

## Úlohy

Vyriešte v množine reálnych čísel

$$2x^2 + 5 = 10$$

$$4x^2 = 4x$$

$$3x + 2 = \frac{1}{2}x^2$$

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

$$\frac{2}{2x+3} + \frac{2}{2x-3} = \frac{4x^2-21}{4x^2-9}$$

$$\frac{x-3}{x+6} + \frac{x-10}{x+5} + \frac{15}{x^2+11x+30} = \frac{9-x}{6+x}$$

$$\frac{x+12}{x+2} + \frac{5}{x^2-x-6} + \frac{x-4}{x-3} = 1 \quad \rightarrow \quad (-11) \quad \begin{array}{l} x^2-x-6 \neq 0 \rightarrow x \neq 3 \\ (x-3)(x+2) = 0 \rightarrow x \neq -2 \end{array}$$

$$x^2+8x-33 \neq 0 \rightarrow D=196 \rightarrow \begin{cases} x_1 = -11 \\ x_2 = 3 \end{cases} \quad x$$

$$1 - \frac{1}{x} = \frac{1}{x^2-x} - \frac{1}{x-1} \quad \rightarrow \quad \begin{array}{l} x^2-x \neq 0 \rightarrow x \neq 0, x \neq 1 \\ x(x-1) \neq 0 \end{array} \quad x \in \emptyset$$

$$6(x^2-5x+1) = -14 - (x^2-5x+2)^2$$

$$\omega = x^2-5x+1 \quad \omega+1 = x^2-5x+2$$

$$6\omega = -14 - (\omega+1)^2$$

$$6\omega = -14 - \omega^2 - 2\omega - 1$$

$$\omega^2 + 8\omega + 15 = 0 \quad \rightarrow \quad D = b^2 - 4ac = 4$$

$$\omega_{1,2} = \frac{-8 \pm \sqrt{4}}{2} = \begin{cases} a_1 = -5 \\ a_2 = -3 \end{cases}$$

$$\text{subst. } x^2 - 5x + 1 = \omega$$

$$\rightarrow a_1 = -5 \quad \dots \quad \begin{array}{l} x^2 - 5x + 1 = -5 \\ x^2 - 5x + 6 = 0 \end{array}$$

$$D = 1 \quad \dots \quad x_{1,2} = \frac{5 \pm 1}{2} = \begin{cases} x_1 = 3 \\ x_2 = 2 \end{cases}$$

$$\rightarrow a_2 = -3 \quad \dots \quad \begin{array}{l} x^2 - 5x + 1 = -3 \\ x^2 - 5x + 4 = 0 \end{array}$$

$$D = 9 \quad \dots \quad x_{3,4} = \frac{5 \pm 3}{2} = \begin{cases} x_3 = 4 \\ x_4 = 1 \end{cases}$$

$$x = \{1, 2, 3, 4\}$$

$$x^2 + 4|x| - 12 = 0$$

$$\begin{array}{l} x \geq 0 \\ x \in [0, \infty) \\ x^2 + 4x - 12 = 0 \\ D = 64 \\ x_{1,2} = \begin{cases} 2 \checkmark \\ -6 \times \end{cases} \end{array} \quad \begin{array}{l} x < 0 \\ x \in (-\infty, 0) \\ x^2 - 4x - 12 = 0 \\ D = 64 \\ x_{1,2} = \begin{cases} 6 \times \\ -2 \checkmark \end{cases} \end{array} \quad X = \{2, -2\}$$

$$x^2 - |x - 5| = |x| + 3 \quad \text{NB: } x=5; \quad x=0$$

	$(-\infty, 0)$	$[0, 5]$	$(5, \infty)$
$ x-5 $	$-x+5$	$-x+5$	$x-5$
$ x $	$-x$	$x$	$x$
	I.	II.	III.

$$\begin{array}{l} \text{I. } x^2 + x - 5 = -x + 3 \\ x^2 + 2x - 8 = 0 \\ D = 36 \\ x_{1,2} = \begin{cases} 2 \\ -4 \end{cases} \end{array}$$

$$\begin{array}{l} \text{II. } x^2 + x - 5 = x + 3 \\ x^2 - 8 = 0 \\ x^2 = 8 \\ |x| = \sqrt{8} = 2\sqrt{2} \\ x = \pm 2\sqrt{2} \end{array}$$

$$\begin{array}{l} \text{III. } x^2 - x + 5 = x + 3 \\ x^2 - 2x + 2 = 0 \\ D = -4 \\ x_{1,2} = \emptyset \end{array}$$

$$X = \{-4, 2\sqrt{2}\}$$

$$(|x| - 3)(x + 1) = -3$$

$$\begin{array}{l} x \geq 0 \\ (x-3)(x+1) = -3 \\ x^2 - 2x = 0 \\ x(x-2) = 0 \\ x_1 = 0 \checkmark, x_2 = 2 \checkmark \end{array} \quad \begin{array}{l} x < 0 \\ (-x-3)(x+1) = -3 \\ -x^2 - 4x = 0 \\ -x(x+4) = 0 \\ x = 0 \times, x = -4 \checkmark \end{array}$$

$$X = \{0, 2, -4\}$$

$$|x^2 + 3x| - 4 = 0$$

$$\begin{array}{l} x^2 + 3x \geq 0 \\ x(x+3) \geq 0 \\ x \in (-\infty, -3] \cup [0, \infty) \\ x^2 + 3x - 4 = 0 \\ D = 25 \\ x_{1,2} = \begin{cases} 1 \checkmark \\ -4 \checkmark \end{cases} \end{array} \quad \begin{array}{l} x^2 + 3x < 0 \\ x(x+3) < 0 \\ x \in (-3, 0) \\ -x^2 - 3x - 4 = 0 \\ D = -7 \\ x_{1,2} \in \emptyset \end{array}$$

$$X = \{1, -4\}$$