

DIE AUFGABEN

Sie sollten unbedingt zuerst die Nenner in Faktoren zerlegen!

$$1 \quad \frac{4m}{m^2 + m - 6} - \frac{m - 4}{m^2 - 3m + 2} =$$

$$2 \quad \frac{m^2 - 8m}{2m^2 + m - 15} - \frac{m}{5 - 2m} =$$

$$3 \quad \frac{4}{x - 3} + \frac{7}{x^2 + 3x - 18} =$$

$$4 \quad \frac{5}{n^2 + n - 6} - \frac{3}{n^2 - n - 2} =$$

$$5 \quad \frac{2x - 1}{x - 3} - \frac{2x^2 + 4}{x^2 - 9} - \frac{2}{3x} =$$

$$6 \quad \frac{a}{a - b} - \frac{b}{a + b} - \frac{2ab}{a^2 - b^2} =$$

$$7 \quad \frac{a - 2}{(a - 4)^2} - \frac{a - 2}{a^2 - 7a + 12} =$$

$$8 \quad \frac{a - 3}{4a^2 - 28a + 49} - \frac{a + 2}{4a^2 - 49} =$$

$$9 \quad \frac{(a + b)^2}{ap + aq - bp - bq} - \frac{a - b}{p + q} =$$

$$10 \quad \frac{4}{c - 5} - \frac{3}{c + 3} - \frac{c + 26}{c^2 - 2c - 15} =$$

$$11 \quad \frac{1}{a - 2} + \frac{1}{a + 5} - \frac{2a + 3}{a^2 + 3a - 10} =$$

$$12 \quad \frac{4a}{(2a - c)^2} - \frac{2c}{4a^2 - c^2} - \frac{2}{2a + c} =$$

DIE LÖSUNGEN

$$\begin{aligned} 1 \quad \frac{4m}{m^2+m-6} - \frac{m-4}{m^2-3m+2} &= \frac{4m}{(m+3)(m-2)} - \frac{m-4}{(m-2)(m-1)} \\ &= \frac{4m(m-1) - (m-4)(m+3)}{(m+3)(m-2)(m-1)} = \frac{4m^2 - 4m - (m^2 - m - 12)}{(m+3)(m-2)(m-1)} \\ &= \frac{3m^2 - 3m + 12}{(m+3)(m-2)(m-1)} = \frac{3(m^2 - m + 4)}{(m+3)(m-2)(m-1)} \\ &= \frac{3(m^2 - m + 4)}{(m+3)(m-2)(m-1)} \end{aligned}$$

$$\begin{aligned} 2 \quad \frac{m^2-8m}{2m^2+m-15} - \frac{m}{5-2m} &= \frac{m^2-8m}{2m^2+m-15} - \frac{-m}{2m-5} = \frac{m^2-8m}{(2m-5)(m+3)} - \frac{-m}{2m-5} \\ &= \frac{m^2-8m+m(m+3)}{(2m-5)(m+3)} = \frac{2m^2-5m}{(2m-5)(m+3)} = \frac{m(2m-5)}{(2m-5)(m+3)} = \frac{m}{m+3} \end{aligned}$$

$$3 \quad \frac{4}{x-3} + \frac{7}{x^2+3x-18} = \frac{4}{x-3} + \frac{7}{(x-3)(x+6)} = \frac{4(x+6)+7}{(x-3)(x+6)} = \frac{4x+31}{(x-3)(x+6)}$$

$$\begin{aligned} 4 \quad \frac{5}{n^2+n-6} - \frac{3}{n^2-n-2} &= \frac{5}{(n+3)(n-2)} - \frac{3}{(n-2)(n+1)} = \frac{5(n+1) - 3(n+3)}{(n+3)(n-2)(n+1)} \\ &= \frac{2n-4}{(n+3)(n-2)(n+1)} = \frac{2(n-2)}{(n+3)(n-2)(n+1)} = \frac{2}{(n+3)(n+1)} \end{aligned}$$

$$\begin{aligned} 5 \quad \frac{2x-1}{x-3} - \frac{2x^2+4x}{x^2-9} - \frac{2}{3x} &= \frac{2x-1}{x-3} - \frac{2x^2+4x}{(x+3)(x-3)} - \frac{2}{3x} \\ &= \frac{3x(x+3)(2x-1) - 3x(2x^2+4x) - 2(x^2-9)}{3x(x+3)(x-3)} \\ &= \frac{3x(2x^2+5x-3) - 6x^3 - 12x^2 - 2x^2 + 18}{3x(x+3)(x-3)} \\ &= \frac{6x^3 + 15x^2 - 9x - 6x^3 - 12x^2 - 2x^2 + 18}{3x(x+3)(x-3)} = \frac{x^2 - 9x + 18}{3x(x+3)(x-3)} \\ &= \frac{(x-6)(x-3)}{3x(x+3)(x-3)} = \frac{x-6}{3x(x+3)} \end{aligned}$$

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

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

$$7 \quad \frac{a-2}{(a-4)^2} - \frac{a-2}{a^2-7a+12} = \frac{a-2}{(a-4)^2} - \frac{a-2}{(a-4)(a-3)} = \frac{(a-2)(a-3) - (a-2)(a-4)}{(a-4)^2(a-3)}$$

$$= \frac{(a^2 - 5a + 6) - (a^2 - 6a + 8)}{(a-4)^2(a-3)} = \frac{a-2}{(a-4)^2(a-3)}$$

$$8 \quad \frac{a-3}{4a^2-28a+49} - \frac{a+2}{4a^2-49} = \frac{a-3}{(2a-7)^2} - \frac{a+2}{(2a-7)(2a+7)} = \frac{(a-3)(2a+7) - (a+2)(2a-7)}{(2a-7)^2(2a+7)}$$

$$= \frac{(2a^2 + a - 21) - (2a^2 - 3a - 14)}{(2a-7)^2(2a+7)} = \frac{4a-7}{(2a-7)^2(2a+7)}$$

$$9 \quad \frac{(a+b)^2}{ap+aq-bp-bq} - \frac{a-b}{p+q} = \frac{(a+b)^2}{(a-b)(p+q)} - \frac{a-b}{p+q} = \frac{(a+b)^2 - (a-b)^2}{(a-b)(p+q)}$$

$$= \frac{(a^2 + 2ab + b^2) - (a^2 - 2ab + b^2)}{(a-b)(p+q)} = \frac{4ab}{(a-b)(p+q)}$$

$$10 \quad \frac{4}{c-5} - \frac{3}{c+3} - \frac{c+26}{c^2-2c-15} = \frac{4}{c-5} - \frac{3}{c+3} - \frac{c+26}{(c-5)(c+3)} = \frac{4(c+3) - 3(c-5) - (c+26)}{(c-5)(c+3)}$$

$$= \frac{1}{(c-5)(c+3)}$$

$$11 \quad \frac{1}{a-2} + \frac{1}{a+5} - \frac{2a+3}{a^2+3a-10} = \frac{1}{a-2} + \frac{1}{a+5} - \frac{2a+3}{(a-2)(a+5)} = \frac{a+5+a-2-(2a+3)}{(a-2)(a+5)} = 0$$

$$12 \quad \frac{4a}{(2a-c)^2} - \frac{2c}{4a^2-c^2} - \frac{2}{2a+c} = \frac{4a}{(2a-c)^2} - \frac{2c}{(2a-c)(2a+c)} - \frac{2}{2a+c}$$

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

$$= \frac{8a^2 + 4ac - 4ac + 2c^2 - 8a^2 + 8ac - 2c^2}{(2a-c)^2(2a+c)} = \frac{8ac}{(2a-c)^2(2a+c)}$$