

3.2.8 Řešení lineárních rovnic IV

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Př. 1: Vyřeš rovnice.

a) $\frac{(x-2)}{3} + 1 = 4$

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

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

d) $3(2x-3) - 2x = 2(2x+1) - 11$

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

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

$x - 2 = 9 \quad /+2$

$x = 11 \quad K = \{11\}$

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

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

$6x + 4 = 3x - 2 \quad /-4$

$6x = 3x - 6 \quad /-3x$

$3x = -6 \quad /:3$

$x = -2 \quad K = \{-2\}$

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

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

$2x + 3 = 2x - 3 \quad /-3$

$2x = 2x - 6 \quad /-2x$

$0x = -6 \quad \text{rovnice nemá řešení } K = \emptyset$

d) $3(2x-3) - 2x = 2(2x+1) - 11$

$6x - 9 - 2x = 4x + 2 - 11$

$4x - 9 = 4x - 9 \quad /-4x + 9$

$0x = 0 \quad K = R$

Př. 2: Vyřeš rovnice:

a) $\frac{x}{2} = x + 3$

b) $\frac{x}{3} - 1 = \frac{2}{3} - \frac{x}{2}$

c) $\frac{x+1}{3} - 2 = \frac{2x+3}{4} + 2x$

d) $\frac{x-1}{3} - \frac{x}{6} = 3 \cdot \frac{x+2}{2} + \frac{2}{3}$

a) $\frac{x}{2} = x + 3 \quad / \cdot 2$

$2 \cdot \frac{x}{2} = 2 \cdot (x + 3)$

$x = 2x + 6 \quad /-x$

$0 = x + 6 \quad /-6$

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

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

$6 \cdot \left(\frac{x}{3} - 1 \right) = 6 \cdot \left(\frac{2}{3} - \frac{x}{2} \right)$

$2x - 6 = 4 - 3x \quad /+3x$

$5x - 6 = 4 \quad /+6$

$5x = 10 \quad /:5$

$x = 2 \quad K = \{2\}$

c) $\frac{x+1}{3} - 2 = \frac{2x+3}{4} + 2x \quad / \cdot 12$

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

$$12 \cdot \left(\frac{x+1}{3} - 2 \right) = 12 \cdot \left(\frac{2x+3}{4} + 2x \right)$$

$$4(x+1) - 24 = 3(2x+3) + 24x$$

$$4x + 4 - 24 = 6x + 9 + 24x$$

$$4x - 20 = 30x + 9 \quad / -4x$$

$$-20 = 26x + 9 \quad / -9$$

$$26x = -29 \quad / :26$$

$$x = -\frac{29}{26} \quad K = \left\{ -\frac{29}{26} \right\}$$

$$6 \cdot \left(\frac{x-1}{3} - \frac{x}{6} \right) = 6 \cdot \left(3 \cdot \frac{x+2}{2} + \frac{2}{3} \right)$$

$$2(x-1) - x = 9 \cdot (x+2) + 4$$

$$2x - 2 - x = 9x + 18 + 4$$

$$x - 2 = 9x + 22 \quad / -x - 22$$

$$-24 = 8x \quad / :8$$

$$x = -3 \quad K = \{-3\}$$

Př. 3: Vyřeš rovnice.

a) $(x-2)^2 = (x+1)^2$

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

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

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

a) $(x-2)^2 = (x+1)^2$

$$x^2 - 4x + 4 = x^2 + 2x + 1 \quad / -x^2$$

$$-4x + 4 = 2x + 1 \quad / +4x$$

$$4 = 6x + 1 \quad / -1$$

$$3 = 6x \quad / :6$$

$$x = \frac{1}{2} \quad K = \left\{ \frac{1}{2} \right\}$$

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

$$x^2 - 2x + 1 + 3x = x^2 + 3x - 2x - 6 \quad / -x^2$$

$$1 + x = x - 6 \quad / -x$$

$$1 = -6 \quad K = \emptyset$$

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

$$2x^2 + 6x - x - 3 = 2x + 1 + 2x^2 + x \quad / -2x^2$$

$$5x - 3 = 3x + 1 \quad / -3x$$

$$2x - 3 = 1 \quad / +3$$

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

$$x = 2 \quad K = \{2\}$$

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

$$6x^2 - 2x + 9x - 3 - (4x^2 + 12x + 9) = 2x^2 - 6x + 3x - 9$$

$$2x^2 - 5x - 12 = 2x^2 - 3x - 9 \quad / -2x^2$$

$$-5x - 12 = -3x - 9 \quad / +5x$$

$$-12 = 2x - 9 \quad / +9$$

$$-3 = 2x \quad / :2$$

$$x = -\frac{3}{2} \quad K = \left\{ -\frac{3}{2} \right\}$$

Shrnutí: