

Lomené výrazy (4)

1. Úprava na spol. jmenovatel

1) Upravte:

$$\frac{x(x+13)}{x^2-1} - \frac{4-2x}{1+x} + \frac{2+3x}{1-x}$$

$$\text{VH: } \frac{2}{x-1}; \quad x \neq \pm 1$$

2) Upravte:

$$\frac{3+2x}{2-x} - \frac{2-3x}{2+x} + \frac{x(16-x)}{x^2-4}$$

$$\text{Sb-rce, VSP: } \frac{1}{x+2}; \quad x \neq \pm 2 \dots \text{str.29/3.12-3)}$$

3) Upravte:

$$\frac{1+2x}{3-x} - \frac{x(x-19)}{x^2-9} - \frac{2-3x}{3+x}$$

$$\text{VH: } \frac{1}{x-3}; \quad x \neq \pm 3$$

4) Upravte:

$$\frac{3-4x}{4-x} - \frac{1+3x}{4+x} - \frac{x(x+22)}{x^2-16}$$

$$\text{VH: } \frac{2}{x+4}; \quad x \neq \pm 4$$

5) Upravte:

$$\left(\frac{2a}{a+2} + \frac{6a}{6-3a} + \frac{8a}{a^2-4} \right) : \frac{a-4}{a-2}$$

$$\text{G-Pe: } 0; \quad a \neq \pm 2$$

6) Upravte:

$$\left(1 - \frac{a}{a-b} \right) \cdot \left(a - b + \frac{a^2+b^2}{b} \right) + b - \frac{a^2}{b-a}$$

$$\text{G-Pe: } \frac{b^2}{b-a}; \quad a \neq b, b \neq 0$$

2. Násobení výrazů

1) Upravte:

$$\left(\frac{2a}{a^2-1} - \frac{1}{a+1} \right) \left(1 - \frac{1}{a} \right)$$

$$\text{VH: } \frac{1}{a}; \quad a \neq 0, a \neq \pm 1$$

2) Upravte:

$$\left(\frac{1}{b-2} - \frac{4}{b^2-4} \right) \left(\frac{2}{b} + 1 \right)$$

$$\text{VH: } \frac{1}{b}; \quad b \neq 0, b \neq \pm 2$$

3) Upravte:

$$\left(\frac{1}{a-3} - \frac{6}{a^2-9} \right) \left(1 + \frac{3}{a} \right)$$

$$\text{VH: } \frac{1}{a}; \quad a \neq 0, a \neq \pm 3$$

4) Upravte:

$$\left(\frac{2b}{b^2-16} - \frac{1}{b+4} \right) \left(1 - \frac{4}{b} \right)$$

$$\text{VH: } \frac{1}{b}; \quad b \neq 0, b \neq \pm 4$$

5) Upravte:

$$\left(1 - \frac{x^2}{y^2} \right) \left(\frac{x^2}{y^2-x^2} + 1 \right)$$

$$\text{Sb-rce: } 1; \quad y \neq 0, y \neq \pm x \dots \text{str.32/3.16-3)}$$

6) Upravte:

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

$$\text{Sb-rce: } \frac{x}{x^2-1}; \quad x \neq \pm 1, x \neq 2 \dots \text{str.32/3.16-5)}$$

7) Upravte:

$$\left(\frac{a+1}{2a-2} + \frac{6}{2a^2-2} - \frac{a+3}{2a+2} \right) \cdot \frac{4a^2-4}{3}$$

$$\text{Sb-rce: } \frac{20}{3}; \quad a \neq \pm 1 \dots \text{str.32/3.16-6)}$$

3. Násobení výrazů s vytýkáním mínus

1) Upravte:

$$\left(\frac{1}{a+1} - \frac{2a}{a^2-1} \right) \left(\frac{1}{a} - 1 \right)$$

$$\text{Sb-rce, VŠE, FES: } \frac{1}{a}; \quad a \neq 0, a \neq \pm 1 \dots \text{str.32/3.16-4)}$$

2) Upravte:

$$\left(\frac{4}{b^2-4} - \frac{1}{b-2} \right) \left(\frac{2}{b} + 1 \right)$$

$$\text{VH: } -\frac{1}{b}; \quad b \neq 0, b \neq \pm 2$$

3) Upravte:

$$\left(\frac{6}{a^2-9} - \frac{1}{a-3} \right) \left(1 + \frac{3}{a} \right)$$

$$\text{VH: } -\frac{1}{a}; \quad a \neq 0, a \neq \pm 3$$

4) Upravte:

$$\left(\frac{1}{b+4} - \frac{2b}{b^2-16}\right) \left(\frac{4}{b} - 1\right)$$

$$\text{VH: } \frac{1}{b}; \quad b \neq 0, b \neq \pm 4$$

4. Dělení výrazů

1) Upravte:

$$\left(\frac{1}{a+2} + \frac{1}{a-2}\right) : \frac{a}{a+2}$$

$$\text{Sb-MM: } \frac{2}{a-2}; \quad a \neq 0, a \neq \pm 2 \dots \text{str.22/6.5-f)}$$

2) Upravte:

$$\left(1 + \frac{x}{1-x}\right) : \frac{1+x}{1-x}$$

$$\text{Sb-rce: } \frac{1}{1+x}; \quad x \neq \pm 1 \dots \text{str.34/3.19-2)}$$

3) Upravte:

$$\left(\frac{x}{x-1} - \frac{3x-1}{x^2-1}\right) : \frac{x}{x+1}$$

$$\text{VH: } \frac{x-1}{x}; \quad x \neq \pm 1, x \neq 0$$

5. Úprava složeného zlomku I.

1) Upravte:

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

$$\frac{x}{x+2} + 1$$

$$\text{SMP: } \frac{1}{x+1}; \quad x \neq -2; \quad x \neq -1$$

2) Upravte:

$$\frac{1+x}{1-x} - \frac{1-x}{1+x}$$

$$\frac{1+x}{1-x} - 1$$

$$\text{SMP: } \frac{2}{1+x}; \quad x \neq 1, x \neq -1, x \neq 0$$

3) Upravte:

$$\frac{1}{1-x} + \frac{1}{1+x}$$

$$\frac{1}{1-x} - \frac{1}{1+x}$$

$$\text{Sb-rce: } \frac{1}{x}; \quad x \neq \pm 1, x \neq 0 \dots \text{str.36/3.21-5)}$$

4) Upravte:

$$1 + \frac{1}{x-1}$$

$$1 - \frac{1}{x+1}$$

$$\text{VH: } \frac{x+1}{x-1}; \quad x \neq \pm 1, x \neq 0$$

5) Upravte:

$$\frac{x+2}{x-2} - \frac{x-2}{x+2}$$

$$\frac{8}{4-x^2}$$

$$\text{Sb-MM: } -x; \quad x \neq \pm 2 \dots \text{str.22/6.5-h)}$$

6) Upravte:

$$\frac{a}{a+b} + \frac{b}{a-b}$$

$$\frac{a}{a-b} - \frac{b}{a+b}$$

$$\text{Sb-rce: } 1; \quad a \neq \pm b \dots \text{str.36/3.21-4)}$$

7) Upravte:

$$\frac{x}{x-1} - \frac{x+1}{x}$$

$$\frac{x}{x+1} - \frac{x-1}{x}$$

$$\text{Sb-rce: } \frac{x+1}{x-1}; \quad x \neq 0, x \neq \pm 1 \dots \text{str.36/3.21-6)}$$

8) Upravte:

$$\frac{x-y}{x+y} + \frac{x+y}{x-y}$$

$$\frac{x}{y} + \frac{y}{x}$$

$$\text{Sb-rce: } \frac{2xy}{x^2-y^2}; \quad x \neq 0, x \neq \pm y, y \neq 0 \dots \text{str.36/3.21-8)}$$

6. Úprava složeného zlomku II.

1) Upravte:

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

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

$$\text{Sb-rce: } \frac{10x+3}{7x+2}; \quad x \neq 0, x \neq -\frac{1}{3} \dots \text{str.36/3.21-9)}$$

2) Upravte:

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

$$\text{Sb-rcce: } \frac{x^3}{x^3 - x + 1}; \quad x \neq \pm 1, x \neq 0 \dots \text{str.36/3.21-10}$$

3) Upravte:

$$\frac{\frac{1}{1-a} - 1}{a + 1 - \frac{2a^2 - 1}{a - 1}}$$

$$\text{FES: } \frac{1}{a}; \quad a \neq 0, a \neq 1$$

4) Upravte:

$$\frac{\frac{1}{a^2} - 1}{(1+a) \left(1 - \frac{2}{a} + \frac{1}{a^2} \right)}$$

$$\text{FES: } \frac{1}{1-a}; \quad a \neq 0, a \neq \pm 1$$

5) Upravte:

$$1 + \frac{\frac{1}{a}}{1 + a + \frac{2a^2}{1-a}}$$

$$\text{G-Pe: } \frac{1+a^2}{1+a}; \quad a \neq \pm 1,$$

6) Upravte:

$$\frac{\frac{1-x}{1-x+x^2} + \frac{1+x}{1+x+x^2}}{\frac{1+x}{1+x+x^2} - \frac{1-x}{1-x+x^2}}$$

$$\text{VŠE, G-Pe: } \frac{1}{x^3}; \quad x \neq \pm 1, x \neq 0$$

7) Upravte:

$$\frac{\frac{a+b}{a-b} - \frac{a-b}{a+b}}{\frac{a^2 \cdot b^2}{a^2 - b^2}}$$

$$\text{P-Zr: } \frac{4}{ab}; \quad a \neq \pm b, ab \neq 0$$

8) Upravte:

$$\frac{\frac{a+b}{a-b} - \frac{a-b}{a+b}}{2 - \frac{1+b^2}{b}} \cdot \frac{1}{1 - \frac{a^2+b^2}{a^2-b^2} - \frac{1}{b^2} - \frac{2}{b} + 1}$$

$$\text{P-Zr: } 2a; \quad a \neq \pm b, b \neq 0$$

7. Úprava ($x^4 - y^4$)

1) Upravte:

$$\frac{x^4 - y^4}{x^2 - 2xy + y^2} \cdot \frac{x-y}{x^2 + xy}$$

$$\text{VŠE: } \frac{x^2+y^2}{x}; \quad x \neq 0, x \neq \pm y$$

2) Upravte:

$$\frac{\frac{x^3}{y^2} + \frac{x^2}{y} + x + y}{\frac{x^2}{y^2} - \frac{y^2}{x^2}}$$

$$\text{FES: } \frac{x^2}{x-y}; \quad x \neq \pm y, x \neq 0, y \neq 0$$

3) Upravte:

$$\frac{a^4 - b^4}{a^2 b^2} : \left[\left(1 + \frac{b^2}{a^2} \right) \left(1 - \frac{2a}{b} + \frac{a^2}{b^2} \right) \right]$$

$$\text{G-Pe: } \frac{a+b}{a-b}; \quad a \neq b, ab \neq 0$$