

### 3.5.11 Sčítání lomených výrazů IV

**Předpoklady:** 030501

**Př. 1:** Vypočti. Podmínky udělej taky.

$$\text{a) } \frac{2-x}{x+1} - \frac{x-3}{x+1} \qquad \text{b) } 1 + \frac{2}{a} - \frac{a}{b} \qquad \text{c) } \frac{3}{x+1} - \frac{2}{x-2}$$

$$\text{a) } \frac{2-x}{x+1} - \frac{x-3}{x+1} = \frac{2-x-(x-3)}{x+1} = \frac{2-x-x+3}{x+1} = \frac{5-2x}{x+1} \qquad x \neq -1$$

$$\text{b) } 1 + \frac{2}{a} - \frac{a}{b} = 1 \cdot \frac{ab}{ab} + \frac{2 \cdot b}{a \cdot b} - \frac{a \cdot a}{b \cdot a} = \frac{ab+2b-a^2}{ab} \qquad a \neq 0; b \neq 0$$

$$\text{c) } \frac{3}{x+1} - \frac{2}{x-2} = \frac{3(x-2)-2(x+1)}{(x+1)(x-2)} = \frac{3x-6-2x-2}{(x+1)(x-2)} = \frac{x-8}{(x+1)(x-2)} \qquad x \neq -1; 2$$

**Př. 2:** Zapiš podmínky a zjednoduš.

$$\text{a) } \frac{2}{a(a-1)} + \frac{a-1}{a^2} \qquad \text{b) } \frac{y-1}{x(x+y)} + \frac{x-1}{y(x+y)} \qquad \text{c) } \frac{x+1}{(x+2)(x-1)} - \frac{2x-3}{(x-1)(x+3)}$$

$$\text{a) } \frac{2}{a(a-1)} + \frac{a-1}{a^2} = \frac{2 \cdot a}{a(a-1) \cdot a} + \frac{(a-1)(a-1)}{a^2(a-1)} = \frac{2a+a^2-2a+1}{a^2(a-1)} = \frac{a^2+1}{a^2(a-1)}$$

$$a \neq 0; 1$$

$$\text{b) } \frac{y-1}{x(x+y)} + \frac{x-1}{y(x+y)} = \frac{(y-1) \cdot y}{x(x+y) \cdot y} + \frac{(x-1) \cdot x}{y(x+y) \cdot x} = \frac{y^2-y+x^2-x}{xy(x+y)} = \frac{y^2+x^2-y-x}{xy(x+y)}$$

$$x \neq 0; y \neq 0; x \neq -y$$

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

$$= \frac{x^2+3x+x+3-(2x^2+4x-3x-6)}{(x+2)(x-1)(x+3)} = \frac{-x^2+3x+9}{(x+2)(x-1)(x+3)}$$

$$x \neq -3; -2; 1$$

**Př. 3:** Kdo umí, ten sčítá. Kdo neumí, alespoň to zkouší. Samozřejmě s podmínkami.

$$\text{a) } \frac{a^2}{a^2+4a} - \frac{a-1}{a+4} \qquad \text{b) } \frac{5}{b+c} - \frac{2b-3c}{b^2+bc} \qquad \text{c) } \frac{x+2}{x^2-x} - \frac{x-1}{x^2+2x}$$

$$\text{a) } \frac{a^2}{a^2+4a} - \frac{a-1}{a+4} = \frac{a^2}{(a+4)a} - \frac{a(a-1)}{a(a+4)} = \frac{a^2-(a^2-a)}{a(a+4)} = \frac{a^2-a^2+a}{a(a+4)} = \frac{a}{a(a+4)} = \frac{1}{a+4}$$

$$a \neq -4; 0$$

$$\begin{aligned} \frac{5}{b+c} - \frac{2b-3c}{b^2+bc} &= \frac{5b}{b(b+c)} - \frac{2b-3c}{b(b+c)} = \frac{5b-(2b-3c)}{b(b+c)} = \frac{5b-2b+3c}{b(b+c)} = \frac{3b+3c}{b(b+c)} = \\ \text{b) } &= \frac{3(b+c)}{b(b+c)} = \frac{3}{b} \end{aligned}$$

$$b \neq 0; b \neq -c$$

$$\begin{aligned} \frac{x+2}{x^2-x} - \frac{x-1}{x^2+2x} &= \frac{x+2}{(x-1)x} - \frac{x-1}{(x+2)x} = \frac{(x+2)^2 - (x-1)^2}{(x-1)x(x+2)} = \frac{x^2+4x+4 - (x^2-2x+1)}{(x-1)x(x+2)} = \\ \text{c) } &= \frac{6x+3}{(x-1)x(x+2)} \end{aligned}$$

$$x \neq -2; 0; 1$$

**Př. 4:** Zapodmínkuj a sečti (a dál už nečti). Urgum chariošil gutami.

$$\text{a) } \frac{3}{x^2+3x} - \frac{2}{x^2-9} \quad \text{b) } \frac{5}{a^2+2a+1} - \frac{2}{a^2-a-2} \quad \text{c) } \frac{y}{y^2-5y+6} + \frac{y}{4-y^2}$$

$$\begin{aligned} \frac{3}{x^2+3x} - \frac{2}{x^2-9} &= \frac{3}{(x+3)x} - \frac{2}{(x-3)(x+3)} = \frac{3(x-3) - 2x}{(x+3)x(x-3)} = \frac{3x-9-2x}{(x+3)x(x-3)} = \\ \text{a) } &= \frac{x-9}{(x+3)x(x-3)} \end{aligned}$$

$$a \neq -3; 0; 3$$

$$\begin{aligned} \frac{5}{a^2+2a+1} - \frac{2}{a^2-a-2} &= \frac{5}{(a+1)^2} - \frac{2}{(a-2)(a+1)} = \frac{5(a-2) - 2(a+1)}{(a-2)(a+1)^2} = \frac{5a-10-2a-2}{(a-2)(a+1)^2} = \\ \text{b) } &= \frac{3a-12}{(a-2)(a+1)^2} \end{aligned}$$

$$a \neq -1; 2$$

$$\begin{aligned} \frac{y}{y^2-5y+6} + \frac{y}{4-y^2} &= \frac{y}{(y-2)(y-3)} + \frac{y}{(2-y)(2+y)} = \frac{y}{(y-2)(y-3)} + \frac{y}{-(y-2)(2+y)} = \\ \text{c) } &= \frac{y}{(y-2)(y-3)} - \frac{y}{(y-2)(2+y)} = \frac{y(y+2) - y(y-3)}{(y-2)(y-3)(y+2)} = \frac{y^2+2y - y^2+3y}{(y-2)(y-3)(y+2)} = \\ &= \frac{5y}{(y-2)(y-3)(y+2)} \end{aligned}$$

$$y \neq -2; 2; 3$$

**Shrnutí:**