

LINEÁRNÍ ROVNICE (část 1.)

Př1 Řešte v $\mathbb{R}$ rovnice:

a) $x+5=0$

$$x = (-5)$$

$$K = \{-5\}$$

b) $3x=0 \quad |:3$

$$x = 0$$

$$K = \{0\}$$

c) $2x-4=0$

$$2x = 4 \quad |:2$$

$$x = 2$$

$$K = \{2\}$$

d) $3x+1=0$

$$3x = -1 \quad |:3$$

$$x = -\frac{1}{3}$$

$$K = \{-\frac{1}{3}\}$$

e) $-x+3=0$

$$-x = -3 \quad | \cdot (-1)$$

$$x = 3$$

$$K = \{3\}$$

f) $-3x=12 \quad | :(-3)$

$$x = (-4)$$

$$K = \{-4\}$$

Př2 Řešte v $\mathbb{R}$ rovnice:

a) $2x-5=3x+7$

$$2x-3x = 7+5$$

$$-x = 12 \quad | \cdot (-1)$$

$$x = (-12)$$

$$K = \{-12\}$$

b) $x-6=-4x+9$

$$x+4x = 9+6$$

$$5x = 15 \quad |:5$$

$$x = 3$$

$$K = \{3\}$$

c) $0,5+7x=12-2x$

$$7x+2x = 12-0,5$$

$$9x = 11,5 \quad |:9$$

$$x = \frac{11,5}{9}$$

$$x = \frac{23}{18} = 1,2\bar{7}$$

$$K = \{\frac{23}{18}\}$$

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

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

$$7x = 3$$

$$x = \frac{3}{7}$$

$$K = \{\frac{3}{7}\}$$

Př3 Řešte v $\mathbb{R}$ rovnice:

a) $5x-4+2(3-2x)=2x-7$

$$5x-4+6-4x = 2x-7$$

$$5x-4x-2x = -7-6+4$$

$$-x = -9$$

$$x = 9$$

$$K = \{9\}$$

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

$$2x+10 = 4x-12-3x+6+2x-2$$

$$2x-4x+3x-2x = -12+6-2-10$$

$$-x = -18$$

$$x = 18$$

$$K = \{18\}$$

$$c) x^2 - 3x + 1 = x^2 + 13 - x$$

$$\cancel{x^2} - 3x - \cancel{x^2} + x = 13 - 1$$

$$-2x = 12 \quad |:(-2)$$

$$\underline{x = (-6)}$$

$$K = \{-6\}$$

$$d) (3x-1)(1-x) = (x-1)(3-x) - 2x^2 - 2x$$

$$3x - 3x^2 - 1 + x = 3x - x^2 - 3 + x - 2x^2 - 2x$$

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

$$2x = -2 \quad |:2$$

$$\underline{x = (-1)}$$

$$K = \{-1\}$$

$$e) 2x^2 + x + 3 - (x-1)^2 = x^2 + 5$$

$$2x^2 + x + 3 - (x^2 - 2x + 1) = x^2 + 5$$

$$2x^2 + x + 3 - x^2 + 2x - 1 = x^2 + 5$$

$$\cancel{2x^2} + x - \cancel{x^2} + 2x - \cancel{x^2} = 5 + 1 - 3$$

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

$$\underline{x = 1}$$

$$K = \{1\}$$

$$f) 5x = (2-3x) \cdot 7 - 4(x+1)$$

$$5x = 14 - 21x - 4x - 4$$

$$5x + 21x + 4x = 14 - 4$$

$$30x = 10 \quad |:30$$

$$\underline{x = \frac{1}{3}}$$

$$K = \{\frac{1}{3}\}$$

$$g) 6 - (x-1)(x+1) = x(5-x)$$

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

$$6 - x^2 + 1 = 5x - x^2$$

$$\cancel{-x^2} + \cancel{x^2} - 5x = -6 - 1$$

$$-5x = -7 \quad |:(-5)$$

$$\underline{x = \frac{7}{5}}$$

$$K = \{\frac{7}{5}\}$$

$$h) 8 + x(x+5) = x - (4-x)(x+4)$$

$$8 + x^2 + 5x = x - (4x + 16 - x^2 - 4x)$$

$$8 + x^2 + 5x = x - 4x - 16 + x^2 + 4x$$

$$\cancel{x^2} + 5x - x - \cancel{x^2} = -16 - 8$$

$$4x = -24 \quad |:4$$

$$\underline{x = (-6)}$$

$$K = \{-6\}$$

Př 4 Řešte v R rovnici:

$$a) \frac{3}{4} - \frac{(x+1)(x-1)}{20} = \frac{x}{5} - \frac{0,5x^2}{10} \quad | \cdot 20$$

$$15 - (x+1)(x-1) = 4x - 2 \cdot 0,5x^2$$

$$15 - (x^2 - 1) = 4x - x^2$$

$$15 - x^2 + 1 = 4x - x^2$$

$$-x^2 - 4x + x^2 = -15 - 1$$

$$-4x = -16 \quad | : (-4)$$

$$\underline{x = 4}$$

$$K = \{4\}$$

$$b) \frac{x}{3} - \frac{x}{2} + \frac{x}{6} = x - 1 \quad | \cdot 6$$

$$2x - 3x + x = 6x - 6$$

$$\underline{2x - 3x + x - 6x = -6}$$

$$-6x = -6 \quad | : (-6)$$

$$\underline{x = 1}$$

$$K = \{1\}$$

$$c) \frac{x+3}{7} - \frac{2x+5}{21} = \frac{x}{3} \quad | \cdot 21$$

$$3(x+3) - (2x+5) = 7x$$

$$3x + 9 - 2x - 5 = 7x$$

$$3x - 2x - 7x = 5 - 9$$

$$-6x = -4 \quad | : (-6)$$

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

$$K = \left\{\frac{2}{3}\right\}$$

$$d) 5 - \frac{x}{3} = \frac{7}{2} - \frac{4x+1}{8} \quad | \cdot 24$$

$$120 - 8x = 84 - 3(4x+1)$$

$$120 - 8x = 84 - 12x - 3$$

$$-8x + 12x = 84 - 3 - 120$$

$$4x = -39 \quad | : 4$$

$$\underline{x = -\frac{39}{4}}$$

$$K = \left\{-\frac{39}{4}\right\}$$

$$e) \frac{3x-1}{5} - \frac{1+x}{2} = 3 - \frac{x-1}{4} \quad | \cdot 20$$

$$4(3x-1) - 10(1+x) = 3 \cdot 20 - 5(x-1)$$

$$12x - 4 - 10 - 10x = 60 - 5x + 5$$

$$12x - 10x + 5x = 60 + 5 + 10 + 4$$

$$7x = 79 \quad | : 7$$

$$\underline{x = \frac{79}{7}}$$

$$K = \left\{\frac{79}{7}\right\}$$

$$f) \frac{2(x-4)}{3} + \frac{3x+13}{8} = \frac{3(2x-3)}{5} - 7 \quad / \cdot 120$$

$$40 \cdot 2 \cdot (x-4) + 15 \cdot (3x+13) = 24 \cdot 3 \cdot (2x-3) - 7 \cdot 120$$

$$80x - 320 + 45x + 195 = 144x - 216 - 840$$

$$80x + 45x - 144x = -216 - 840 - 195 + 320$$

$$-19x = -931 \quad / : (-19)$$

$$\underline{\underline{x = 49}}$$

$$K = \{49\}$$

$$g) \frac{x}{2} + \frac{3x-1}{3} - \frac{3x-2}{6} = x-1 \quad / \cdot 6$$

$$3x + 2(3x-1) - (3x-2) = 6(x-1)$$

$$3x + 6x - 2 - 3x + 2 = 6x - 6$$

$$3x + 6x - 3x - 6x = -6 - 2 + 2$$

$$0 \neq -6$$

$$K = \emptyset$$

$$h) \frac{x-2}{3} - \frac{3x+4}{5} + x = 24 - \frac{5x+6}{7} \quad / \cdot 105$$

$$35(x-2) - 21(3x+4) + 105x = 105 \cdot 24 - 15(5x+6)$$

$$35x - 70 - 63x - 84 + 105x = 2520 - 75x - 90$$

$$35x - 63x + 105x + 75x = 2520 - 90 + 70 + 84$$

$$152x = 2584 \quad / : 152$$

$$\underline{\underline{x = 17}}$$

$$K = \{17\}$$