

KVADRATICKÉ ROVNICE

1) V množině R řešte kvadratické rovnice bez použití diskriminantu:

a) $x^2 - 4 = 0$

$$[[K = \{-2; 2\}]]$$

b) $x^2 - 36 = 0$

$$[[K = \{-6; 6\}]]$$

c) $9x^2 - 1 = 0$

$$[[K = \{-\frac{1}{3}; \frac{1}{3}\}]]$$

d) $4x^2 - 49 = 0$

$$[[K = \{-\frac{7}{2}; \frac{7}{2}\}]]$$

e) $x^2 - 3 = 0$

$$[[K = \{-\sqrt{3}; \sqrt{3}\}]]$$

f) $2x^2 - 1 = 0$

$$[[K = \{-\frac{\sqrt{2}}{2}; \frac{\sqrt{2}}{2}\}]]$$

g) $5x^2 - 3 = 0$

$$[[K = \{-\sqrt{\frac{3}{5}}; \sqrt{\frac{3}{5}}\}]]$$

h) $x^2 - 0,01 = 0$

$$[[K = \{-0,1; 0,1\}]]$$

i) $x^2 - 0,16 = 0$

$$[[K = \{-0,4; 0,4\}]]$$

j) $3x^2 + 5 = 0$

$$[[K = \emptyset]]$$

k) $7x^2 + 2 = 0$

$$[[K = \emptyset]]$$

2) V množině R řešte kvadratické rovnice bez použití diskriminantu:

a) $x^2 + x = 0$

$$[[K = \{0; -1\}]]$$

b) $x^2 - 3x = 0$

$$[[K = \{0; 3\}]]$$

c) $2x^2 - 13x = 0$

$$[[K = \{0; \frac{13}{2}\}]]$$

d) $17x^2 - 15x = 0$

$$[[K = \{0; \frac{15}{17}\}]]$$

e) $5x^2 - \sqrt{3}x = 0$

$$[[K = \{0; \frac{\sqrt{3}}{5}\}]]$$

f) $x^2 - 0,8x = 0$

$$[[K = \{0; 0,8\}]]$$

g) $0,2x^2 + 0,3x = 0$

$$[[K = \{0; -1,5\}]]$$

3) V množině R řešte rovnice:

a) $2x^2 - 5x + 2 = 0$

$$[[K = \{2; \frac{1}{2}\}]]$$

b) $3x^2 - 8x + 4 = 0$

$$[[K = \{2; \frac{2}{3}\}]]$$

c) $10x^2 - 29x + 10 = 0$

$$[[K = \{\frac{5}{2}; \frac{2}{5}\}]]$$

d) $64x^2 - 16x - 35 = 0$

$$[[K = \{\frac{7}{8}; -\frac{5}{8}\}]]$$

e) $16x^2 - 40x - 23 = 0$

$$[[K = \{\frac{5+\sqrt{3}}{4}; \frac{5-\sqrt{3}}{4}\}]]$$

f) $4x^2 + 4x + 1 = 0$

$$[[K = \{-\frac{1}{2}\}]]$$

g) $9x^2 + 12x + 4 = 0$

$$[[K = \{-\frac{2}{3}\}]]$$

h) $4x^2 - 20x + 25 = 0$

$$[[K = \{\frac{5}{2}\}]]$$

i) $3x^2 + 5x + 7 = 0$

$$[[K = \emptyset]]$$

j) $5x^2 - 4x + 2 = 0$

$$[[K = \emptyset]]$$

k) $x^2 - x - 12 = 0$

$$[[K = \{-3; 4\}]]$$

l) $x^2 - 2x - 3 = 0$

$$[[K = \{-1; 3\}]]$$

m) $x^2 + 3x - 4 = 0$

$$[[K = \{-4; 1\}]]$$

4) V množině R řešte rovnice:

a) $(x + 3)(x + 4) + (x - 2)(x - 1) = 30$

$\llbracket K = \{-4; 2\} \rrbracket$

b) $(4x - 3)^2 - (6x + 4)^2 = 29$

$\llbracket K = \{-\frac{3}{5}; -3\} \rrbracket$

c) $(x - 2)^2 + (x - 9)^2 = (x - 11)^2$

$\llbracket K = \{-6; 6\} \rrbracket$

d) $(2x + 3)^2 - (3x - 2)^2 = (4x - 5)^2 - (3x - 2)(x + 6)$

$\llbracket K = \{4; \frac{4}{9}\} \rrbracket$

e) $\frac{x}{2} + \frac{x}{3} + \frac{x}{4} = \frac{x^2}{9} - 3$

$\llbracket K = \{12; -\frac{9}{4}\} \rrbracket$

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

$\llbracket K = \{0\}; x \neq 2 \rrbracket$

g) $\frac{x^2-5x+11}{x^2-7x+17} = \frac{5}{7}$

$\llbracket K = \{-2; 2\} \rrbracket$

h) $\frac{4x+9}{2x-3} = \frac{3x+8}{4-x}$

$\llbracket K = \{-\sqrt{6}; \sqrt{6}\}; x \neq \frac{3}{2}; x \neq 4 \rrbracket$

i) $\frac{x-1}{x-2} + \frac{x-2}{x-1} = \frac{5}{2}$

$\llbracket K = \{0; 3\}; x \neq 2; x \neq 1 \rrbracket$

j) $\frac{x+3}{x-3} + \frac{x-6}{x+6} = \frac{11}{5}$

$\llbracket K = \{-42; 9\}; x \neq 3; x \neq -6 \rrbracket$

k) $\frac{x-2}{x-3} + \frac{15}{x^2-3x} = \frac{6}{x-3} - \frac{3}{2}$

$\llbracket K = \{2\}; x \neq 3; x \neq 0 \rrbracket$

l) $1 - \frac{1}{x} = \frac{1}{x^2-x} - \frac{1}{x-1}$

$\llbracket K = \emptyset; x \neq 0; x \neq 1 \rrbracket$

m) $\frac{6}{x-1} + \frac{5}{x+1} = \frac{6}{x-2}$

$\llbracket K = \{4; \frac{1}{5}\}; x \neq \pm 1; x \neq 2 \rrbracket$

n) $\frac{5}{x-2} + \frac{3}{x-3} - \frac{7}{x-1} = 0$

$\llbracket K = \{-3 + \sqrt{30}; -3 - \sqrt{30}\}; x \neq 1; x \neq 2; x \neq 3 \rrbracket$

5) Sestavte všechny kvadratické rovnice o kořenech:

a) $x_1 = 3, x_2 = 6$

$\llbracket a(x^2 - 9x + 18 = 0); \text{ pro } a \in R \setminus \{0\} \rrbracket$

b) $x_1 = -5, x_2 = 3$

$\llbracket a(x^2 + 2x - 15 = 0); \text{ pro } a \in R \setminus \{0\} \rrbracket$

c) $x_1 = 3, x_2 = -\frac{1}{2}$

$\llbracket a(2x^2 - 5x - 3 = 0); \text{ pro } a \in R \setminus \{0\} \rrbracket$

d) $x_1 = -2, x_2 = \frac{5}{3}$

$\llbracket a(3x^2 + x - 10 = 0); \text{ pro } a \in R \setminus \{0\} \rrbracket$

6) Zjednodušte a určete podmínky:

a) $\frac{x^2-4}{x^2+5x+6}$

$\llbracket \frac{x-2}{x+3}; x \neq -3; x \neq -2 \rrbracket$

b) $\frac{9-a^2}{a^2-a-6}$

$\llbracket -\frac{a+3}{a+2}; a \neq -2; a \neq 3 \rrbracket$

c) $\frac{a^2-7a+1}{a^2-25}$

$\llbracket \frac{a-2}{a+5}; a \neq \pm 5 \rrbracket$

d) $\frac{x^2-7x+1}{x-4}$

$\llbracket x - 3; x \neq 4 \rrbracket$

e) $\frac{a^2+2a-1}{3a+15}$

$\llbracket \frac{a-3}{3}; a \neq -5 \rrbracket$

f) $\frac{x^2+4x+4}{x^2+x-2}$

$\llbracket \frac{x+2}{x-1}; x \neq -2; x \neq 1 \rrbracket$

g) $\frac{x^2-8x+15}{x^2-5x+6}$

$\llbracket \frac{x-5}{x-2}; x \neq 2; x \neq 3 \rrbracket$

h) $\frac{a^2-7a-8}{a^2-6a-7}$

$\llbracket \frac{a-8}{a-7}; a \neq -1; a \neq 7 \rrbracket$

i) $\frac{x^2-7x+10}{2x^2-13x+15}$

$\llbracket \frac{x-2}{2x-3}; x \neq 5; x \neq \frac{3}{2} \rrbracket$

j) $\frac{2a^2+4a+2}{3a^2-6a-9}$

$\llbracket \frac{2(a+1)}{3(a-3)}; a \neq 1; a \neq 3 \rrbracket$

k) $\frac{3x^2-11x+10}{3x^2-17x+10}$

$\llbracket \frac{x-3}{x-5}; x \neq 5; x \neq \frac{2}{3} \rrbracket$

l) $\frac{4a^2-4a-3}{6a^2+a-1}$

$\llbracket \frac{2a-3}{3a-1}; a \neq \frac{1}{3}; a \neq -\frac{1}{2} \rrbracket$