

Algebra in \mathbb{Q}^3

Lösung

$$1) \quad \left(1\frac{1}{2} - \frac{2}{3} + \frac{3}{5}\right) : \frac{1}{10} = \left(\frac{3}{2} - \frac{2}{3}\right) \cdot \frac{10}{1} = \frac{11 \cdot \frac{11}{20} \cdot \frac{10}{1}}{\frac{7}{12} \cdot \frac{7}{12}} = \frac{7}{144}$$

$$= 11 : \frac{7}{144} = \frac{11 \cdot 144}{7} = \frac{1584}{7} = 226\frac{2}{7}$$

$$2) \quad \left(\frac{a-b}{6(x+y)} - \frac{3(a-b)^3}{2(x+y)}\right) \cdot \left(\frac{x+y}{a-b} - \frac{2(x+y)}{3(a-b)}\right) =$$

$$\left(\frac{(a-b) - 9(a-b)}{6(x+y)}\right) \cdot \left(\frac{3(x+y) - 2(x+y)}{3(a-b)}\right) =$$

$$\frac{-8(a-b)}{6(x+y)} \cdot \frac{(x+y)}{3(a-b)} = -\frac{8}{18} = -\frac{4}{9}$$

$$3) \quad a) \quad \frac{x}{x+y} + \frac{y}{x-y} = \frac{x(x-y)}{x+y} + \frac{y(x+y)}{x-y} = \frac{x(x-y) + y(x+y)}{(x-y)(x+y)}$$

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

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

$$b) \quad \frac{4a-5b}{5x} - \frac{2a-3b}{3y} = \frac{12ay - 15by - (10ax - 15bx)}{15xy}$$

$$\frac{12y-10x}{15b} - \frac{y-x}{a} = \frac{12ay-10ax - (15by-15bx)}{15ab}$$

$$\frac{(12ay - 15by - 10ax + 15bx)}{15xy} \cdot \frac{15ab}{15ab} = \frac{ab}{xy}$$

$$4) a) \frac{3c-2a}{11ab} \cdot \frac{5x+2b}{3c} \cdot \frac{3bc}{5x(3c-2a)+2b(3c-2a)} = \frac{3bc}{5} \cdot \frac{1}{3bc} = \frac{1}{5}$$

$$b) \left(\frac{3(a-1) \cdot 5(1-a)}{a(x-1) \cdot a(x+1)} \right) \cdot \frac{1}{11(1-x)} = \frac{3(a-1) \cdot a(x+1)}{a(x-1) \cdot (-5)(a-1)} \cdot \frac{(-1)(x-1)}{1}$$

$$= \frac{3(x+1)}{-5} - 3(x+1) = \underline{\underline{3x+9}}$$

$$5) \begin{array}{l} \text{Faktor 1} + \text{Faktor 2} = 75 \\ \downarrow \\ x \qquad \qquad 75-x \end{array}$$

$$(x+11)(75-x-4) = x(75-x)+46$$

$$71x - x^2 + 781 - 11x = 75x - x^2 + 46 \quad | -60x - 46$$

$$735 = 15x$$

$$49 = x$$

$$1. \text{ Faktor } \underline{\underline{49}}; \quad 2. \text{ Faktor } 75-49 = \underline{\underline{26}}$$