

3.8.14 Násobení lomených výrazů II

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Př. 1: Vynásob. Uveď podmínky.

$$a) \frac{4xy^2}{5z^3} \cdot \frac{10z^2}{6x^2y}$$

$$b) \frac{a+2}{a(a-3)} \cdot \frac{a^2(a-3)}{(a+2)^2}$$

$$c) \frac{y^2}{3y-4} \cdot \frac{3y-4}{y^3(y+1)}$$

$$a) \frac{4xy^2}{5z^3} \cdot \frac{10z^2}{6x^2y} = \frac{2 \cdot 2y}{5z} \cdot \frac{2 \cdot 5}{2 \cdot 3x} = \frac{4y}{3xz}$$

$$x \neq 0; y \neq 0; z \neq 0$$

$$b) \frac{a+2}{a(a-3)} \cdot \frac{a^2(a-3)}{(a+2)^2} = \frac{a}{a+2}$$

$$a \neq -2; 0; 3$$

$$c) \frac{y^2}{3y-4} \cdot \frac{3y-4}{y^3(y+1)} = \frac{1}{y(y+1)}$$

$$y \neq -1; 0; \frac{3}{4}$$

Př. 2: Vypočti.

$$a) \frac{a+3}{3a-3b} \cdot \frac{ab-b^2}{2a+6}$$

$$b) \frac{4y-6}{10xy-2x} \cdot \frac{5y-1}{2y^2-3y}$$

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

$$a) \frac{a+3}{3a-3b} \cdot \frac{ab-b^2}{2a+6} = \frac{a+3}{3(a-b)} \cdot \frac{b(a-b)}{2(a+3)} = \frac{b}{6}$$

$$a \neq -3; a \neq b$$

$$b) \frac{4y-6}{10xy-2x} \cdot \frac{5y-1}{2y^2-3y} = \frac{2(2y-3)}{2x(5y-1)} \cdot \frac{5y-1}{y(2y-3)} = \frac{1}{xy}$$

$$x \neq 0; y \neq 0; \frac{1}{5}; \frac{3}{2}$$

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

$$a \neq \pm \frac{1}{2}$$

Př. 3: Vypočti.

$$a) \frac{x^2+2xy+y^2}{x^2-y^2} \cdot \left(x - \frac{xy+y^2}{x+y} \right)$$

$$b) \frac{a^2-3a}{4ab+8b} \cdot \frac{2ab}{a^2-a-6} \cdot \frac{a^2+4a+4}{3a^2}$$

$$a) \frac{x^2+2xy+y^2}{x^2-y^2} \cdot \left(x - \frac{xy+y^2}{x+y} \right) = \frac{(x+y)^2}{(x-y)(x+y)} \cdot \left[\frac{x(x+y) - (xy+y^2)}{x+y} \right] =$$

$$= \frac{(x+y)^2}{(x-y)(x+y)} \cdot \left[\frac{x^2+xy-xy-y^2}{x+y} \right] = \frac{(x+y)}{(x-y)} \cdot \frac{x^2-y^2}{x+y} = \frac{(x+y)}{(x-y)} \cdot \frac{(x-y)(x+y)}{x+y} = x+y$$

$$x \neq \pm y$$

$$b) \frac{a^2 - 3a}{4ab + 8b} \cdot \frac{2ab}{a^2 - a - 6} \cdot \frac{a^2 + 4a + 4}{3a^2} = \frac{(a-3)a}{4b(a+2)} \cdot \frac{2ab}{(a-3)(a+2)} \cdot \frac{(a+2)^2}{3a^2} = \frac{1}{6}$$

$a \neq -2; 0; 3, b \neq 0$

Př. 4: Vypočti. $\frac{x^2 + 2x}{x^2 + 5x + 4} \cdot \frac{x^2 + 2x - 8}{(x^2 - 4)(x - 1)} + \frac{x^2 - 9}{x^2 - 1} \cdot \frac{x - 1}{x^2 + x - 6}$

$$\begin{aligned} & \frac{x^2 + 2x}{x^2 + 5x + 4} \cdot \frac{x^2 + 2x - 8}{(x^2 - 4)(x - 1)} + \frac{x^2 - 9}{x^2 - 1} \cdot \frac{x - 1}{x^2 + x - 6} = \\ & = \frac{x(x+2)}{(x+4)(x+1)} \cdot \frac{(x+4)(x-2)}{(x+2)(x-2)(x-1)} + \frac{(x-3)(x+3)}{(x-1)(x+1)} \cdot \frac{x-1}{(x+3)(x-2)} = \\ & = \frac{x}{(x+1)} \cdot \frac{1}{(x-1)} + \frac{x-3}{(x+1)} \cdot \frac{1}{(x-2)} = \frac{x}{(x+1)(x-1)} + \frac{x-3}{(x+1)(x-2)} = \\ & = \frac{x(x-2)}{(x+1)(x-1)(x-2)} + \frac{(x-3)(x-1)}{(x+1)(x-2)(x-1)} = \\ & = \frac{x^2 - 2x + x^2 - 3x - x + 3}{(x+1)(x-1)(x-2)} = \frac{2x^2 - 6x + 3}{(x+1)(x-1)(x-2)} \end{aligned}$$

$x \neq \pm 1; \pm 2; -4; -3$

Shrnutí: