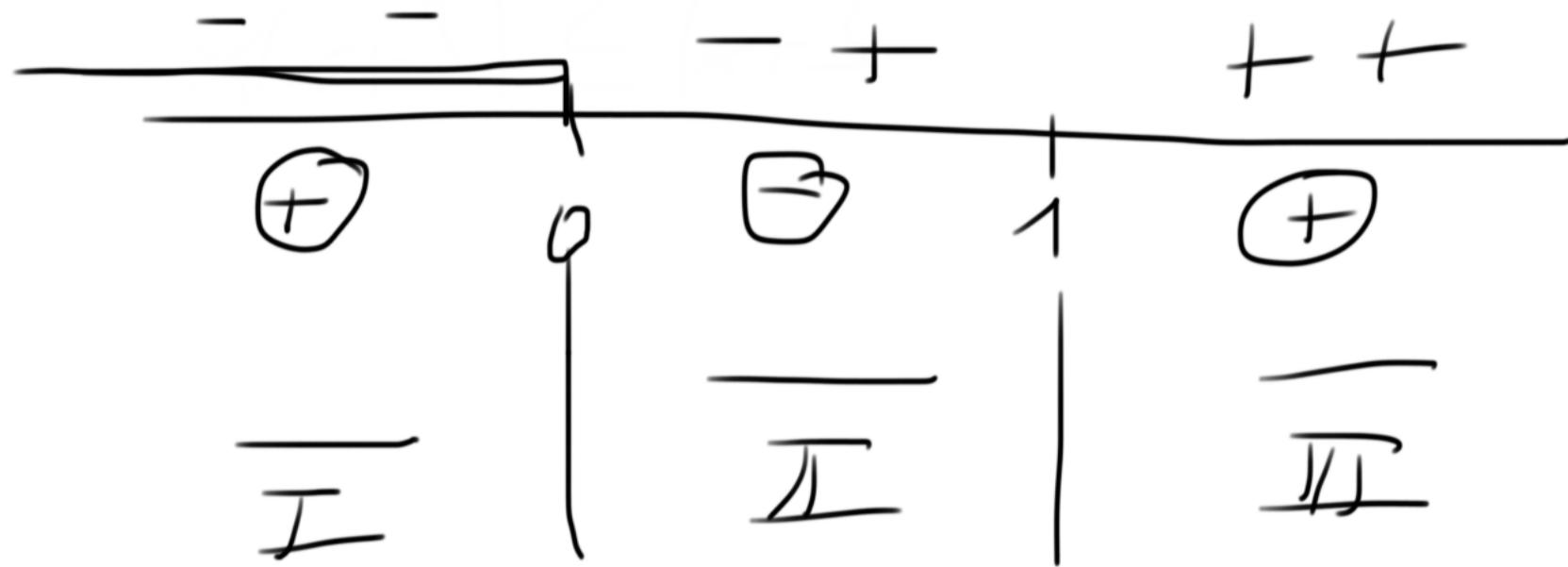
$$x \in \{-3, 5\}$$

$$2x^2 - 2x + 6 - x(x+7) < x^2 - 3$$

$$\text{II) } \frac{x+3}{x-1} \leq \frac{x+3}{x}$$

$\begin{matrix} x \\ x-1 \end{matrix}$

$$x \neq 0, 1$$



$$\text{I) } x \in (-\infty, 0)$$

$$x \cdot (x-1) > 0 \quad \leftarrow$$

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

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

$$x \leq -3$$

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

$$\text{IV) } x \in [1, \infty)$$

$$x \cdot (x-1) > 0$$

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

NR

$$\text{II) } x \in (0, 1)$$

$$x(x-1)$$

$$(0, 1) \cap (-3, \infty) =$$

$$x \geq -3$$

$$x \in [-3, 1) \rightarrow x \in [0, 1]$$

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

$$11) \boxed{x+x=2} \quad /^2 \quad \mathbb{R} \quad | \quad \underline{x \geq 0}$$

$$(x+x)^2 = 4$$

$$\cancel{x+2\boxed{x+x}=4}$$

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

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

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

$$0 = (x-4)(x-1) \quad x_1 = 1, x_2 = 4$$

$$\text{Zk. } x_1: LS = \sqrt{1} + 1 = 2 \quad LS = 2 \checkmark$$

$$x_2: LS = \sqrt{4} + 4 = 6 \quad LS \neq PS \quad x$$

$$PS = 2$$

$$\boxed{x_2 = 1}$$

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

$$A^2 + 2AB + B^2$$

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

$$\begin{aligned} x-5 &\geq 0 \\ 2x+7 &\geq 0 \\ 3x+2 &\geq 0 \\ x &\geq 5 \\ x &\geq -\frac{2}{3} \\ x &\geq -\frac{2}{3} \end{aligned}$$

$$x \cdot \cancel{(2x+7)(x-5)} = 0$$

$$x_1 = -\frac{7}{2} \quad \boxed{x_2 = 5}$$

$$21. \quad \text{L} = \sqrt{10+7+0} = \sqrt{17}$$

$$PS = \sqrt{15+2} = \sqrt{17} \quad \text{L} = \sqrt{17}$$

$$21) \quad |x+4| = 1$$

————— + —————

— 4 —————

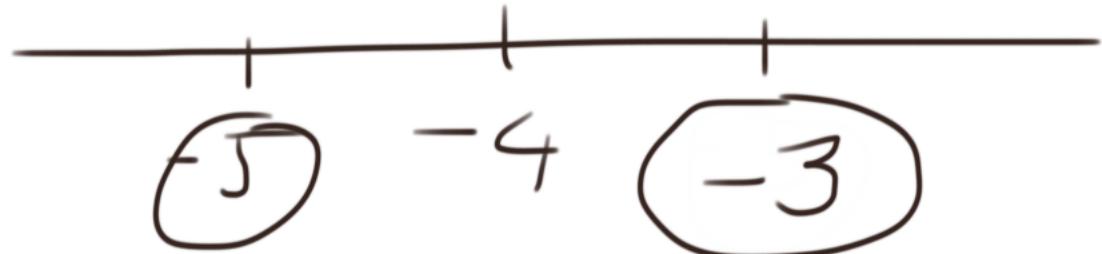
$\checkmark R$

$$|x+4| = |x - (-4)|$$

Vzdešenost x od -4

$$x \in \{-5, -3\}$$

$$x = -5, -3$$



$$22) |2x-3| = x$$

$$2x-3 = 0$$

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

$$\leftarrow \qquad \rightarrow$$

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

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

$$-2x+3 = x$$

$$3 = 3x$$

$$\underline{x=1}$$

$$x < \frac{3}{2} \quad \checkmark$$

$$x = 1$$

$$\boxed{x=1}$$

$$2x-3 > 0 \quad \mathbb{R}$$

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

$$2x-3 = x$$

$$\underline{x = -3}$$

$$-3 \notin \left(\frac{3}{2}, \infty \right)$$

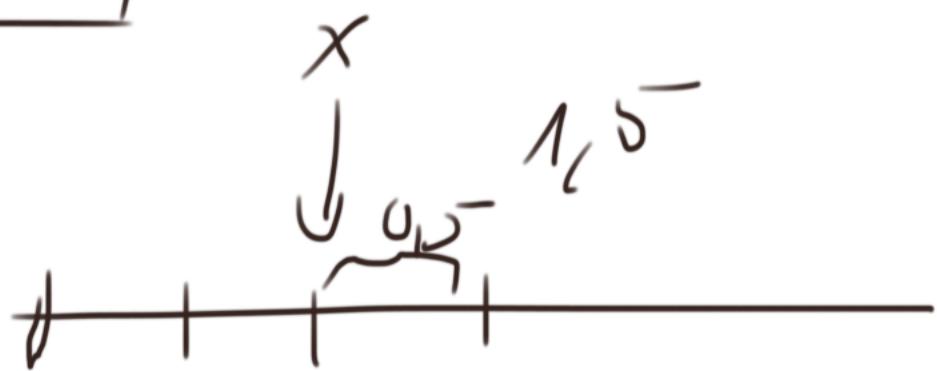
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$$|2x-3| = x$$

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

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



$$0,5 \leq 1 \frac{1}{2}$$

$$0,5 = \frac{1}{2} = \frac{x}{2}$$

$$28) |x^2 - 4| - |9 - x^2| = 5 \quad \checkmark \mathbb{R}$$

$$\begin{aligned} x^2 - 4 &= 0 & 9 - x^2 &= 0 \\ x &= \pm 2 & x &= \pm 3 \end{aligned}$$

$$\left| \frac{(x+2)(x-2)}{(3-x)(3+x)} \right| - 5 = 5$$

-3, -2, 2, 3

$$\begin{array}{ccccccccc} - & - & = & + & - & - & = & + & + - = - & + + = + & + + = + \\ + & - & = & - & + & + & = & + & + & + = + & - & + & = & - \\ \hline & & & & & & & & & & & & & & \\ I & -3 & II & -2 & III & 2 & IV & 3 & V & & & & & & \end{array}$$

$$I) \quad (-\infty, -3)$$

$\overbrace{\quad \quad \quad}^{>0}$

$\overbrace{\quad \quad \quad}^{<0}$

$$(x+2)(x-4) - (-1) \cdot (3-x) \cdot (3+x) = 5$$

$$\underline{x^2 - 4} + \underline{9 - x^2} = 5$$

$$5 = 5$$

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

24) napříte $x, y \in \mathbb{R}$

$$7x - 3y = 15 \quad | \cdot 2$$

$$5x + 6y = 27$$

$$\begin{array}{r} 14x - 6y = 30 \\ 5x + 6y = 27 \\ \hline 19x = 57 \end{array} \quad \left. \begin{array}{l} \\ \\ \oplus \end{array} \right.$$

$$19x + 0 = 57$$

$$\boxed{\begin{array}{l} x = 3 \\ \\ y = 2 \end{array}}$$

$$21 - 3y = 15$$

$$\begin{aligned} 3y &= 6 \\ y &= 2 \end{aligned}$$

$$7x = 15 + 3y$$

$$x = \frac{15 + 3y}{7}$$

$$5 \cdot \left(\frac{15 + 3y}{7} \right) + 6y = 27$$

→ ✓

$$25) \begin{array}{r} x - 5y = 7 \\ x - 5y = 6 \\ \hline \boxed{0 = 1} \end{array} \quad \boxed{NR}$$

$$\begin{array}{l} 26) \begin{array}{r} 2x - 3y = 5 \\ 4x - 6y = 10 \\ \hline x = \frac{5 + 3y}{2} \end{array} \\ 4 \cdot \frac{5 + 3y}{2} - 6y = 10 \\ 10 + \cancel{6y} - \cancel{6y} = 10 \\ 10 = 10 \end{array}$$

nehmende - mehr Lösun'