

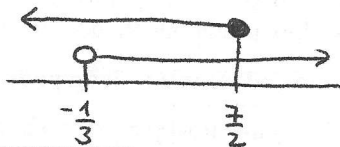
SOUSTAV LINEÁRNÍCH NEROVNÍK

Př1

a) $2x - 7 \leq 0$
 $3x + 1 > 0$

- $2x \leq 7$
 $x \leq \frac{7}{2}$

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

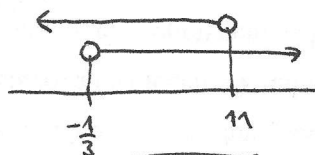


$K = (-\frac{1}{3}; \frac{7}{2}]$

b) $3x + 1 > 0$
 $x - 1 < 10$

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

- $x < 10 + 1$
 $x < 11$

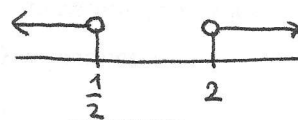


$K = (-\frac{1}{3}; 11)$

c) $5x - 3 > 7$
 $2(x + 1) < 3$

- $5x > 7 + 3$
 $5x > 10$
 $x > 2$

- $2x + 2 < 3$
 $2x < 1$
 $x < \frac{1}{2}$



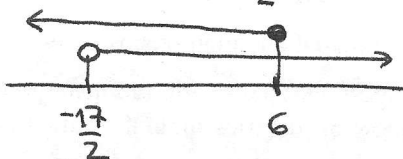
$K = \emptyset$

Př2

a) $3x - 5 \leq 2x + 1$
 $5(x + 1) > 3(x - 4)$

- $3x - 2x \leq 1 + 5$
 $x \leq 6$

- $5x + 5 > 3x - 12$
 $5x - 3x > -12 - 5$
 $2x > -17$
 $x > -\frac{17}{2}$

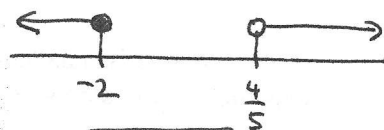


$K = (-\frac{17}{2}; 6]$

b) $2x + 3 \leq x + 1$
 $4x > 4 - x$

- $2x - x \leq 1 - 3$
 $x \leq -2$

- $4x + x > 4$
 $5x > 4$
 $x > \frac{4}{5}$

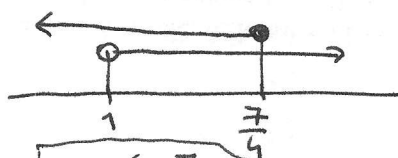


$K = \emptyset$

c) $3(-x + 2) \geq x - 1$
 $3 < 2x + 1$

- $-3x + 6 \geq x - 1$
 $-3x - x \geq -1 - 6$
 $-4x \geq -7$
 $x \leq \frac{7}{4}$

- $-2x < 1 - 3$
 $-2x < -2$
 $x > 1$

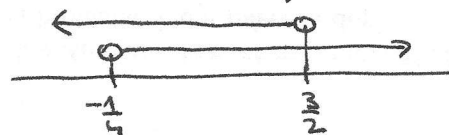


$K = (1; \frac{7}{4}]$

d) $2(2x - 3) < 0$
 $3(5x + 2) - (2 - x) > 0$

- $4x - 6 < 0$
 $4x < 6$
 $x < \frac{3}{2}$

- $15x + 6 - 2 + x > 0$
 $15x + x > 2 - 6$
 $16x > -4$
 $x > -\frac{1}{4}$



$K = (-\frac{1}{4}; \frac{3}{2})$

$$c) 7 - 7x < 3x + 4$$

$$7 - 4x > 3 + 3x$$

$$\bullet -7x - 3x < 4 - 7$$

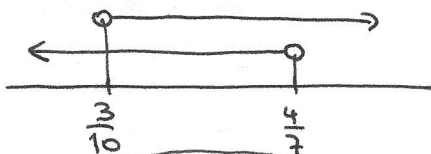
$$-10x < -3$$

$$x > \frac{3}{10} \quad (0,3)$$

$$\bullet -4x - 3x > 3 - 7$$

$$-7x > -4$$

$$x < \frac{4}{7} \quad (0,57)$$



$$K = \left(\frac{3}{10}; \frac{4}{7} \right)$$

Pr 3

$$a) 2(3x - 1) < 3(4x + 1) + 16$$

$$4(2x + 4) < 7x + 16$$

$$\bullet 6x - 2 < 12x + 3 + 16$$

$$6x - 12x < 3 + 16 + 2$$

$$-6x < 21$$

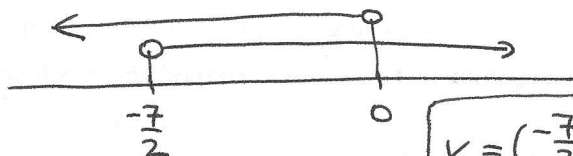
$$x > \frac{-21}{6}$$

$$x > \frac{-7}{2}$$

$$\bullet 8x + 16 < 7x + 16$$

$$8x - 7x < 16 - 16$$

$$x < 0$$



$$K = \left(-\frac{7}{2}; 0 \right)$$

$$b) (x+1)^2 + 7 > (x-4)^2$$

$$(1+x)^2 + 3x^2 \leq (2x-1)^2 + 7$$

$$\bullet x^2 + 2x + 1 + 7 > x^2 - 8x + 16$$

$$2x + 8x > 16 - 1 - 7$$

$$10x > 8$$

$$x > \frac{8}{10}$$

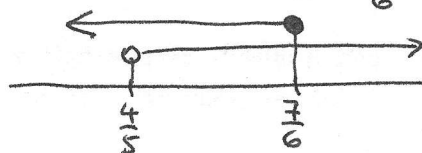
$$x > \frac{4}{5} \quad (0,8)$$

$$\bullet 1 + 2x + x^2 + 3x^2 \leq 4x^2 - 4x + 1 + 7$$

$$2x + 4x \leq 1 + 7 - 1$$

$$6x \leq 7$$

$$x \leq \frac{7}{6} \quad (1,1\bar{6})$$



$$K = \left(\frac{4}{5}; \frac{7}{6} \right)$$

Pr 4

$$a) \frac{x}{3} + \frac{3}{4} \geq \frac{1}{12} \quad / \cdot 12$$

$$x - 2 < \frac{1}{5} \quad / \cdot 5$$

$$\bullet 4x + 9 \geq 1$$

$$4x \geq 1 - 9$$

$$4x \geq -8$$

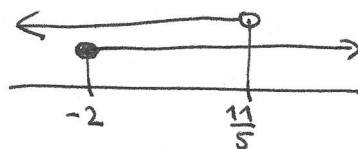
$$x \geq -2$$

$$\bullet 5x - 10 < 1$$

$$5x < 1 + 10$$

$$5x < 11$$

$$x < \frac{11}{5}$$



$$K = \left[-2; \frac{11}{5} \right)$$

$$b) \frac{1-2x}{3} < \frac{1+3x}{4} \quad | \cdot 12$$

$$1-7x \geq -6x$$

$$\bullet 4(1-2x) < 3(1+3x)$$

$$4-8x < 3+9x$$

$$-8x-9x < 3-4$$

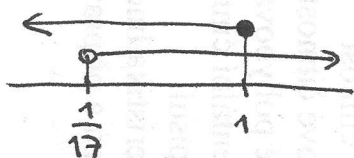
$$-17x < -1$$

$$x > \frac{1}{17}$$

$$\bullet -7x + 6x \geq -1$$

$$-x \geq -1$$

$$x \leq 1$$



$$K = \left(\frac{1}{17}; 1 \right]$$

$$c) 3-x \leq \frac{1}{2} + 2x \quad | \cdot 2$$

$$2+x > 7x + \frac{3}{2} \quad | \cdot 2$$

$$\bullet 6-2x \leq 1+4x$$

$$-2x-4x \leq 1-6$$

$$-6x \leq -5$$

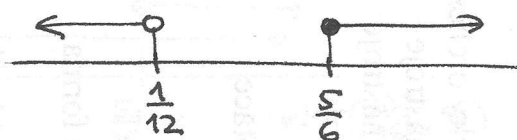
$$x \geq \frac{5}{6}$$

$$\bullet 4+2x > 14x+3$$

$$2x-14x > 3-4$$

$$-12x > -1$$

$$x < \frac{1}{12}$$



$$K = \emptyset$$

$$d) \frac{x-1}{4} + \frac{7-x}{2} > 3 \quad | \cdot 2$$

$$2x-3 - \frac{x^2+2}{3} \leq 2 - \frac{(3-x)^2}{3} \quad | \cdot 3$$

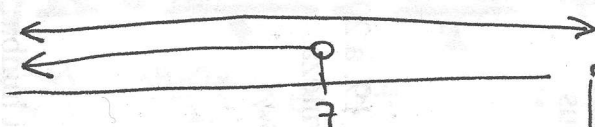
$$\bullet x-1 + 2(7-x) > 6$$

$$x-1 + 14 - 2x > 6$$

$$x-2x > 6+1-14$$

$$-x > -7$$

$$x < 7$$



$$\bullet 6x-9-(x^2+2) \leq 6-(3-x)^2$$

$$6x-9-x^2-2 \leq 6-(9-6x+x^2)$$

$$6x-9-x^2-2 \leq 6-9+6x-x^2$$

$$6x-x^2-6x+x^2 \leq 6-9+9+2$$

$$0 \leq 8$$

pravdivý zaps, tzn. $K_1 = \mathbb{R}$

$$K = (-\infty; 7)$$

Pr 5 $x \in \mathbb{N}$ a) $x+3 < 4+2x$
 $5x-3 < 4x-1$

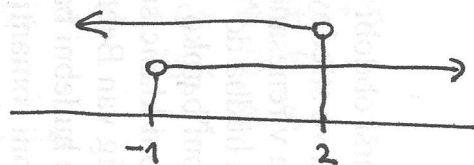
$$\bullet x-2x < 4-3$$

$$-x < 1$$

$$x > (-1)$$

$$\bullet 5x-4x < -1+3$$

$$x < 2$$



$$K' = (-1; 2), \text{ ale } x \in \mathbb{N}, \text{ tzn.}$$

$$K = \{1\}$$

$$b) x \in \mathbb{Z} \quad \frac{2x+3}{2} - \frac{x-1}{3} < 2x + 0,2x \quad | \cdot 6$$

$$1,2x - \frac{2(x-1)}{3} > \frac{2x+1}{2} - x \quad | \cdot 6$$

$$\bullet 3(2x+3) - 2(x-1) < 12x + 1,2x$$

$$6x + 9 - 2x + 2 < 12x + 1,2x$$

$$6x - 2x - 12x - 1,2x < -2 - 9$$

$$-9,2x < -11 \quad | : (-9,2)$$

$$x > \frac{11}{9,2}$$

$$x > \frac{110}{92}$$

$$x > \frac{55}{46} \quad (1,196)$$

$$\bullet 72x - 4(x-1) > 3(2x+1) - 6x$$

$$72x - 4x + 4 > 6x + 3 - 6x$$

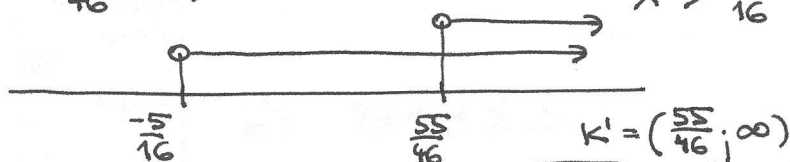
$$72x - 4x - 6x + 6x > 3 - 4$$

$$3,2x > -1 \quad | : 3,2$$

$$x > \frac{-1}{3,2}$$

$$x > \frac{-10}{32}$$

$$x > \frac{-5}{16} \quad (-0,3125)$$



$$K' = \left(\frac{55}{46}; \infty \right)$$

$$K = \{x \in \mathbb{Z}; x > \frac{55}{46}\} = \{2; 3; \dots\}$$

Pr 6

$$x - 2 = \frac{2-3x}{8} + \frac{8-x}{12} \quad | \cdot 24$$

$$x^2 + 2x - 1 > (x-2)^2 - 3$$

$$\bullet 24(x-2) = 3(2-3x) + 2(8-x)$$

$$24x - 48 = 6 - 9x + 16 - 2x$$

$$24x + 9x + 2x = 6 + 16 + 48$$

$$35x = 70$$

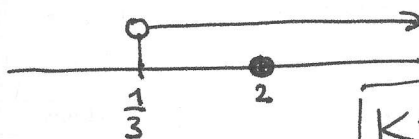
$$x = 2$$

$$\bullet x^2 + 2x - 1 > x^2 - 4x + 4 - 3$$

$$x^2 + 2x - x^2 + 4x > 4 - 3 + 1$$

$$6x > 2 \quad | : 6$$

$$x > \frac{1}{3}$$



$$K = \{2\}$$

Pr 7

Určete definiční obor výrazu:

$$\sqrt{2x - \frac{2x-11}{4} - \frac{19-2x}{2}} + \sqrt{\frac{x}{3} + \frac{x-1}{5} - \frac{2x+15}{9}}$$

$$\bullet 2x - \frac{2x-11}{4} - \frac{19-2x}{2} \geq 0 \quad | \cdot 4$$

$$8x - (2x-11) - 2(19-2x) \geq 0$$

$$8x - 2x + 11 - 38 + 4x \geq 0$$

$$8x - 2x + 4x \geq 38 - 11$$

$$10x \geq 27$$

$$x \geq \frac{27}{10}$$

$$\bullet \frac{x}{3} + \frac{x-1}{5} - \frac{2x+15}{9} \geq 0 \quad | \cdot 45$$

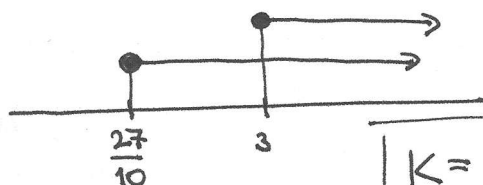
$$15x + 9(x-1) - 3(2x+15) \geq 0$$

$$15x + 9x - 9 - 6x - 45 \geq 0$$

$$15x + 9x - 6x \geq 45 + 9$$

$$18x \geq 54$$

$$x \geq 3$$



$$K = [3; \infty)$$