

## DIE AUFGABEN

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$$1 \quad \frac{2}{x+y} + \frac{2}{x-y} =$$

$$2 \quad \frac{a}{ab-b^2} - \frac{c}{ac-bc} =$$

$$3 \quad \frac{2}{a} + \frac{4a-b}{a^2+ab} =$$

$$4 \quad \frac{2v+3w}{2v+w} - \frac{2v-w}{2v} - \frac{2v+3w}{w} =$$

$$5 \quad \frac{1}{a-2} - \frac{1}{a-3} =$$

$$6 \quad \frac{x-y}{x+3y} - \frac{x+y}{3y} =$$

$$7 \quad \frac{1}{a+b} + \frac{1}{a} =$$

$$8 \quad \frac{3}{m+3} - \frac{2}{m+1} - \frac{1}{m+1} =$$

$$9 \quad \frac{9x-13}{6x-15y} + \frac{2x+3}{8x-20y} - \frac{7(x-1)}{4x-10y} =$$

$$10 \quad \frac{7}{3a+6b} - \frac{1}{2a+4b} - \frac{5}{4a+8b} =$$

$$11 \quad \frac{x-y}{x} - \frac{x^2+y^2}{x^2-xy} =$$

$$12 \quad \frac{4}{x-1} + \frac{3}{1-x} =$$

$$13 \quad \frac{a-7}{2a-1} - \frac{3a+2}{3a+1} =$$

$$14 \quad \frac{15}{3x-9} - \frac{4}{4-12x} =$$

## DIE LÖSUNGEN

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$$1 \quad \frac{2}{x+y} + \frac{2}{x-y} = \frac{2(x-y)}{(x+y)(x-y)} + \frac{2(x+y)}{(x+y)(x-y)} = \frac{2x-2y+2x+2y}{(x+y)(x-y)} = \frac{4x}{(x+y)(x-y)}$$

$$2 \quad \frac{a}{ab-b^2} - \frac{c}{ac-bc} = \frac{a}{b(a-b)} - \frac{c}{c(a-b)} = \frac{a}{b(a-b)} - \frac{1}{(a-b)} = \frac{a}{b(a-b)} - \frac{b}{b(a-b)} = \frac{a-b}{b(a-b)} = \frac{1}{b}$$

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

$$4 \quad \begin{aligned} \frac{2v+3w}{2v+w} - \frac{2v-w}{2v} - \frac{2v+3w}{w} &= \frac{2vw(2v+3w)}{2vw(2v+w)} - \frac{w(2v+w)(2v-w)}{2vw(2v+w)} - \frac{2v(2v+w)(2v+3w)}{2vw(2v+w)} \\ &= \frac{4v^2w+6vw^2 - w(4v^2-w^2) - 2v(4v^2+8vw+3w^2)}{2vw(2v+w)} \\ &= \frac{4v^2w+6vw^2 - 4v^2w+w^3 - 8v^3 - 16v^2w - 6vw^2}{2vw(2v+w)} \\ &= \frac{w^3 - 8v^3 - 16v^2w}{2vw(2v+w)} \\ &= \\ &= \end{aligned}$$

$$5 \quad \frac{1}{a-2} - \frac{1}{a-3} = \frac{a-3}{(a-2)(a-3)} - \frac{a-2}{(a-2)(a-3)} = \frac{a-3-(a-2)}{(a-2)(a-3)} = \frac{a-3-a+2}{(a-2)(a-3)} = -\frac{1}{(a-2)(a-3)}$$

$$6 \quad \begin{aligned} \frac{x-y}{x+3y} - \frac{x+y}{3y} &= \frac{3y(x-y)}{3y(x+3y)} - \frac{(x+y)(x+3y)}{3y(x+3y)} = \frac{3xy-3y^2-(x^2+4xy+3y^2)}{3y(x+3y)} \\ &= \frac{-x^2-xy-6y^2}{3y(x+3y)} = -\frac{x^2+xy+6y^2}{3y(x+3y)} \end{aligned}$$

$$7 \quad \frac{1}{a+b} + \frac{1}{a} = \frac{a}{a(a+b)} + \frac{a+b}{a(a+b)} = \frac{2a+b}{a(a+b)}$$

$$8 \quad \frac{3}{m+3} - \frac{2}{m+1} - \frac{1}{m+1} = \frac{3}{m+3} + \frac{1}{m+1} = \frac{3(m+1)}{(m+3)(m+1)} + \frac{(m+3)}{(m+3)(m+1)}$$

$$= \frac{3m+3+m+3}{(m+3)(m+1)} = \frac{4m+6}{(m+3)(m+1)}$$

$$9 \quad \frac{9x-13}{6x-15y} + \frac{2x+3}{8x-20y} - \frac{7(x-1)}{4x-10y} = \frac{9x-13}{3(2x-5y)} + \frac{2x+3}{4(2x-5y)} - \frac{7(x-1)}{2(2x-5y)}$$

$$= \frac{4(9x-13) + 3(2x+3) - 42(x-1)}{12(2x-5y)}$$

$$= \frac{36x-52+6x+9-42x+42}{12(2x-5y)} = -\frac{1}{12(2x-5y)}$$

$$10 \quad \frac{7}{3a+6b} - \frac{1}{2a+4b} - \frac{5}{4a+8b} = \frac{7}{3(a+2b)} - \frac{1}{2(a+2b)} - \frac{5}{4(a+2b)} = \frac{7 \cdot 4 - 6 - 5 \cdot 3}{12(a+2b)} = \frac{7}{12(a+2b)}$$

$$11 \quad \frac{x-y}{x} - \frac{x^2+y^2}{x^2-xy} = \frac{x-y}{x} - \frac{x^2+y^2}{x(x-y)} = \frac{(x-y)^2}{x(x-y)} - \frac{x^2+y^2}{x(x-y)} = \frac{x^2-2xy+y^2-x^2-y^2}{x(x-y)} = -\frac{2xy}{x(x-y)}$$

$$12 \quad \frac{4}{x-1} + \frac{3}{1-x} = \frac{4}{x-1} + \frac{-3}{-1+x} = \frac{1}{x-1} \quad \text{den 2. Bruch mit } (-1) \text{ erweitern!}$$

$$13 \quad \frac{a-7}{2a-1} - \frac{3a+2}{3a+1} = \frac{(a-7)(3a+1)}{(2a-1)(3a+1)} - \frac{(2a-1)(3a+2)}{(2a-1)(3a+1)}$$

$$= \frac{(3a^2-20a-7) - (6a^2+a-2)}{(2a-1)(3a+1)} = \frac{3a^2-20a-7-6a^2-a+2}{(2a-1)(3a+1)} = -\frac{3a^2+21a+5}{(2a-1)(3a+1)}$$

$$14 \quad \frac{15}{3x-9} - \frac{4}{4-12x} = \frac{15}{3(x-3)} - \frac{4}{4(1-3x)} = \frac{5}{x-3} - \frac{1}{1-3x}$$

$$= \frac{5(1-3x)}{(x-3)(1-3x)} - \frac{(x-3)}{(x-3)(1-3x)} = \frac{5-15x-x+3}{(x-3)(1-3x)} = \frac{8-16x}{(x-3)(1-3x)}$$