

Lineární · (ne)rovnice · Řešte v \mathbb{R}

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

$$-3x + 7 + 42 + 5 = 0 \quad /+3x$$

$$54 = -12 \quad /:-3$$

$$x = 18$$

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

$$2x-21 - (x-4) \geq 12x-18$$

$$-x+4 \geq 10x-18$$

$$-x \geq -12 \quad /(-1)$$

$$x \leq 12$$

$$3) \quad x^2 + 6x + 8 = 0$$

$$x_{1,2} = \frac{-6 \pm \sqrt{36-4 \cdot 8}}{2}$$

$$= \frac{-6 \pm 2}{2} = \begin{cases} -2 \\ -4 \end{cases}$$

$$(x+4) \cdot (x+2) = 0$$

$$A^2 - B^2 = (A+B) \cdot (A-B)$$

$$x^2 + 6x + 8 = (x+3)^2 + 8 - 9 = (x+3)^2 - 1^2 = (x+3+1) \cdot (x+3-1) = (x+4) \cdot (x+2)$$

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

$$\begin{cases} -2x - 2x < 8 \\ -4x < 8 \\ x > -2 \end{cases}$$

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

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

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

$$5) \quad (x-6) \cdot (x+2) > 0$$

$$\begin{array}{ccccccc} & - & - & - & + & + & + \\ & \oplus & -2 & - & 6 & \oplus & \mathbb{R} \end{array}$$

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

$$\text{Pozn.} \quad (-x+6) = (6-x)$$

$$\begin{array}{ccc} & + & - \\ & | & \\ & 6 & \end{array}$$

$$6) \quad (x^2+2) \cdot (x+7) \geq 0$$

$$/ : (x^2+2)$$

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

$$x+7 \geq 0$$

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

$$x \geq -7$$

$$x \in [-7, \infty)$$

$$7) \quad a) \quad \frac{2x-5}{x+3} = 0 \quad (60) \quad x \neq -3$$

$$2x-5=0$$

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

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

$$\text{I) } \begin{array}{ccccccc} & - & - & + & + & + & \\ & | & | & | & | & | & \\ & -3 & & \frac{5}{2} & & & \mathbb{R} \end{array}$$

$$x \in (-\infty, -3) \cup (\frac{5}{2}, \infty)$$

$$\text{II) } x \in (-\infty, -3)$$

$$x+3 < 0$$

$$2x-5 \leq 0$$

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

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

$$x \in (-3, \infty) \quad x+3 > 0$$

$$2x-5 \geq 0$$

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

$$x \in (\frac{5}{2}, \infty)$$

$$x \in (-\infty, -3) \cup (\frac{5}{2}, \infty)$$

$$8) \quad 4x^2 + x = 0$$

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

$$x_1 = 0$$

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

$$9) \quad 2x^2 - 5 = 0$$

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

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

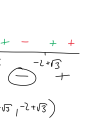
$$10) \quad 3x^2 + x + 2 < 0$$

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

$$\forall x \in \mathbb{R}: 3x^2 + x + 2 > 0$$

$$\Rightarrow \text{nerovnice nemá řešení}$$

$$K = \{\} = \emptyset$$



$$11) \quad \frac{8}{x^2+4x+1} \leq 0$$

$$x^2+4x+1 = (x+2)^2 - 3$$

$$= (x+2+\sqrt{3})(x+2-\sqrt{3})$$

$$x_1 = -2+\sqrt{3}$$

$$x_2 = -2-\sqrt{3}$$

$$\begin{array}{ccccccc} & - & - & + & - & + & + \\ & | & | & | & | & | & \\ & -2-\sqrt{3} & & -2 & & -2+\sqrt{3} & \\ & + & \ominus & & + & & \end{array}$$

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

$$\text{Soustavy lin. rovnic}$$

$$\text{Řešte v } \mathbb{R}^2$$

$$\begin{cases} 7x - 3y = 15 \\ 5x + 6y = 27 \end{cases} \quad /2 \quad \oplus$$

$$19x + 0 = 57$$

$$x = 3$$

$$15 + 6y = 27$$

$$y = 2$$

$$K = \{(3, 2)\}$$

$$x = 3, y = 2$$

$$\begin{cases} x - 5y = 7 \\ x - 5y = 6 \end{cases} \quad \ominus$$

$$0 = 1$$

$$2=3 \quad /-2$$

$$0=1$$

$$\text{Soustava NR}$$

$$K = \emptyset$$

$$\begin{cases} 2x - 3y = 5 \\ 4x - 6y = 10 \end{cases} \quad /2 \quad \ominus$$

$$0 = 0$$

$$\Rightarrow \text{soustava má nekonečně mnoho řešení}$$

$$2x - 3y = 5$$

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

$$K = \{(x, \frac{2}{3}x - \frac{5}{3}) : x \in \mathbb{R}\}$$

$$\text{Rovnice s neznámou pod odmocninou}$$

$$\text{Řešte v } \mathbb{R}$$

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

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

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

$$x = 4 - 6x + x^2$$

$$\text{správně, ale k ničemu}$$

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

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

$$x_1 = 4 \quad x_2 = 1$$

$$\text{Zk: } x = 4:$$

$$LS = 2$$

$$PS = 2 - 4 = -2$$

$$LS \neq PS$$

$$x = 1:$$

$$LS = 1$$

$$PS = 1$$

$$LS = PS \quad \boxed{x = 1}$$

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

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

$$2\sqrt{(2x+7)(x-5)}=0 \quad /^2$$

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

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

$$\text{Zk: } x = -\frac{7}{2}:$$

$$LS = \sqrt{0} + \sqrt{-\frac{21}{2}-5} \Rightarrow \text{není kořen}$$

$$x = 5:$$

$$LS = \sqrt{17} + \sqrt{0}$$

$$PS = \sqrt{17}$$

$$L=P$$

$$\boxed{x = 5}$$

$$\text{Rovnice s Absolutní hodnotou}$$

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$$|x-a|$$



$$\cdot \quad |x+4| = 1$$

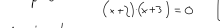
$$|x-(-4)| = 1$$



$$x_1 = -5$$

$$x_2 = -3$$

$$\cdot \quad |2x-4| - |x+3| = 2 - |x-5|$$



$$\text{I) } x \in (-\infty, -3)$$

$$-(2x-4) + (x+3) = 2 + (x-5)$$

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

$$-x + 7 = x - 3$$

$$-2x = -10$$

$$x = 5 \quad \text{NR}$$

$$\text{II) } x \in (-3, 2)$$

$$-2x + 4 - (x+3) = 2 + (x-5)$$

$$-3x + 1 = x - 3$$

$$4 = 4x$$

$$x = 1$$

$$\text{III) } x \in (2, 5)$$

$$2x - 4 - (x+3) = 2 + (x-5)$$

$$\text{IV) } x \in (5, \infty)$$

$$(2x-4) - (x+3) = 2 - (x-5)$$

$$x - 7 = -x + 7$$

$$x = 7$$

$$x_1 = 1 \quad x_2 = 7$$

$$\cdot \quad x^2 + px + 6 = 0$$

$$x_1 = -2 \text{ je kořenem rce}$$

$$p = ? \quad x_2 = ?$$

$$4 - 2 \cdot p + 6 = 0$$

$$p = 5$$

$$\Rightarrow x^2 + 5x + 6 = 0$$

$$(x+2) \cdot (x+3) = 0$$

$$\boxed{p = 5}$$

$$x_2 = -3$$

$$\text{Náhled písemky}$$

$$K = \{1, 2, 3, 4, 5\}$$

$$L = \{n \in \mathbb{N} : n \mid 15\}$$

$$N = \{n \in \mathbb{N} : n^2 \leq 16\}$$

$$K \cap N, K \cup L$$

$$\cdot \text{ rovnice } \sqrt{\quad} \quad \text{rovnice } s \quad | \quad$$

$$\cdot \text{ Alg. výraz}$$

$$\cdot \text{ nerovnice}$$

$$\cdot \text{ MSD, msa}$$

$$\cdot \text{ lehké rovnice}$$

$$+ \text{ pár teor. otázky}$$