

Lineární nerovnice

POZOR: odlišnost od řešení rovnic

☞ násobení (dělení) nerovnice kladným číslem – znak nerovnosti zůstává stejný

☞ násobení (dělení) nerovnice záporným číslem – znak nerovnosti se změní na opačný

Výsledek řešení nerovnice se uvádí vždy ve formě **intervalu**.

Příklady

1) $2x + 7 < 6x - 4$

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

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

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

5) $2(x - 4) - 3(1 - 2x) < 8(3x + 5)$

6) $2(2 - x) - \frac{4x - 3}{4} \leq x$

7) $2x + \frac{3(x + 1)}{2} < 3 - \frac{x - 1}{4}$

8) $2(1 - 3x) + \frac{3x - 1}{3} < \frac{5}{2}$

9) $\frac{14 - 2x}{-2} + 2 < 0$

10) $2x - 1 > -2 + 2x$

11) $\frac{3 - x}{-2} < -1$

12) $\frac{3 - 2x}{-2} > x$

13) $\frac{x - 1}{2} - 3 \cdot \frac{x + 1}{6} < x$

Řešení

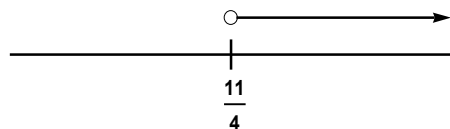
1)

$$2x + 7 < 6x - 4$$

$$2x - 6x < -4 - 7$$

$$-4x < -11 \quad / : (-4)$$

$$x > \frac{11}{4}$$



$$x \in \left(\frac{11}{4}; \infty \right)$$

2)

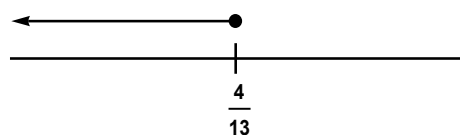
$$5x - 2 \leq 4(-2x + 1) - 2$$

$$5x - 2 \leq -8x + 4 - 2$$

$$5x + 8x \leq 4 - 2 + 2$$

$$13x \leq 4 \quad / : 13$$

$$x \leq \frac{4}{13}$$



$$x \in \left(-\infty; \frac{4}{13} \right]$$

3)

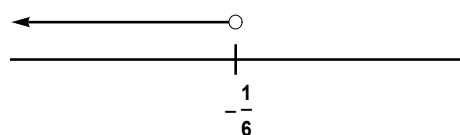
$$\frac{5 - 2x}{4} < 1 - 2x \quad / \cdot 4$$

$$5 - 2x < 4 - 8x$$

$$-2x + 8x < 4 - 5$$

$$6x < -1 \quad / : 6$$

$$x < -\frac{1}{6}$$



$$x \in \left(-\infty; -\frac{1}{6} \right)$$

4)

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

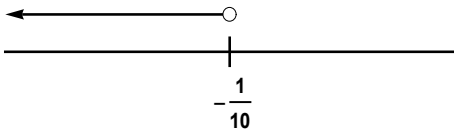
$$8 - 1 \cdot (2x - 3) > 8x + 12$$

$$8 - 2x + 3 > 8x + 12$$

$$-2x - 8x > 12 - 8 - 3$$

$$-10x > 1 \quad / : (-10)$$

$$x < -\frac{1}{10}$$



$$x \in \left(-\infty; -\frac{1}{10}\right)$$

5)

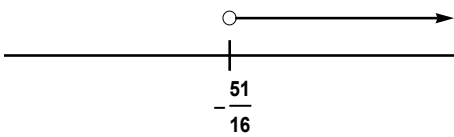
$$2(x-4) - 3(1-2x) < 8(3x+5)$$

$$2x - 8 - 3 + 6x < 24x + 40$$

$$2x + 6x - 24x < 40 + 8 + 3$$

$$-16x < 51 \quad /: (-16)$$

$$x > -\frac{51}{16}$$



$$x \in \left(-\frac{51}{16}; \infty\right)$$

6)

$$2(2-x) - \frac{4x-3}{4} \leq x$$

$$4 - 2x - \frac{4x-3}{4} \leq x \quad / \cdot 4$$

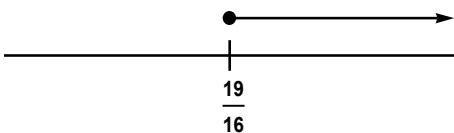
$$16 - 8x - 1 \cdot (4x-3) \leq 4x$$

$$16 - 8x - 4x + 3 \leq 4x$$

$$-8x - 4x - 4x \leq -16 - 3$$

$$-16x \leq -19 \quad /: (-16)$$

$$x \geq \frac{19}{16}$$



$$x \in \left[\frac{19}{16}; \infty\right)$$

7)

$$2x + \frac{3(x+1)}{2} < 3 - \frac{x-1}{4} \quad / \cdot 4$$

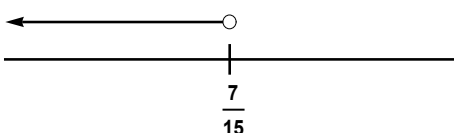
$$8x + 6(x+1) < 12 - 1 \cdot (x-1)$$

$$8x + 6x + 6 < 12 - x + 1$$

$$8x + 6x + x < 12 + 1 - 6$$

$$15x < 7 \quad /: 15$$

$$x < \frac{7}{15}$$



$$x \in \left(-\infty; \frac{7}{15}\right)$$

8)

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

$$2 - 6x + \frac{3x-1}{3} < \frac{5}{2} \quad / \cdot 6$$

$$12 - 36x + 2 \cdot (3x-1) < 15$$

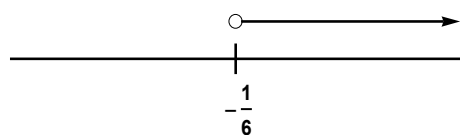
$$12 - 36x + 6x - 2 < 15$$

$$-36x + 6x < 15 - 12 + 2$$

$$-30x < 5 \quad / : (-30)$$

$$x > -\frac{5}{30}$$

$$x > -\frac{1}{6}$$



$$x \in \left(-\frac{1}{6}; \infty\right)$$

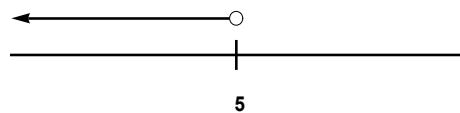
9)

$$\frac{14-2x}{-2} + 2 < 0 \quad / \cdot (-2)$$

$$14 - 2x - 4 > 0$$

$$-2x > -10 \quad / : (-2)$$

$$x < 5$$



$$x \in (-\infty; 5)$$

10)

$$2x - 1 > -2 + 2x$$

$$2x - 2x > 1 - 2$$

$$0 > -1$$

Tato nerovnost vždy platí, proto:

$$x \in R$$

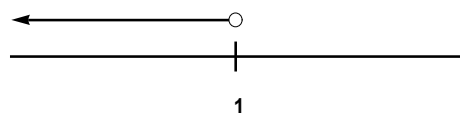
11)

$$\frac{3-x}{-2} < -1 \quad / \cdot (-2)$$

$$3 - x > 2$$

$$-x > -1 \quad / \cdot (-1)$$

$$x < 1$$



$$x \in (-\infty; 1)$$

12)

$$\frac{3-2x}{-2} > x \quad / \cdot (-2)$$

$$3-2x < -2x$$

$$3 < 0$$

Tato nerovnost neplatí, proto nerovnice nemá řešení:

$$P = \emptyset$$

13)

$$\frac{x-1}{2} - 3 \cdot \frac{x+1}{6} < x$$

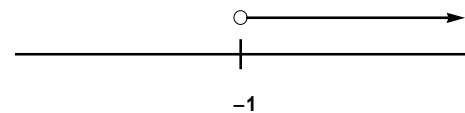
$$\frac{x-1}{2} - \frac{3(x+1)}{6} < x \quad / \cdot 6$$

$$3(x-1) - 3(x+1) < 6x$$

$$3x - 3 - 3x - 3 < 6x$$

$$-6x < 6 \quad / : (-6)$$

$$x > -1$$



$$x \in (-1; \infty)$$