

Samostatná práce Lineární nerovnice, Soustavy lineárních nerovnic

Zadání

1) Řešte nerovnici:

$$3(x-5) - 4(8-5x) < 4(2x+5)$$

2) Řešte soustavu nerovnic:

$$\frac{3-5x}{3} \leq \frac{2+3x}{4}$$

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

3) Řešte nerovnici:

$$2x - (x+3)^2 < -4x - (2-x)^2$$

4) Řešte soustavu nerovnic:

$$4 + \frac{4x-11}{3} > \frac{3}{2}x$$

$$10 - 4(3-x) \geq 2x$$

5) Řešte nerovnici:

$$2x - \frac{2}{5}(2x+1) > -2x - \frac{2}{3}$$

6) Řešte nerovnici:

$$2x - \frac{3}{4}(3x-1) > 5x - \frac{1}{2}$$

7) Řešte soustavu nerovnic:

$$3 + \frac{4x-5}{3} > \frac{3}{4}x$$

$$8 - 3(2-x) \geq 5x$$

8) Řešte nerovnici:

$$2(x-6) - 3(7-5x) \leq 4(2x-2)$$

9) Řešte nerovnici:

$$3x + (x-5)^2 < 8x + (5-x)^2$$

10) Řešte soustavu nerovnic:

$$\frac{5-8x}{3} > \frac{2-3x}{2}$$

$$3(2x-1) > 5(3x+1)$$

Výsledky

1) $x \in \left(-\infty; \frac{67}{15}\right)$

2) $x \in \left\langle \frac{6}{29}; \infty \right\rangle$

3) $x \in \left(-\frac{5}{4}; \infty\right)$

4) $x \in \langle 1; 2 \rangle$

5) $x \in \left\langle -\frac{1}{12}; \infty \right\rangle$

6) $x \in \left(-\infty; \frac{5}{21}\right)$

7) $x \in \left(-\frac{16}{7}; 1\right\rangle$

8) $x \in \left(-\infty; \frac{25}{9}\right\rangle$

9) $x \in (0; \infty)$

10) $x \in \left(-\infty; -\frac{8}{9}\right)$

Postup řešení

1) Řešte nerovnici:

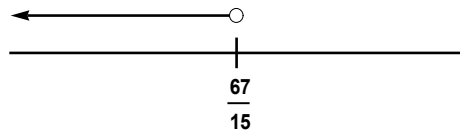
$$3(x-5) - 4(8-5x) < 4(2x+5)$$

$$3x - 15 - 32 + 20x < 8x + 20$$

$$3x + 20x - 8x < 20 + 15 + 32$$

$$15x < 67 \quad /:15$$

$$x < \frac{67}{15}$$



$$x \in \left(-\infty; \frac{67}{15} \right)$$

2) Řešte soustavu nerovnic:

$$\frac{3-5x}{3} \leq \frac{2+3x}{4}$$

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

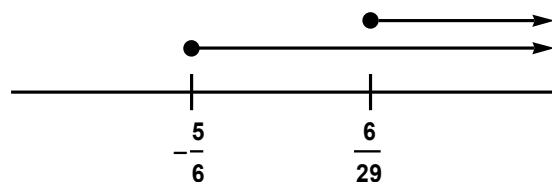
$$\frac{3-5x}{3} \leq \frac{2+3x}{4} \quad / \cdot 12 \qquad 2(3x-1) \leq 3(4x+1)$$

$$4(3-5x) \leq 3(2+3x) \qquad 6x-2 \leq 12x+3$$

$$12-20x \leq 6+9x \qquad -6x \leq 5 \quad /:(-6)$$

$$-29x \leq -6 \quad /:(-29) \qquad x \geq -\frac{5}{6}$$

$$x \geq \frac{6}{29}$$



$$x \in \left(\frac{6}{29}; \infty \right)$$

3) Řešte nerovnici:

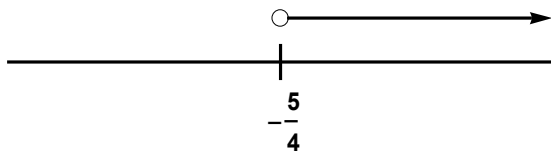
$$2x - (x+3)^2 < -4x - (2-x)^2$$

$$2x - (x^2 + 6x + 9) < -4x - (4 - 4x + x^2)$$

$$2x - x^2 - 6x - 9 < -4x - 4 + 4x - x^2$$

$$-4x < 5 \quad /: (-4)$$

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



$$x \in \left(-\frac{5}{4}; \infty \right)$$

4) Řešte soustavu nerovnic:

$$4 + \frac{4x-11}{3} > \frac{3}{2}x$$

$$10 - 4(3-x) \geq 2x$$

$$4 + \frac{4x-11}{3} > \frac{3}{2}x \quad / \cdot 6 \qquad 10 - 4(3-x) \geq 2x$$

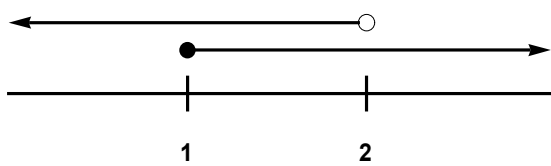
$$24 + 2(4x-11) > 9x \qquad 10 - 12 + 4x \geq 2x$$

$$24 + 8x - 22 > 9x \qquad 4x - 2x \geq -10 + 12$$

$$-x > -2 \quad /: (-1) \qquad 2x \geq 2 \quad /: 2$$

$$x < 2$$

$$x \geq 1$$



$$x \in \langle 1; 2 \rangle$$

5) Řešte nerovnici:

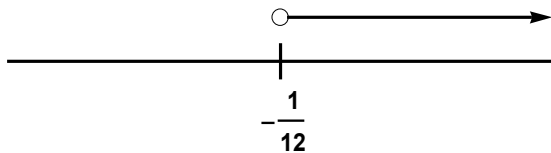
$$2x - \frac{2}{5}(2x+1) > -2x - \frac{2}{3}$$

$$2x - \frac{4x}{5} - \frac{2}{5} > -2x - \frac{2}{3} \quad / \cdot 15$$

$$30x - 12x - 6 > -30x - 10$$

$$48x > -4 \quad / : 48$$

$$x > -\frac{1}{12}$$



$$x \in \left(-\frac{1}{12}; \infty \right)$$

6) Řešte nerovnici:

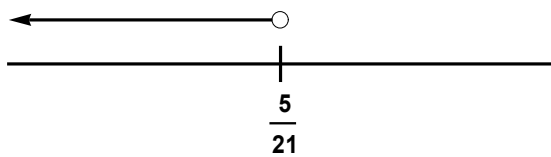
$$2x - \frac{3}{4}(3x-1) > 5x - \frac{1}{2}$$

$$2x - \frac{9x}{4} + \frac{3}{4} > 5x - \frac{1}{2} \quad / \cdot 4$$

$$8x - 9x + 3 > 20x - 2$$

$$-21x > -5 \quad / : (-21)$$

$$x < \frac{5}{21}$$



$$x \in \left(-\infty; \frac{5}{21} \right)$$

7) Řešte soustavu nerovnic:

$$3 + \frac{4x-5}{3} > \frac{3}{4}x$$

$$8 - 3(2-x) \geq 5x$$

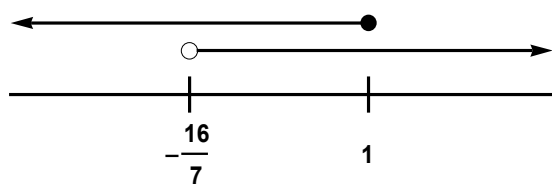
$$3 + \frac{4x-5}{3} > \frac{3}{4}x \quad / \cdot 12 \qquad 8 - 3(2-x) \geq 5x$$

$$36 + 4(4x-5) > 9x \qquad 8 - 6 + 3x \geq 5x$$

$$36 + 16x - 20 > 9x \qquad -2x \geq -2 \quad / : (-2)$$

$$7x > -16 \quad / : 7 \qquad x \leq 1$$

$$x > -\frac{16}{7}$$



$$x \in \left(-\frac{16}{7}; 1 \right]$$

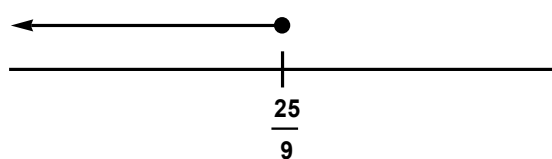
8) Řešte nerovnici:

$$2(x-6) - 3(7-5x) \leq 4(2x-2)$$

$$2x - 12 - 21 + 15x \leq 8x - 8$$

$$9x \leq 25 \quad / : 9$$

$$x \leq \frac{25}{9}$$



$$x \in \left(-\infty; \frac{25}{9} \right]$$

9) Řešte nerovnici:

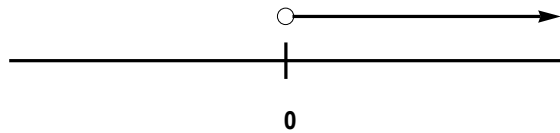
$$3x + (x-5)^2 < 8x + (5-x)^2$$

$$3x + (x^2 - 10x + 25) < 8x + (25 - 10x + x^2)$$

$$3x + x^2 - 10x + 25 < 8x + 25 - 10x + x^2$$

$$-5x < 0 \quad /: (-5)$$

$$x > 0$$



$$x \in (0; \infty)$$

10) Řešte soustavu nerovnic:

$$\frac{5-8x}{3} > \frac{2-3x}{2}$$

$$3(2x-1) > 5(3x+1)$$

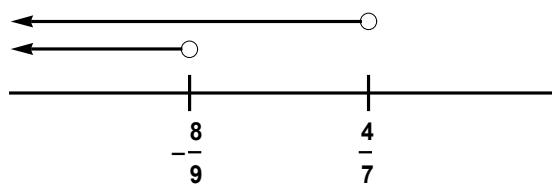
$$\frac{5-8x}{3} > \frac{2-3x}{2} \quad / \cdot 6 \qquad 3(2x-1) > 5(3x+1)$$

$$2(5-8x) > 3(2-3x) \qquad 6x-3 > 15x+5$$

$$10-16x > 6-9x \qquad -9x > 8 \quad /: (-9)$$

$$-7x > -4 \quad /: (-7) \qquad x < -\frac{8}{9}$$

$$x < \frac{4}{7}$$



$$x \in \left(-\infty; -\frac{8}{9}\right)$$